

ECONOMIC ANALYSIS OF DENTAL HEALTH FOR OLDER AUSTRALIANS

FINAL REPORT

This report was prepared for
COTA Over 50s and
the Australian Dental Industry Association
by Econtech Pty Ltd.

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Abbreviations

ADIA	Australian Dental Industry Association
AIHW	Australian Institute of Health and Welfare
CHD	Coronary Heart Disease
DVA	Department of Veterans Affairs
PAR	Population Attributable Risk
PVD	Peripheral Vascular Disease
RR	Relative Risk

Key Findings

- Poor dental health has become a growing concern, particularly among older Australians. This is partly due to the absence of a national dental health program which can be accessed by older Australians. In light of this, COTA Over 50s and the Australian Dental Industry Association (ADIA) commissioned Econtech to analyse two policies that could be introduced to improve the dental health of older Australians. To do so, Econtech began by estimating the prevalence and cost of dental ill health among older Australians.
- People with poor oral health suffer from active dental infections, predominantly periodontal disease and dental caries. The incidence of periodontal disease is nearly twice as prevalent in older Australians at about 54 per cent, compared to young Australians, at about 25 per cent¹.
- Poor dental health can indirectly lead to chronic conditions that prevent people from normal activities such as chewing and speaking. Periodontal disease can lead to a range of medical conditions including coronary heart disease, stroke, peripheral vascular disease and pancreatic cancer. The indirect cost of poor dental health associated with these four medical conditions is estimated at \$412 million per annum (2005/06 prices).
- Expenditure on dental services almost doubled between 1997-98 and 2004-05 from \$2.6 billion to \$5 billion². The majority of dental health care is paid by individuals (67 per cent) and the remainder is paid by the government, private health insurance funds and other sources. Of this \$5 billion, approximately \$627³ million (12 per cent) is attributed to older Australians (aged 65 and over). Approximately \$339 million of dental services expenditure directly relates to dental illness among older Australians.
- Two policy options to improve dental health among older Australians are analysed in this report. Under a Broad Policy Option, dental benefits that are received by Department of Veterans Affairs (DVA) Gold Card holders are extended to Age Pension Card holders. Under a Narrow Policy Option, those who reside in aged care facilities and hold a Centrelink Pension card would have access to the same dental benefits that are received by DVA Gold Card holders.
- The annual net benefit to the nation of the Broad Policy Option is estimated at \$42 million. This is the difference between the cost (\$672 million) and the benefit delivered by better dental health (\$714 million). The annual net benefit to the nation of the Narrow Policy Option is estimated at \$2.3 million. This is the difference between the cost (\$38 million) and the benefit (\$40 million). These annual net benefits to the nation are clearly positive, which supports the proposal to introduce policies to improve dental health among older Australians.

¹ Econtech calculations based on the National Survey of Adult Oral Health 2004-06 (presented in AIHW, *Australia's Dental Generations, The National Survey of Adult Oral Health 2004-06*, 2007, page 248) and ABS, *Population*, 3201 table 9.

² AIHW, *Health Expenditure 2003-04*, table 1997-98 Aus; AIHW, *Health Expenditure 2004-05*, table A3.

³ 2005-06 prices.

Executive Summary

Poor dental health has become a growing concern, particularly among older Australians. This is partly due to the absence of a national dental health program which can be accessed by older Australians. In light of this, COTA Over 50s and the Australian Dental Industry Association (ADIA) commissioned Econtech to analyse dental health among older Australians. There are two components to this study. First, Econtech estimates the prevalence and cost of dental ill health among older Australians. Second, Econtech analyses two policies that could be introduced to improve the dental health of older Australians.

While the public sector funds some dental services, the majority of these services are privately funded. The public sector funding of dental services is primarily in the form of concessions to concession card holders and the private health insurance rebate on ancillary health insurance policies which usually include dental services.

The National Advisory Committee on Oral Health released a National Oral Action Plan⁴ in 2004. The Plan is designed “to improve health and wellbeing across the Australian population by improving oral health status and reducing the burden of disease”.⁵ It includes seven action areas, including one area that specifically relates to older people (Australians aged 65 and over). The two policies analysed in this report would help to address the aims of the National Oral Action Plan.

Oral health is defined in the National Oral Action Plan as having healthy teeth and gums. In contrast, people with poor oral health suffer from active dental infections, predominantly periodontal disease⁶ and dental caries (tooth decay). These conditions can lead to chronic conditions that prevent people from normal activities such as chewing and speaking. In this report, periodontal disease is used as the benchmark for poor dental health. According to the Dental Wellness Institute, other dental conditions such as tooth decay have less effect on general health than the effects of periodontal disease⁷.

Prevalence and Cost of Dental Ill Health

The incidence of periodontal disease is nearly twice as prevalent in older Australians at about 54 per cent, compared to young Australians, at about 25 per cent. The prevalence of more than one decayed tooth is similar among older and younger Australians. These estimates were constructed using information from the National Oral Health Survey of Australia (NOHSA) along with ABS population estimates.

There is a range of reasons that younger Australians generally have better dental health than older Australians. Some of these reasons are outlined below.

- Fluoride in toothpastes which helps to protect teeth from decay was only introduced into toothpastes in the 1960s.⁸

⁴ The National Advisory on Oral Health, *Healthy Mouths Healthy Lives, National Oral Action Plan 2004-2013*, July 2004.

⁵ The National Advisory on Oral Health, *Healthy Mouths Health Lives, National Oral Action Plan 2004-2013*, July 2004, page v.

⁶ Periodontal disease refers to a disease of the gums and other tissues that attach to or anchor teeth to the jaws.

⁷ <http://www.dentalwellness4u.com/oralhealth/disease.html>

⁸ <http://www.australianprescriber.com/magazine/17/2/49/51/>

- Fluoride in most of the water that is supplied to Australian household was introduced from 1957.⁹
- Improvements in education on oral health and awareness about dental hygiene.
- Improvements in dental techniques.

Those born since the introduction of these changes have enjoyed the full benefit, whereas those born before their introduction have only partially benefitted from the changes.

Expenditure on dental services almost doubled between 1997-98 and 2004-05 from \$2.6 billion to \$5 billion¹⁰. The majority of dental health care is paid by individuals (67 per cent) and the remainder is paid by the government, private health insurance funds and other sources. In 2005-06, expenditure on dental services was about \$5.3 billion.¹¹ Approximately 12 per cent (\$627 million) of this expenditure is related to older Australians. Of this \$627 million, approximately \$339 million (2005-06 prices) is directly related to dental illness among older Australians. This is calculated by apportioning the dental services expenditure (\$627 million) to the estimated 1.5 million¹² older Australians with poor dental health.

Poor dental care can lead to a range of medical conditions. The dental-related health conditions that are considered in this report are coronary heart disease, stroke, peripheral vascular disease and pancreatic cancer. These four health conditions have been linked to periodontal disease, which is used as the benchmark for poor dental health in this report.

The share of the cost of treating these conditions that can be attributed to periodontal disease is defined as the indirect cost of dental illness. To estimate this cost, Econtech used the concept of 'Population Attributable Risk' (PAR). The PAR is the maximum proportion of medical conditions attributable to a specific exposure (i.e. to periodontal disease). The PAR is based on the incidence of medical conditions in the exposed group (i.e. group with periodontal disease) as compared with the non-exposed group (i.e. group without periodontal disease). The indirect cost of the four periodontal disease-related conditions is \$412 million per annum (2005/06 prices). The indirect costs of other dental illnesses such as dental caries have not been included in this study. Therefore, this indirect cost estimate is conservative.

The indirect cost of poor dental health is combined with the direct cost to calculate the total cost of dental ill health among older Australians. Table A shows the total cost of dental illness is estimated at \$752 million per annum.

Table A
Annual Cost of Dental Ill Health Among Older Australians (\$m, 2005-06 prices)

Direct cost	339
Indirect cost	412
Total cost	752

Source: Econtech estimates

⁹ <http://www.forums.naturalparenting.com.au/archive/index.php/t-9014.html>

¹⁰ AIHW, *Health Expenditure 2003-04*, table 1997-98 Aus; AIHW, *Health Expenditure 2004-05*, table A3.

¹¹ AIHW, *Health Expenditure 2004-05*, table A3. Adjusted by Econtech to 2005/06 prices, using ABS Health CPI data.

¹² Based on ABS population estimates, there were about 2.7 million people aged 65 and over in 2005-06. Econtech estimates that 54 per cent of older Australians suffered poor dental health, based on the prevalence of periodontal disease. 54 per cent of 2.7 million equals 1.5 million people with poor dental health.

Policy Options to Improve Dental Health among Older Australians

The analysis has shown that dental health care among older Australians is currently poor and therefore needs to be improved. Thus, two policy options to improve dental health care among older Australians are analysed. These policies would help to address the aims of the Action Area in the National Oral Action Plan that targets older people. The two policies are:

- a Broad Policy Option – dental benefits that are provided to Department of Veteran Affairs (DVA) Gold Card holders are extended to Age Pension Card holders; and
- a Narrow Policy Option – dental benefits provided to DVA Gold Card holders are extended to Centrelink Pension Card holders that reside in aged care facilities.

Dental health programs can potentially achieve large reductions in poor dental health among older Australians. However, the benefits from such programs depend not on the incidence of short-term improvements in dental health, but rather on the permanent improvements in dental health. A permanent improvement relies on permanent changes in behaviour in areas such as access to dental professionals, personal dental hygiene and diet. The proposed policies aim to achieve a permanent change in behaviour by improving access to dental health professionals by subsidising the cost of dental health outlays among older Australians.

By improving dental health among older Australians, general health levels will also improve. Thus, the government would benefit in terms of saving some of the costs that are incurred through dental-related medical conditions. The costs and benefits of the policies are analysed in terms of government and social (or national) costs and benefits.

Table B
Annual Impact of Dental Policy Options (\$m, 2005-06 prices)

	Broad Policy Option	Narrow Policy Option
Government Impact		
Cost	672	38
Benefit	294	17
Net Cost	379	21
Social Impact		
Cost	672	38
Benefit	714	40
Net Benefit	42	2

Source: Econtech estimates

Table B shows that the government cost of the policies outweighs the benefit. This is expected because the government would pay the full cost of the improved dental access, yet the government does not receive all of the saving in health costs, as some of that benefit is received by individuals. Of course savings received by the private sector should be taken into account in assessing the proposal from a public policy standpoint. Therefore, it is more appropriate to use social costs and benefits to assess the policy proposals. Table B shows the annual net benefit to the nation, estimated at \$42 million or \$2 million, is clearly positive, which supports the introduction of either policy option.

1. Introduction

Poor dental health has become a concern, particularly among older Australians. This is partly due to the absence of a national dental health program which can be accessed by older Australians. In light of this, COTA Over 50s and the Australian Dental Industry Association (ADIA) commissioned Econtech to analyse dental health among older Australians. There are two components to this study. First, Econtech estimates the prevalence and cost of dental ill health among older Australians. Second, Econtech analyses two policies that could be introduced to improve the dental health of older Australians.

Past studies have identified the prevalence of various dental conditions. The findings of these studies have been used in this report to present a snapshot of the prevalence of dental health among older Australians. This report uses information about the prevalence of dental health to estimate the cost of dental illness and analyse the impact of introducing policies that would improve access to dental care for some older Australians.

This report is structured as follows.

- Section 2 presents background information about existing dental programs and the National Oral Action Plan.
- Section 3 outlines the prevalence of dental illness among older Australians.
- Section 4 presents the direct cost of dental illness among older Australians.
- Section 5 presents the indirect costs associated with dental ill health.
- Section 6 presents the combined direct and indirect costs of dental ill health.
- Section 7 outlines two policy options to improve access to dental services for older Australians.
- Section 8 presents the conclusions of the study.

While all care, skill and consideration has been used in the preparation of this report, the findings refer to the terms of reference of COTA Over 50s and ADIA and are designed to be used only for the specific purpose set out below. If you believe that your terms of reference are different from those set out below, or you wish to use this work or information contained within it for another purpose, please contact us.

The specific purpose of this report is to estimate the prevalence and costs of dental ill health among older Australians and to undertake an analysis of two policies that could be introduced to improve the dental health of older Australians.

The findings in this report are subject to unavoidable statistical variation. While all care has been taken to ensure that the statistical variation is kept to a minimum, care should be used whenever using this information. This report only takes into account information available to Econtech up to the date of this report and so its findings may be affected by new information. Should you require clarification of any material, please contact us.

2. Background

There is evidence to suggest that there is room for improvement in current dental health services, particularly in regard to services for older Australians. This section presents an overview of the services currently available, and their policy environment.

While the public sector funds some dental services, the majority of these services are privately funded. The public sector funding of dental services is primarily in the form of concessions to concession card holders (mostly provided through state and territory governments) and the private health insurance rebate (provided by the Federal Government) on ancillary health insurance policies which usually include dental services. Details of some programs which are government funded are listed below.

- Enhanced Primary Care (EPC) program – some patients with chronic conditions that are referred by GPs for dental care are eligible for a rebate on dental health costs.¹³
- Private Health Insurance Rebate (Ancillary insurance) – patients with private ancillary insurance, which usually includes dental services, are eligible for the rebate provided by the government. A rebate rate of 30 per cent applies to patients under age 65, 35 per cent for those aged 65 to 69, and 40 per cent for those aged 70 and over.¹⁴
- Centrelink Health Care Cards – some low income earners are eligible for a Health Care Card which may entitle them to reductions in dental care costs, depending on the concessions available in the card holders’ state or territory of residence.
- Centrelink Pension Concession Cards – like Health Care Card holders, Pension Card holders may be eligible for concessions on dental health, depending on the holders’ state or territory of residence. According to the National Oral Action Plan, most older Australians “hold a concession card and are eligible for public dental care, but ... long waiting lists mean that appropriate care is not available”¹⁵.
- Department of Veterans Affairs (DVA) Gold Card – war veterans aged 70 and over with ‘qualifying service’, can use the Gold Card to pay the full cost of some dental health care.
- DVA White Cards – war veterans with specific conditions, such as war injuries, can use the White Card to pay the full cost of some dental health treatment, although the treatments covered under the White Card are more restrictive than under the Gold Card.

In addition, in the recent 2007-08 Federal Budget, the Government announced that it would increase its contribution to Medicare items for dental treatment for patients whose oral health affects their chronic or complex medical condition. This includes residents of aged care facilities who are being managed by a GP under a multidisciplinary care plan. From 1 November 2007, these patients will receive up to \$4,250 over two consecutive years.¹⁶

¹³ Department of Health and Ageing, *Dental treatment – enhanced Medicare item for patients with chronic and complex conditions* <http://www.health.gov.au/internet/budget/publishing.nsf/Content/budget2007-hfact04.htm>

¹⁴ <http://www.ahia.org.au/rebatecalculator.php>

¹⁵ The National Advisory Committee on Oral Health *Healthy Mouths Healthy Lives, National Oral Action Plan 2004-2013*, July 2004, page 24.

¹⁶ Federal Budget 2007-08, Budget Paper no. 2, Part 2: Expenses Measures, Health and Ageing. <http://www.budget.gov.au/2007-08/bp2/html/expense-20.htm>

Dental items covered under this initiative include diagnostic services and dentures. This equates to funding of \$377.6 million over four years¹⁷.

The Federal Government does not provide a universal dental health program. This is particularly concerning for older Australians. The National Advisory Committee on Oral Health (established by the Australian Health Minister's Conference) released a National Oral Action Plan in 2004. It is designed "to improve health and wellbeing across the Australian population by improving oral health status and reducing the burden of disease".¹⁸ It includes seven action areas, including one area that specifically relates to older people (defined as Australians aged 65 and over). Under this action area, it aims to provide "good oral health for older people, to help them maintain high levels of general health, quality of life, nutrition, and social interaction".¹⁹

The action area which targets older people has a series of short, medium and long term actions. Examples of some of these actions are listed below.

- "For older people in the community who are identified as being at risk of oral disease, include support for the maintenance of oral hygiene in care programs aimed at assisting them to remain in their own homes."²⁰ (short term)
- "Require residential aged care facilities of an agreed size to set aside a small dedicated area for the provision of a range of simple primary health services including oral health services."²¹ (medium term)

By fulfilling the plans outlined in this targeted action area, it is expected that there will be an improvement in the oral health of older people who are living independently and in residential aged care facilities. It will improve "health-related quality of life"²². Section 7 of this report analyses two policy options that would help to address the aims of the National Oral Action Plan.

To understand the extent of poor dental health in Australia, particularly among older Australians, the next section of this report presents estimates of the prevalence of dental illness.

¹⁷ Parliamentary Library, *Health Insurance Amendment (Medicare Dental Services Bill 2007)*, Bills Digest no. 35 2007–08, August 2007, <http://wopared.parl.net/library/Pubs/bd/2007-08/08bd035.htm>

¹⁸ The National Advisory Committee on Oral Health *Healthy Mouths Health Lives, National Oral Action Plan 2004-2013*, July 2004, page v.

¹⁹ The National Advisory on Oral Health *Healthy Mouths Health Lives, National Oral Action Plan 2004-2013*, July 2004, page 23.

²⁰ *ibid.*

²¹ *ibid.*

²² The National Advisory on Oral Health *Healthy Mouths Health Lives, National Oral Action Plan 2004-2013*, July 2004, page 26.

3. Prevalence of Dental Illness in Older Australians

This section examines the prevalence of dental illness and illnesses that are caused by poor dental health among older Australians. In this report, the term ‘older Australians’ refers to Australians aged 65 and over. The current profile of dental illness is compared to the past profile. The prevalence of dental illness among older Australians that is presented in this section is later used as an input to model the cost of dental illness to the Australian economy.

Data relating to the prevalence of dental health in Australia has been collected in surveys. The National Oral Health Survey of Australia (NOHSA) was conducted in 1987-88 and again between 2004 and 2006. In this survey, participants were examined by dental professionals.²³ For that reason, the data collected in the NOHSA is used in this report to estimate the prevalence of dental illness among older Australians.

3.1 Dental Illness

Oral health is defined in the National Oral Action Plan²⁴ as having healthy teeth and gums. Good oral health means that people are not affected by oral diseases that cause pain, infection and tooth loss. In contrast, people with poor oral health suffer from active dental infections, predominantly periodontal disease and dental caries. These conditions can lead to chronic conditions that prevent people from normal activities such as chewing and speaking. The prevalence of periodontal disease and dental caries has been captured in the NOHSA.

Using information from the NOHSA along with ABS population estimates, the percentage of older Australians with periodontal disease and decayed teeth has been estimated. Chart 3.1 shows that the prevalence of more than one decayed tooth is similar among older and younger Australians. However, the incidence of periodontal disease is nearly twice as prevalent in older Australians at about 54 per cent, compared to young Australians, at about 25 per cent (see Chart 3.1).

Periodontal disease refers to a disease of the gums and other tissues that attach to or anchor teeth to the jaws²⁵. It is caused by bacteria, which leads to a build up of plaque. Dental decay occurs when “the hard mineral structure of teeth is dissolved by acids produced by bacteria”²⁶.

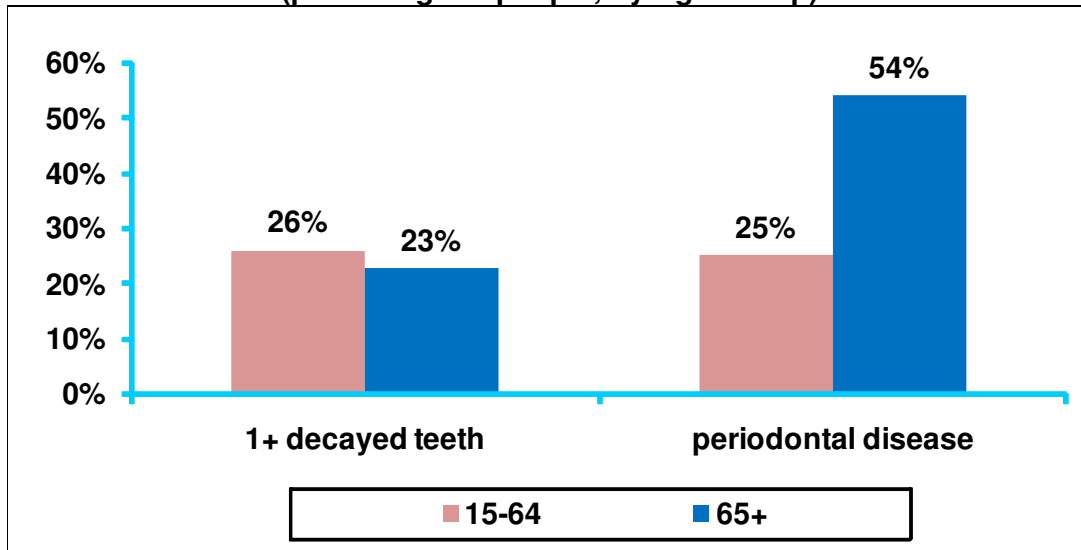
²³ AIHW, *Australia’s Dental Generations, The National Survey of Adult Oral Health 2004-06*, 2007, page 19.

²⁴ The National Advisory on Oral Health, *Healthy Mouths Healthy Lives, National Oral Action Plan 2004-2013*, July 2004.

²⁵ AIHW, *Australia’s Dental Generations, The National Survey of Adult Oral Health 2004-06*, 2007, page 259

²⁶ AIHW, *Australia’s Dental Generations, The National Survey of Adult Oral Health 2004-06*, 2007, page 99

Chart 3.1
Prevalence of Common Dental Conditions, 2004-06
(percentage of people, by Age Group)



Source: Econtech calculations based on the National Survey of Adult Oral Health 2004-06 (presented in AIHW, *Australia's Dental Generations, The National Survey of Adult Oral Health 2004-06*, 2007, page 248) and ABS, *Population*, 3201 table 9.

In this report, periodontal disease is used as the benchmark for poor dental health. According to the Dental Wellness Institute, other dental conditions such as tooth decay have less effect on general health than the effects of periodontal disease²⁷.

As shown in the chart above, research shows that dental health is generally poorer among older Australians than younger Australians. There is a range of reasons that younger people generally have better dental health. Some of these reasons are outlined below.

- Since the 1960s, fluoride has been in toothpastes to help protect teeth from decay²⁸. Australians born before this time have not had the full benefit of fluoride in toothpastes over the whole lifetime. Australians born after the 1960s have fully benefited from fluoride in toothpastes.
- Since the late 1950s, fluoride has been in most of the water that is supplied to Australian households²⁹. Again, those born before this time have not had the same benefit of water fluoridisation throughout their lifetime as young people. In 2001, 69.1 per cent of the Australian population were served by fluoridated water supplies³⁰.
- Education on oral health and awareness about dental hygiene has improved over time.
- Dental techniques have improved over time. For example, in the first half of the twentieth century, the predominant method of treating tooth decay was extraction, whereas now most decayed teeth are filled.³¹

²⁷ <http://www.dentalwellness4u.com/oralhealth/disease.html>

²⁸ <http://www.australianprescriber.com/magazine/17/2/49/51/>

²⁹ <http://www.forums.naturalparenting.com.au/archive/index.php/t-9014.html>

³⁰ AIHW, *Australia's Dental Generations, The National Survey of Adult Oral Health 2004-06*, 2007, page 58.

³¹ AIHW, *Australia's Dental Generations, The National Survey of Adult Oral Health 2004-06*, 2007, page xv.

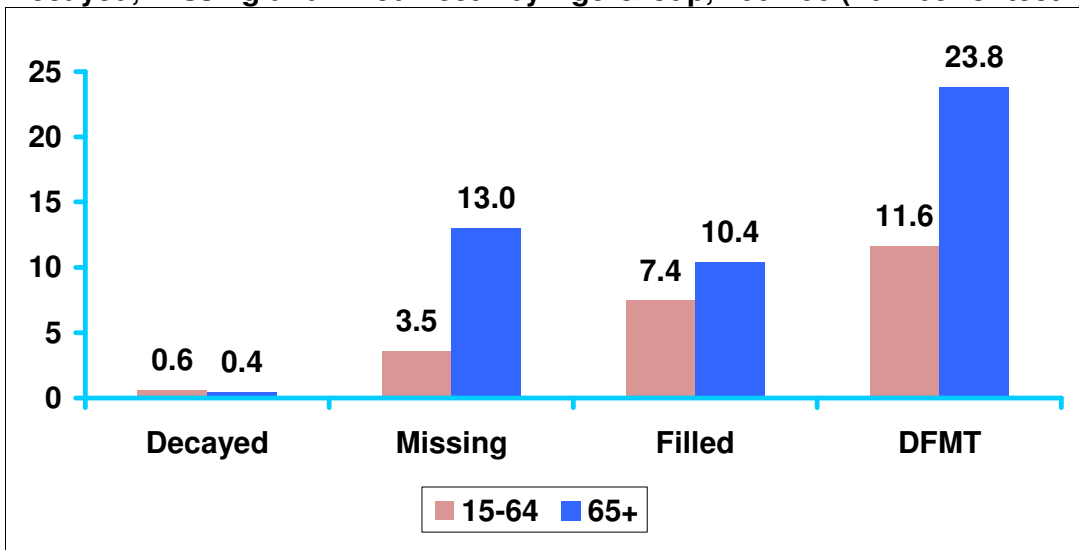
Those born since the introduction of these changes have enjoyed the full benefit, whereas those born before their introduction have only partially benefitted from the changes.

The Decay, Missing and Filled Teeth (DMFT) index can also be used as a measure of dental decay experienced by different groups of people over different time periods. The DMFT index is commonly used in dental research.

If dental infections are left untreated, there is a progression from decayed to missing teeth. Generally, if decayed teeth are left untreated, there is a risk that those teeth will need to be filled or removed. If treated at an early stage, decayed teeth may only require fillings. But if a decayed tooth is not treated at an early stage, the tooth may need to be removed.

The chart below shows the prevalence of decayed, missing and filled teeth among younger and older Australians in 2004-06. The Chart shows that the incidence of decayed teeth was similar among older and younger Australians, but the incidence of missing and filled teeth were significantly higher among older Australians than younger Australians. Overall, the DMFT index (last bars of the chart) was much higher among older Australians than young Australians, indicating a greater experience of dental decay among older Australians.

Chart 3.2
Decayed, Missing and Filled Teeth by Age Group, 2004-06 (number of teeth)



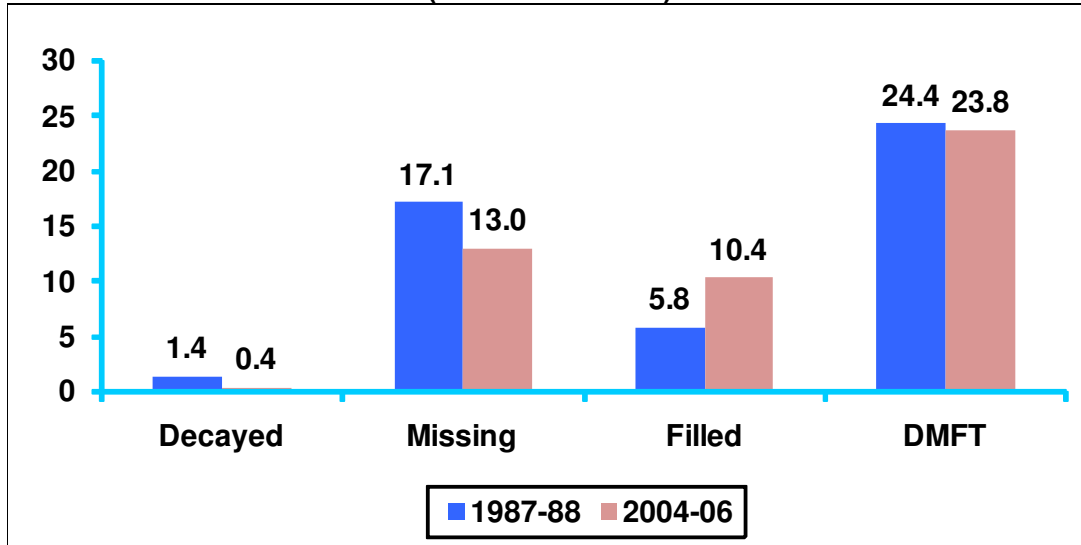
Sources: National Oral Health Survey of Australia 1987-88
National Survey of Adult Oral Health 2004-06

Note: There are generally 32 adult permanent teeth.

The DMFT index can also be used to compare the prevalence of decayed, missing and filled teeth among older Australians at two points in time – 1987-88 and 2004-06. The survey data presented in Chart 3.3 shows that there were less decayed and missing teeth among older Australians in 2004-06 than in 1987-88. However, there were more filled teeth in 2004-06 than eighteen years earlier. Fewer decayed and missing teeth in 2004-06 indicates an improvement in dental care. This could be either due to an increase in access to professional dental care or better personal dental care, or both. The increase in filled teeth from 6 to 10 might indicate that more people have access to dental services and can treat their teeth at an earlier stage. This would reduce the need to remove decayed teeth, as indicated by the lower number of missing teeth in 2004-06. Overall, DMFT index (last bars of the chart) was

similar in 1987-88 and 2004-06, indicating that there has little change in dental decay experienced by older Australians.

Chart 3.3
Decayed, Missing and Filled Teeth among Older Australians
(number of teeth)

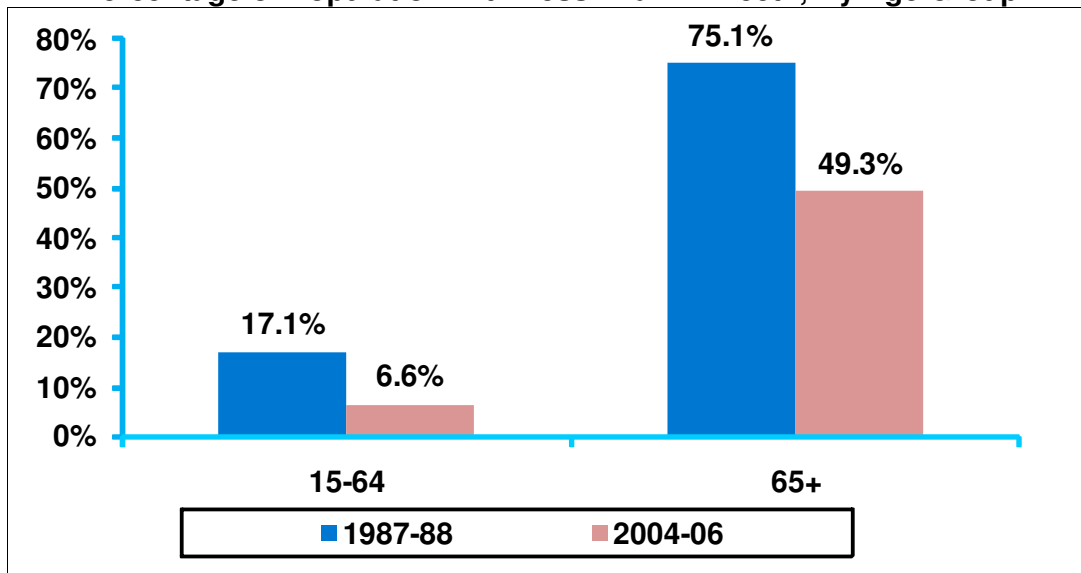


Sources: National Oral Health Survey of Australia 1987-88
National Survey of Adult Oral Health 2004-06

Note: There are generally 32 adult permanent teeth.

The final step in treating poor dental health is the removal of teeth. Chart 3.4 shows the percentage younger and older Australians with less than 21 teeth. A person with less than 21 teeth is missing one-third (21 out of 32) of adult permanent teeth. The chart shows that the percentage of older Australians with less than 21 teeth is three times higher than among the young population. Between 2004 and 2006, about 49 per cent of older Australians had less than 21 teeth compared to 7 per cent of younger Australians. Interestingly, the percentage of people with less than 21 teeth has declined over time for both age groups. This is consistent with an improvement in dental health care over the last eighteen years, as concluded from the analysis of the DMFT index (above).

Chart 3.4
Percentage of Population with Less Than 21 Teeth, By Age Group



Source: AIHW, *Australia's Dental Generations, The National Survey of Adult Oral Health 2004-06*, 2007, page 203

In extreme cases, poor dental health can lead to edentulism (complete tooth loss). Research has shown that tooth loss is generally due to poor dental care rather than the ageing process. As mentioned earlier, in the past, Australians were not exposed to fluoridated water and education about the importance of dental hygiene. The improvement in awareness of dental needs means that more teeth are retained now than in the past (see Chart 3.4). For this reason, older Australians have a higher incidence of edentulism than younger generations. Table 3.1 below shows the percentage of older Australian with edentulism. Edentulism fell 23 percentage points over the 17 years to 2006.

Table 3.1
Prevalence of Tooth Loss in Older Australians

Year of survey	Edentulism (% of older Australians)
1987-88	50.6%
2004-06	27.6%

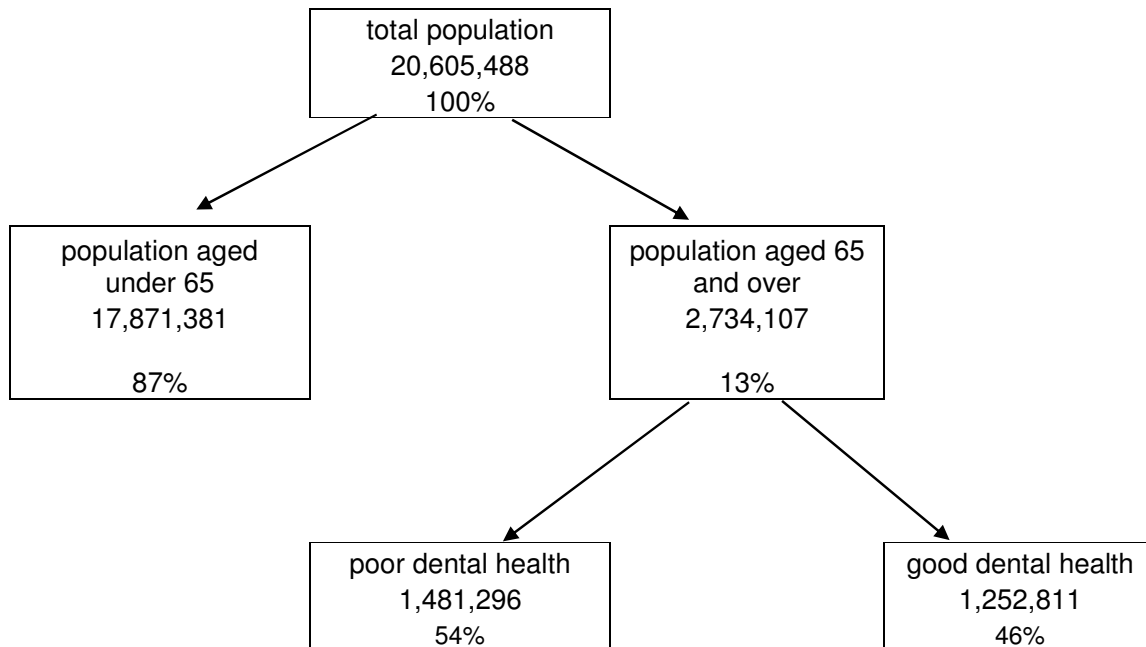
1987-88: NOHSA = National Oral Health Survey of Australia
 2004-06: NSAOH = National Survey of Adult Oral Health

As more older Australians retain their own teeth, the need to maintain the health of those teeth will increase. In the past, when a greater proportion of older Australians wore dentures, issues such as tooth decay and periodontal disease were less important. Assuming that the trend in decreasing edentulism continues, the need for effective oral health care for older Australians will increase in the future.

As explained earlier, periodontal disease is used to measure poor dental health in this report. Figure 3.1 shows a breakdown of the Australian population by age and dental health. It

shows that 13 per cent of the Australian population are aged 65 and over (2005-06). Of these 2.7 million older Australians, 54 per cent (1.5 million) suffer from poor dental health.

Figure 3.1
Population Breakdown by Age and Dental Health (2005-06)



Poor oral health can affect other parts of the body. In the next subsection, some of the medical conditions that are related to dental ill health are discussed.

3.2 Illnesses Caused by Poor Dental Health

Poor dental care can lead to a range of health conditions. This subsection outlines four health conditions that are found to have a strong causal relationship with dental ill health, particularly periodontal disease. Importantly, while these conditions are related to poor dental health, they can also be contracted by people with good oral health. The health conditions that are considered in this analysis are outlined below.

- Coronary heart disease (CHD) - CHD is the single largest cause of death and the most common cause of sudden death in Australia, claiming 24,576 lives in 2004.³² In a recent meta-analysis³³ of nine longitudinal studies by Janket et al.³⁴, the authors found an increase in the risk of CHD due to periodontal disease.

³² AIHW, *Coronary Heart Disease*, 2006, www.aihw.gov.au/cvd/majordiseases/coronary.cfm

³³ A meta-analysis is a statistical procedure that uses results of several studies. It synthesises results of several independent studies which address a set of related hypothesis. The advantage of a meta-analysis is that it incorporates comprehensive research evidence of several sources and provides an accurate estimate of effects.

³⁴ Janket, S., Meurman, J. & Sanz, M., *Oral Health, Atherosclerosis, and Cardiovascular Disease*. *Crit Rev Oral Biol Med*, 15, 403-413, 2004.

- Stroke - Similar to CHD, poor dental health has been found to be statistically associated with stroke. A study by Joshipura et al.³⁵ recently reported a significant association between stroke and periodontal disease.
- Peripheral vascular disease (PVD) – In a study by Hung et al.³⁶ a sample of 45,167 males was used to find that those with periodontal disease had an increased risk of experiencing PVD compared to men who did not have periodontal disease.
- Pancreatic cancer - Dominique et al.³⁷ examined the relationship between periodontal disease and the subsequent risk of pancreatic cancer. It was estimated that males (aged 40-75) with periodontal disease had an increased risk of pancreatic cancer compared to males who had no periodontal disease.

There is evidence that periodontal disease relates to other medical conditions such as pneumonia and diabetes. In a recent study, it was also found that tongue cancer is linked to chronic periodontitis³⁸. However, the evidence linking periodontal disease with these medical illnesses is either inconclusive or the statistical association was not calculated or not representative of the Australian population. Therefore, this study does not quantify the indirect costs associated with these conditions. This makes Econtech's estimate of indirect costs conservative.

The following sections draw on the information about the prevalence of dental ill health to estimate the cost of poor dental health among older Australians.

³⁵ Joshipura, KJ, Hung HC, Rimm, EB, Willett, WC, Ascherio, A., *Periodontal disease, tooth loss, and incidence of ischemic stroke*, 34, 47-52, 2003.

³⁶ Hung HC., Willett W., Merchant A., Rosner BA., Ascherio A., Joshipura, KJ., *Oral Health and Peripheral Arterial Disease. Circulation*, 107:1152-57, 2003.

³⁷ Dominique, S., Kaumudi, J., Giovannucci, E. & Fuchs, C., *A prospective study of periodontal disease and pancreatic cancer in US male health professionals*, Journal of National Cancer Institute, 99, 171-75, 2007.

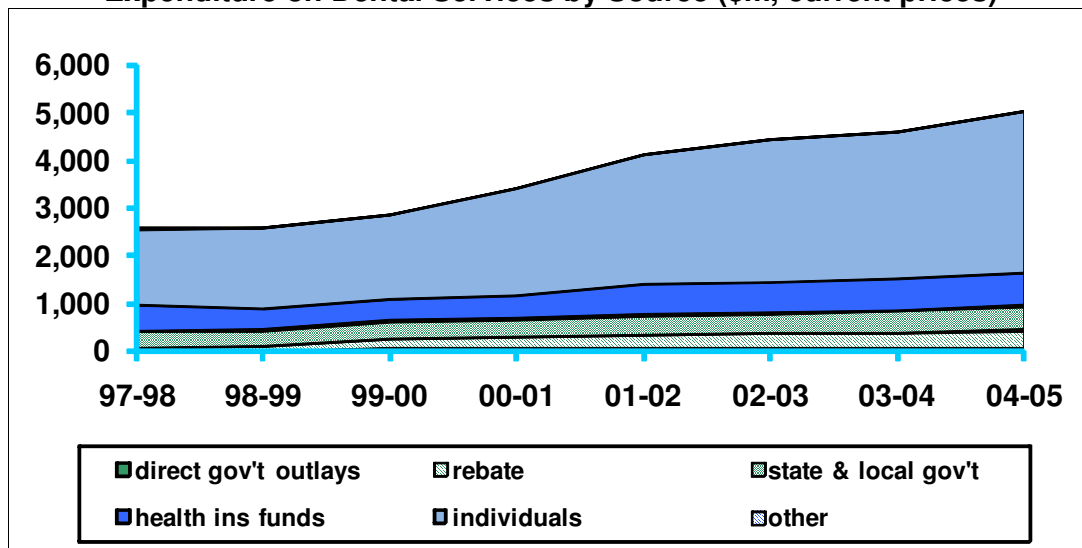
³⁸ Mine Tezal, DDS, PhD; Maureen A. Sullivan, DDS; Mary E. Reid, PhD; James R. Marshall, PhD; Andrew Hyland, PhD; Thom Loree, MD; Cheryl Lillis, BS; Linda Hauck, BA; Jean Wactawski-Wende, PhD; Frank A. Scannapieco, DMD, PhD, *Chronic Periodontitis and the Risk of Tongue Cancer*, archives of otolaryngology-head and neck surgery;133:450-54, May 2007.

4. Direct Cost of Dental Illness

The cost of dental services among older Australians is incurred by the government, private health insurance funds, individuals and the community in general. In this report, the direct and indirect costs of dental illness have been estimated. This section estimates dental services expenditure attributed to older Australians and the direct cost of dental illness among older Australians. The indirect costs are then estimated in the next section, so that the total cost of dental illness among older Australians can be calculated. This section shows how expenditure levels have changed over time according to different funding sources.

Expenditure on dental services almost doubled in the eight years from 1997-98 to 2004-05 from \$2.6 billion to \$5 billion³⁹. The chart below shows the level of expenditure on dental health services since 1997-98. The areas shaded in green relate to government funding, and the blue areas relate to non-government funding. The chart clearly shows that the majority of dental health care is paid by individuals (67 per cent in 2004-05) and the remainder is paid by the government, private health insurance funds and other sources.

Chart 4.1
Expenditure on Dental Services by Source (\$m, current prices)



Source: AIHW, *Health Expenditure*, various years.

The chart above also shows how expenditure on dental services has changed over time by funding sources. The contribution to dental expenditure by government sources has increased, mainly due to the introduction of the private health insurance rebate. The private health insurance rebate is applied to hospital and ancillary policies. Most ancillary policies cover dental services. This is one of the ways the Federal Government contributes to dental services expenditure. The 30 per cent rebate on ancillary (and hospital) insurance was introduced on 1 January 1999. In 2005, the rebate was amended so that people with private health insurance aged 65 to 69 receive a 35 per cent rebate and those aged 70 and over receive a 40 per cent rebate.⁴⁰ The introduction of the private health insurance rebate has contributed to the rise in total government funding from 16 per cent in 1997-98 to 19 per cent in 2004-05.

³⁹ AIHW, *Health Expenditure 2003-04*, table 1997-98 Aus; AIHW, *Health Expenditure 2004-05*, table A3.

⁴⁰ <http://www.aph.gov.au/library/pubs/bd/2004-05/05bd070.htm>

The share of non-government funding of dental services has remained stable. Interestingly, there has been a switching from private health insurance contributions to individual contributions. Specifically, the contribution to dental services expenditure by individuals has increased from 62 per cent in 1997-98 to 67 per cent in 2004-05, while the contribution by health insurance funds has declined from 21 per cent to 14 per cent. This could be due to a range of reasons, such as a greater share of uninsured patients requiring dental services compared to insured patients.

In 2005-06, expenditure on dental services is estimated to be \$5.3 billion⁴¹. Econtech estimates that approximately 12 per cent (\$627 million) of this expenditure was related to older Australians. This cost relates to all older Australians, whether they do or do not use dental health services.

Table 4.1 shows dental expenditure by funding source. Percentage estimates of dental expenditure used by older Australians were applied to total dental expenditure to estimate the cost of dental services among older Australians. The rationale behind the percentages that were applied to total dental expenditure is explained below the table.

Table 4.1
Dental Expenditure by Source of Funding, 2005-06

Funding Source	all Australians \$ million	older Australians \$ million	% of older Australians % of total
Government			
PHI rebate	385	38	10%
other	612	260	42%
Health insurance	733	73	10%
Individuals	3,552	254	7%
Other	10	1	7%
total	5,292	627	12%

Sources:

'All Australians': AIHW, *Health Expenditure 2004-05*, Table A3, adjusted by Econtech to 2005-06 using ABS, *Consumer Price Index*, 6401.0, table 7.

'Older Australians' and '% of older Australians' based on Econtech calculations.

Government spending on dental services is expected to be mostly provided in the form of the private ancillary insurance rebate and concessions. Ten per cent of people with private ancillary health insurance cover (which usually includes dental services) are aged 65 and over. Hence, 10 per cent of the rebate expenditure on dental services can be attributed to older Australians (see first row of data in Table 4.1). Concession card holders are offered various discounts on dental services depending on the type of concession card and the state or territory in which they reside. For example, in Victoria, Pensioner and Health Care cardholders are entitled to "emergency and general dental care ... through public dental clinics in community health centres, rural hospitals and the Royal Dental Hospital Melbourne".⁴² In 2005-06, 42 per cent of concession card holders were older Australians.

⁴¹ AIHW, *Health Expenditure 2004-05*, table A3, adjusted by health CPI sourced from ABS, *Consumer Price Index*, 6401.0, table 7.

⁴² Department of Human Services, Victoria, 2006, *State Concessions, Your Entitlements*, http://www.dhs.vic.gov.au/concessions/docs/2006/state_concessions_entitlements_2006.pdf

Therefore, it is reasonable to assume that 42 of dental expenditure by government (excluding expenditure on the PHI rebate) is spent on older Australians.

People with private ancillary insurance are able to claim some dental expenditure. As mentioned, in 2005-06, 10 per cent of people with private ancillary insurance were aged 65 and over. Therefore, 10 per cent of dental expenditure paid by private health insurance funds can be attributed to older Australians.

The National Health Survey (conducted by the Australian Bureau of Statistics) published data about the number of persons who had consultations with health professionals. The survey showed that of 1,159 people who visited a dental professional (in the two weeks prior to the survey), 137 (or 12 per cent) of those were aged 65 and over. Therefore, 12 per cent of total dental expenditure by individuals and other sources are expected to be spent on older Australians. The level of dental expenditure by individuals and other sources is assumed to be made up of the remaining amount of dental expenditure on older Australians.

The above mentioned percentages are applied to the different sources of funding to estimate the dental expenditure attributed to older Australians. As shown in Table 4.1, \$627 million of \$5.3 billion (12 per cent) in dental services expenditure was spent on older Australians. This estimate of \$627 million refers to dental services expenditure which includes check-ups and major dental work. So, this expenditure applies to those with good and poor dental health.

The next step is to estimate the proportion of dental services expenditure that only relates to dental illness. This is calculated by apportioning the dental services expenditure by older Australians (\$627 million) to those with poor dental health.

Based on ABS population estimates, there were about 2.7 million people aged 65 and over in 2005-06. This means that the average dental services expenditure per older Australian is \$229 per year⁴³. In Section 3, it was estimated that 54 per cent of older Australians suffered poor dental health, based on the prevalence of periodontal disease. That is, 1.5 million older Australians (54% of 2.7 million people) suffer from poor dental health. By applying the average dental services expenditure (\$229 per year) to those that suffer poor dental health (1.5 million people), it is estimated that the direct cost of dental illness is \$339 million (2005-06 prices). This assumes that the average dental expenditure is the same for people using dental services to treat a dental illness or for preventative or maintenance purposes.

This cost of \$339 million is the direct cost of dental illness among older Australians. In the next section, indirect costs associated with dental illness among older Australians are estimated so that the total cost of dental illness can be calculated.

⁴³ This is calculated as \$627 million divided by the number of people aged 65 and over (2.7 million).

5. Indirect Cost of Dental Illness

The indirect costs of dental health are the costs of the share of medical conditions that are caused by poor dental health. This section estimates those indirect costs. After estimating the indirect cost of poor dental health, these and the direct costs of dental illness (estimated in section 4) are combined to estimate the total cost of dental ill health among older Australians.

5.1 Method Used to Estimate Indirect Cost of Dental Illness

Dental illness can lead to a range of medical conditions. Four medical conditions that relate to periodontal disease have been included in this analysis. This is because periodontal disease is used as the benchmark for poor dental health in this report. According to the Dental Wellness Institute, other dental conditions such as tooth decay have less effect on general health than the effects of periodontal disease⁴⁴. Studies have found conclusive evidence that a causal relationship exists between periodontal disease and certain medical conditions. The four conditions that are used in this analysis are the following:

- coronary heart disease;
- stroke;
- peripheral vascular disease; and
- pancreatic cancer.

For this report, the share of the cost of treating these diseases that can be attributed to periodontal disease is defined as the indirect cost of dental illness. To estimate this cost, Econtech used the concept of 'Population Attributable Risk' (PAR). The PAR is the maximum proportion of medical conditions attributable to a specific exposure (i.e. to periodontal disease). The PAR is based on the incidence of medical conditions in the exposed group (i.e. group with periodontal disease) as compared with the non-exposed group (i.e. group without periodontal disease). The PAR is calculated using the following formula⁴⁵:

$$\text{Population Attributable Risk} = (P(RR-1)) / (1+P(RR-1))$$

Where:

P = prevalence of periodontal disease in older Australians; and

RR = relative risk (of medical condition outcome) in the group with periodontal disease, compared to the group without periodontal disease.

The relative risk is a measure of the strength of association between periodontal disease and a medical condition. The relative risk compares the rates of health or disease in individuals. For example, those who smoke are more than ten times as likely to develop lung cancer, compared to non-smokers.⁴⁶ In contrast, the PAR depends on the relative risk and prevalence of periodontal disease (risk factor) in the population. As such, the PAR measures

⁴⁴ <http://www.dentalwellness4u.com/oralhealth/disease.html>

⁴⁵ Stephenson, P., Bauman, A., Armstrong, T., Smith, B., and Bellew, B., *The Cost of Illness Attributable to Physical Inactivity in Australia: A Preliminary Study*, The Commonwealth Department of Health and Aged Care and the Australian Sports Commission, 2000.

⁴⁶ Ibid.

the incidence of a disease in the population as a result of the risk factor in the population (i.e. as a result of the prevalence of periodontal disease).

This method of estimation was previously used by Stephenson et al.⁴⁷. In that study, the estimates of the direct health care costs of illness attributable to physical inactivity in the adult Australian population were presented. The study used the population attributable risk approach to “estimate the proportion of disease outcomes attributable to being inactive”⁴⁸. The same approach is used to estimate the indirect cost of dental illness in this study.

Using the concept of PAR, Econtech estimated the proportion of four medical conditions that can be attributed to periodontal disease. This PAR value also illustrates the potential reduction in the risk of the four medical conditions that could be achieved if older Australians had good oral health.

To estimate the PAR for each of the four medical conditions, Econtech used the prevalence of periodontal disease among older Australian (estimated at 54 per cent in Section 3) and estimates of relative risk of the four medical conditions found in the literature. Table 5.1 shows these relative risk factors.

As mentioned before, the relative risk is a measure of the strength of association between periodontal disease and a particular medical condition. For instance, Table 5.1 shows that the risk of coronary heart disease is 1.25 (25 per cent) times higher among people with periodontal disease, compared to people without periodontal disease.

Table 5.1
RR Estimates for Four Health Conditions Linked to Periodontal Disease

Disease	Relative Risk	PAR
Coronary Heart Disease (a)	1.25	12%
Stroke (b)	1.33	15%
Peripheral Vascular Disease (c)	1.41	18%
Pancreatic Cancer (d)	1.52	22%

Sources:

- (a) Janket, S., Meurman, J. & Sanz, M., *Oral Health, Atherosclerosis, and Cardiovascular Disease*. Crit Rev Oral Biol Med, 15, 403-413, 2004.
- (b) Joshipura, KJ., Hung HC., Rimm, EB, Willett, WC, Ascherio, A., *Periodontal disease, Tooth loss, and Incidence of Ischemic Stroke*, 34, 47-52, 2003.
- (c) Hung HC., Willett W., Merchant A., Rosner BA., Ascherio A., Joshipura, KJ., *Oral Health and Peripheral Arterial Disease*. *Circulation*, 107:1152-57, 2003⁴⁹
- (d) Michaud, D., Joshipura, K., Giovannucci, E., Fuchs, C, *A Prospective Study of Periodontal Disease and Pancreatic Cancer in US Male Health Professionals*, Journal of National Cancer Institute, 99:171-75, 2007.

⁴⁷ Stephenson, P., Bauman, A., Armstrong, T., Smith, B., and Bellew, B., *The cost of illness attributable to physical inactivity in Australia: A preliminary study*, commission by Department of Health and Aged Care and the Australian Sports Commission, 2000.

⁴⁸ Stephenson, P., Bauman, A., Armstrong, T., Smith, B., and Bellew, B., *The cost of illness attributable to physical inactivity in Australia: A preliminary study*, commission by Department of Health and Aged Care and the Australian Sports Commission, 2000, page vii.

⁴⁹ The relative risk estimate calculated by Hung et al. (2003) is considered to be conservative when compared to estimates by Mendez, MV., Scott, T., LaMorte, W., Vokonas, P., Menzoin JO., Garcia, R. (1998) An association between periodontal disease and peripheral vascular disease. 176(2):153-7. The estimate by Hung et al was chosen because it is considered to be more accurate as it controls for factors such as age, smoking, body mass index, family history of heart disease, hypertension, diabetes, hypercholesterolemia and occupation

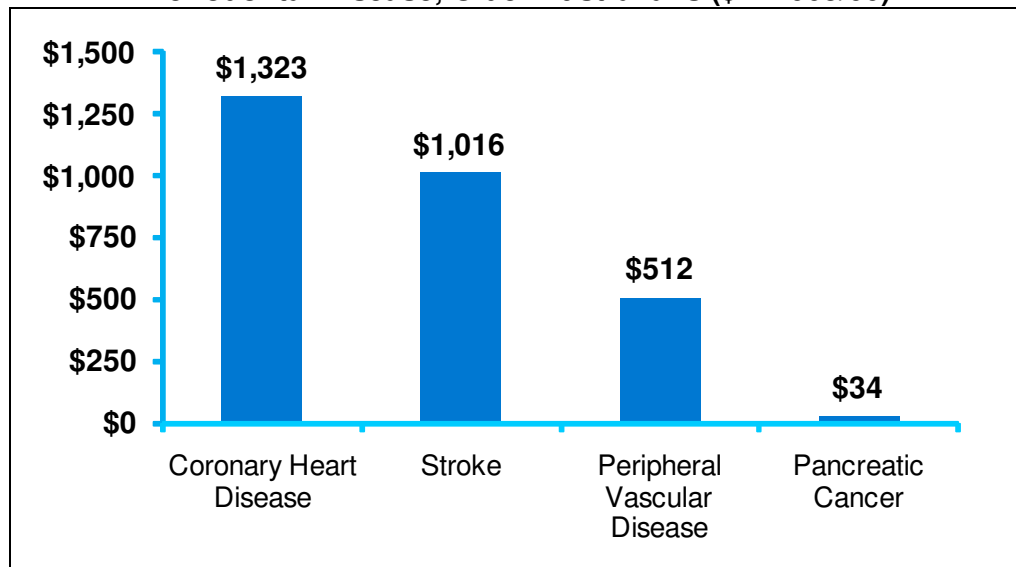
Using the relative risk estimates presented in Table 5.1, Econtech calculated the PAR for each of the four medical conditions related to periodontal disease. These estimates are shown in the last column of Table 5.1. The PAR illustrates the proportion of each medical condition that can be attributable to periodontal disease (or the proportion of disease that might be prevented by eliminating periodontal disease).

These PAR estimates, together with the health expenditure associated with the four medical conditions related to periodontal disease, are used to calculate the indirect costs attributable to periodontal disease in older Australians. The health expenditure estimates relate to the total allocated recurrent health expenditures on disease and injury for both the public and private sectors⁵⁰.

The latest expenditure estimates for disease by the AIHW are for the year 2000/01. Econtech updated these costs to 2005/06 prices using the Health Consumer Price Index⁵¹. Additionally, Econtech adjusted the expenditure estimates by taking into account population growth from the 2000/01 to the 2005/06 period. The total health care expenditure estimates were a proportioned to older Australians.

Chart 5.1 shows the health care costs of the four medical conditions related to periodontal disease for 2005/06, for older Australians. Interestingly, coronary heart disease was the biggest contributor to total health care costs (for older Australians), followed by strokes.

Chart 5.1
Recurrent Health Expenditure of Four Medical Conditions Related to Periodontal Disease, Older Australians (\$m 2005/06)



Source: Estimated by Econtech using data from AIHW, *Health System Expenditure on Disease and Injury in Australia 2000-01* (Second edition), table 4. ABS, *Consumer Price Index*, 6401 table 7 and ABS, *Population*, 3201 table 9.

⁵⁰ AIHW, *Health System Expenditure on Disease and Injury in Australia, 2000-01*. Second edition, Catalogue number HWE 28, Canberra, 2005.

⁵¹ ABS, *Consumer Price Index*, 6401 table 7.

By applying the PAR estimates presented in Table 5.1, to the health expenditure associated with the medical conditions related to periodontal disease presented in Chart 5.1, Econtech calculated the indirect costs attributable to periodontal disease among older Australians. This information is presented in Table 5.2, which shows that the indirect cost of the four medical conditions that are linked to periodontal disease is \$412 million per annum (2005/06 prices).

Table 5.2
Indirect Cost Attributable to Periodontal Disease for Older Australians
2005/06 (\$m)

Medical Condition	Total cost of disease	Total cost attributable to periodontal disease
Coronary Heart Disease	\$1,323	\$158
Stroke	\$1,016	\$154
Peripheral Vascular Disease	\$512	\$93
Pancreatic Cancer	\$34	\$7
Total	\$2,885	\$412

Source: AIHW and Econtech estimates

Note: Total may not appear to add, due to rounding of components.

Other medical illnesses have not been included in this study because the evidence presented in the medical literature is inconclusive or not representative of the Australian population.

As mentioned before, the indirect cost of dental illness among older Australians presented in this report includes medical conditions that have a strong link to periodontal disease as established in medical literature. The indirect costs of other dental illnesses such as dental caries have not been included in this study. Therefore, the indirect costs of poor dental health estimated in this section are conservative. Furthermore, the indirect costs only consider four medical conditions for which appropriate, conclusive evidence shows a link to periodontal disease. This also makes the indirect cost estimates conservative.

The following section combines these indirect costs with the direct costs of dental illness (estimated in Section 4) to calculate the total cost of dental ill health among older Australians.

6. Economic Cost of Dental Ill Health among Older Australians

The previous two sections have estimated the direct and indirect costs of dental illness among older Australians. In this section, the total cost of dental illness among older Australians is calculated by adding direct and indirect costs together. Figure 6.1 below shows the steps involved in estimating the cost of dental illness.

Figure 6.1
Annual Cost of Dental Illness (\$m, 2005-06 prices)

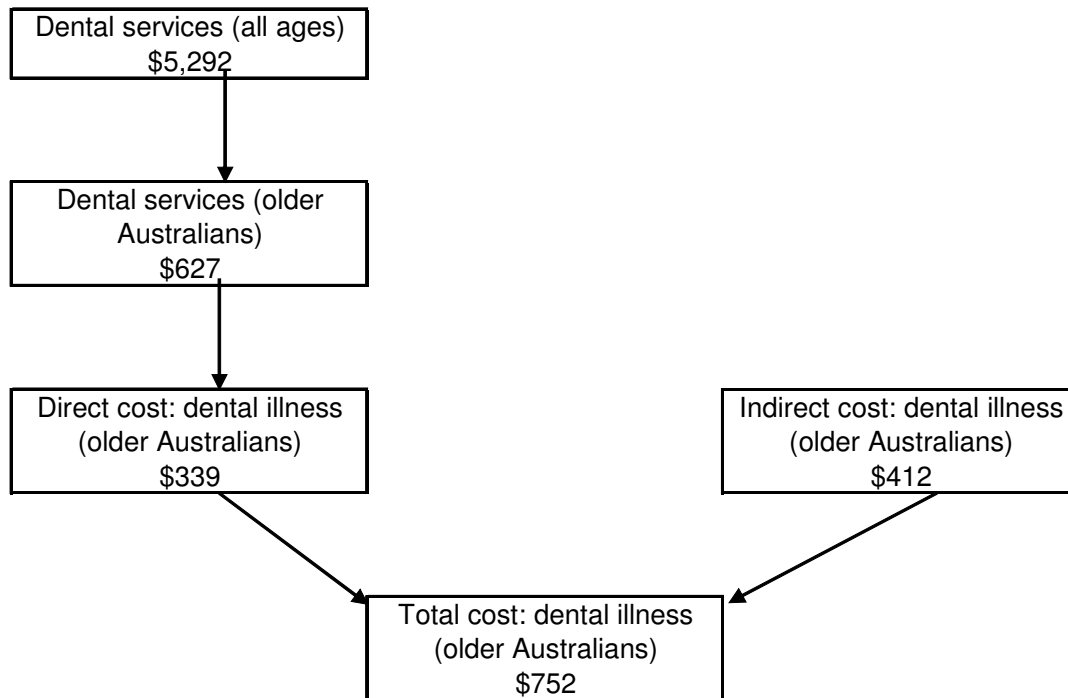
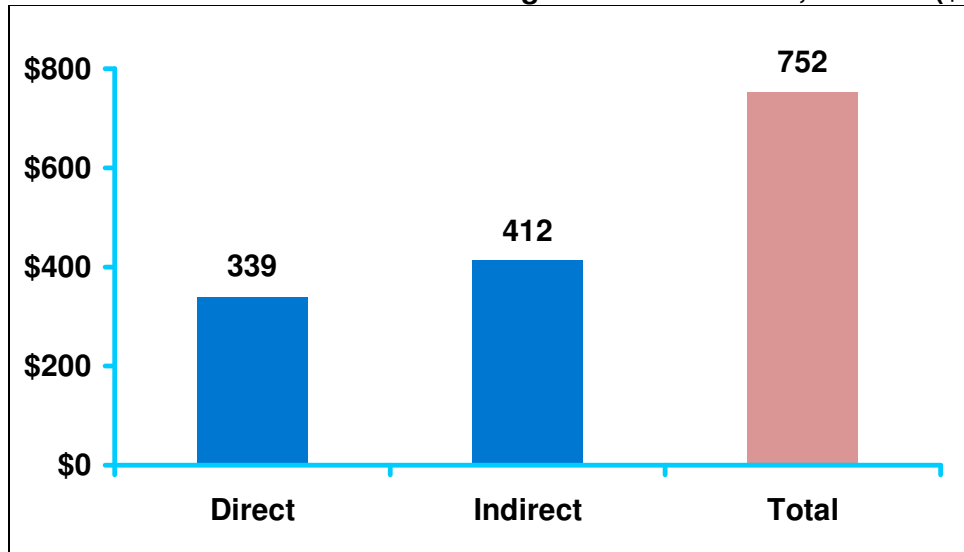


Chart 6.1 shows the total cost of dental illness among older Australians of about \$752 million (in 2005-06 prices). The direct costs account for 45 per cent of the total, while indirect costs account for the remaining 55 per cent.

Chart 6.1
Annual Cost of Dental Ill Health among Older Australians, 2005-06 (\$m)



Source: Econtech estimates

The next section analyses the net cost/benefit of two policy options that could be implemented to improve dental health among older Australians. This analysis is based on the costs that have been estimated so far in this report.

7. Options to Improve Dental Health Care for Older Australians

The previous sections have provided a picture of the current state of dental health among older Australians and the cost of dental health to the Australian economy. The analysis has shown that dental health among older Australians is currently poor and therefore needs to be improved. Thus, in this section, two policy options to improve dental health care among older Australians are discussed. As mentioned in Section 2, these policies would help to address the aims of the Action Area in the National Oral Action Plan that targets older people. The two policies are as follows

- Broad Policy Option – dental benefits that are provided to Department of Veteran Affairs (DVA) Gold Card holders are extended to Age Pension Card holders.
- Narrow Policy Option – dental benefits provided to DVA Gold Card holders are extended to Centrelink Pension Card holders that reside in aged care facilities.

The DVA Gold Card is issued to veterans of Australia’s defence forces who meet certain criteria. Among other health care services, the card entitles the holder to most dental services that are necessary to meet a clinical need. The dental service is free of charge, as long as the health professional agrees to treat the cardholder under DVA arrangements. For this purpose, dental services are defined as “the prevention and treatment of oral disease and include general dental services, the filling and crowning of teeth and the construction of dentures”⁵².

Under the current DVA dental benefit arrangements, the dental services that DVA Gold Card holders are eligible for depend on cardholder’s clinical needs. Periodic oral examinations are limited to one every six months. These dental benefit limits can be extended if the dentist advises that it is necessary and the DVA approves the extension. An annual monetary limit applies to certain high cost items such as crowns and bridges. For the 2007 calendar year, the annual monetary limit is \$2,162⁵³. Under the Broad and Narrow Policy Options considered in this report, the same dental benefits would apply to new recipients.

This report also assumes that the same method used by DVA Gold Card holders to access dental benefits would be used by the new recipients of dental benefits under the Broad or Narrow Policy option. Currently, DVA Gold Card holders access dental benefits by firstly checking whether their dentist accepts DVA Gold Cards. If the dentist agrees to treat these patients under the DVA arrangements, the patient then books the dental appointment. At the completion of the dental visit, the patient signs a service voucher. The dentist then bills DVA directly for any services provided to the card holder⁵⁴.

The proposed policies specifically target older Australians with concession cards. According to the National Oral Action Plan, most older Australians “hold a concession card and are eligible for public dental care, but ... long waiting lists mean that appropriate care is not available”⁵⁵. Either of the proposed policies would enable those older Australians with concession cards to access private dental care at a discount. This would improve the general level of dental health among older Australians.

⁵² Department of Veterans Affairs, *Health Care: Dental Services*, DVA FACTS HSV17 page 1

⁵³ *ibid*

⁵⁴ *ibid*

⁵⁵ The National Advisory Committee on Oral Health *Healthy Mouths Healthy Lives, National Oral Action Plan 2004-2013*, July 2004, page 24.

Both policy options are analysed by estimating the national costs and benefits of the policies and the government budget impact. The expected benefits of the policy options are in the form of cost savings from the reduced prevalence of dental ill health among older Australians. The cost of the options is the government funding that is required to operate the policies. The benefits are weighted against the costs to estimate the net cost or benefit of the policies. Section 7.1 analyses the Broad Policy Option and Section 7.2 analyses the Narrow Policy Option.

7.1 Broad Policy Option

In this section, the Broad Policy Option is analysed. Under this policy, dental benefits that are currently provided to DVA Gold Card holders are extended to Age Pension Card holders. Under the Broad Policy Option, the dental health of older Australians is expected to improve. As shown in Section 3, older Australians currently suffer from poorer dental health than younger Australians. Indeed, the report shows that 54 per cent of older Australians are estimated to have periodontal disease compared to 25 per cent of the younger population.

Dental health programs can potentially achieve large reductions in poor dental health among older Australians. However, the benefits from such programs depend not on the incidence of short-term improvements in dental health, but rather on the incidence of permanent improvements in dental health. Translating a short-term improvement in dental health into a permanent improvement relies on permanent changes in behaviour in areas such as access to dental professionals, personal dental hygiene and diet. This proposed policy aims to achieve a permanent change in behaviour by improving access to dental health professionals by subsidising the cost of dental health outlays among older Australians.

By improving dental health among older Australians, general health levels will also improve. This was implied by the analysis of indirect costs which looked at medical conditions that are linked to periodontal disease. While the introduction of this policy would cost the government in terms of providing better access to dental professionals, it would also benefit the government in terms of saving some of the costs that are incurred through dental-related medical conditions. The costs and benefits of this policy are analysed in terms of government costs and benefits and social (national) costs and benefits. These costs and benefits of the Broad Policy Option are now discussed in turn.

Government Costs and Benefits

The estimated annual net cost to government of the Broad Policy Option is shown in Table 7.1. To estimate the government cost and benefit of the Broad Policy Option, the average costs and benefits of the new dental benefits are applied to the number of people that would be eligible for the dental benefits. These estimates are presented in Table 7.1 and explained below.

Table 7.1
Annual Net Cost to Government – Broad Policy Option

Gross Cost	
Number of people expected to access new dental benefits	860,323
Average cost per older Australian who accesses new dental benefits	\$781
Cost (\$ million)	\$672
Savings Offset	
Number of people expected to access new dental benefits	860,323
Average benefit per older Australian who accesses new dental benefits	\$830
Direct Benefit	\$375
Indirect Benefit	\$455
Government Benefit (75%)	\$341
Offset (\$ million)	\$294
Net cost to Government (\$ million)	\$379

Source: Econtech estimates

The gross cost of this policy to government is based on:

- the number of people covered by the new policy that are expected to access the dental benefits (“active pension card holders”); and
- the average cost of providing the new dental benefits to those people.

In 2005-06, about 45 per cent of DVA Gold Card holders accessed the dental benefits that were offered. It is assumed that the same take-up rate would apply under the Broad Policy Option. In 2005-06, there were about 1.9 million Age Pension Card holders⁵⁶. Therefore, under the Broad Policy Option, 45 per cent of the 1.9 million Age Pension Card holders (860,323) are expected to access the new dental benefits.

The cost of providing dental care to those people is based on the cost of providing the same dental service to DVA Gold Card holders. Given that this is an average benefit, some of the DVA Gold Card holders who accessed the dental benefits received a higher dental benefit than \$781 per year, and others received less. By applying the average annual dental benefit of \$781 to the estimated 860,323 active pension card holders, the gross cost of the policy to the government would be around \$672 million annually (see Table 7.1).

This cost to government of introducing the Broad Policy Option is offset by a saving to the government. This saving is incurred because more older Australians would have improved dental health and therefore be generally healthier under this policy. This would save the government some expenditure on dental-related medical conditions.

As mentioned above, the Broad Policy Option aims to achieve a permanent change in behaviour to improve dental health among older Australians. The modelling assumes that 10 per cent of older Australians who are eligible for the new dental benefits would achieve a permanent improvement in dental health. To account for the fact that an estimated 45 per cent of eligible persons are likely to access the new dental benefits the ‘improvement rate’ of

⁵⁶ Department of Family and Community Services, *Annual Report 2005-06, Output Group 3.1: Support for the Aged*, page 111.

10 per cent has been adjusted. Thus, the final ‘improvement rate’ is estimated to be 22 per cent⁵⁷. This ‘improvement rate’ of 22 per cent takes into account three main factors.

1. Some people will have poor dental health at certain stages of their life and good dental health at other stages, depending on their circumstances.
2. Not everyone who improves their dental health will permanently experience an improvement in oral health. Some will still suffer from poor dental health despite their ability to access professional dental services at a discount.
3. Not everyone who is eligible for the new dental benefits will have poor dental health. That is, some people will already have good oral health, so no improvement in dental health will be made by introducing the policy. However, the affordability of dental services would be improved.

The government benefit from the Broad Policy Option depends on the value of each permanent improvement in dental health. The value of each permanent improvement is based on the annual prevalence cost for each older Australian with poor dental health (\$508⁵⁸). In crude terms, permanently improving the dental health of an older Australian will remove this prevalence cost for the balance of that persons’ life. In practice, the situation is more complex because the costs of a person’s dental health is not the same from one year to the next, but rather will rise from a lower level to a higher level with age, as health complications generally increase with age. This would need to be taken into account in a more detailed analysis.

Nevertheless, the value of a permanent improvement in dental health is broadly estimated at \$3,730. This is based on an assumed residual life expectancy of 9 years (for older Australians), and the prevalence cost of \$508 per year, which gives a gross value from a permanent improvement in avoided costs of \$4,765. This is reduced to a present value of \$3,730, after applying a real time rate of discount to future cost savings of 5 per cent per year.

These estimates are broad. A more detailed analysis would consider the epidemiology of poor dental health and associated diseases and project on a year-by-year basis the impact of the proposed improvement in access to dental health.

The expected benefit per Age Pension Card holder can now be estimated. Based on the estimated poor dental health permanent improvement rate of 22 per cent and the present value of each dental health permanent improvement of \$3,730, the average expected benefit is \$830 per active pension card holder. This expected benefit includes direct and indirect benefits of the policy. The direct benefits accrue from treating poor dental health. Under this policy, the direct benefits are estimated to be \$375 per active pension card holder. The indirect benefits occur due to the savings that accrue as a result of a lower incidence of dental-related medical conditions. The indirect benefit of this policy is estimated to be \$455 per active pension card holder.

⁵⁷ The final improvement rate of 22 per cent is calculated as the initial improvement rate of 10 per cent (which takes into account that not all eligible people will access the dental benefits) divided by 45 per cent (the percentage of eligible people that are expected to access the new dental benefits, based on the experience of DVA Gold Card holder dental benefits).

⁵⁸ This is calculated as the total cost of treating poor dental health and dental-related medical conditions (\$752 million) divided by population aged 65 and over with poor dental health (1.5 million).

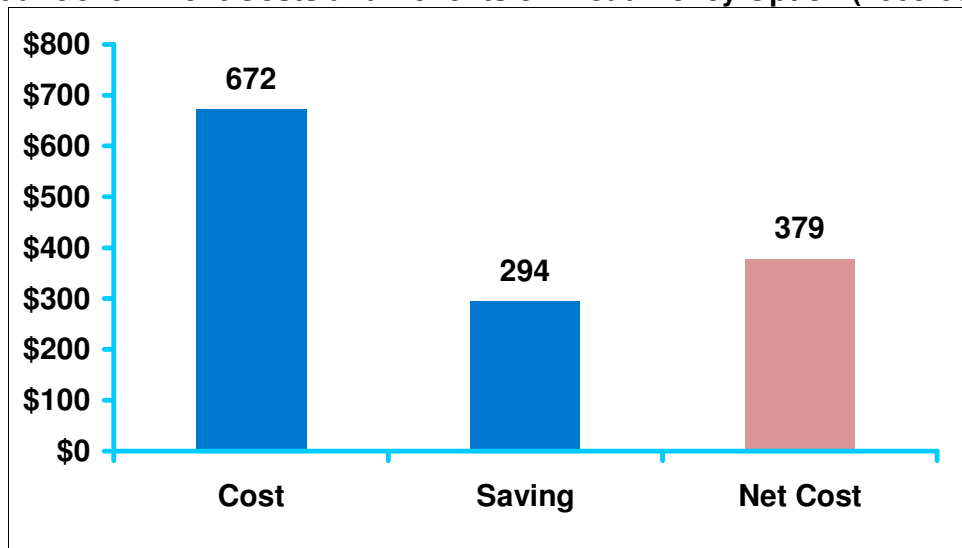
The indirect benefit (savings that result from a lower incidence of dental-related medical conditions) would be shared by government and non-government sources. Hence, the government benefit of this policy is estimated to be 75 per cent of the indirect benefit, which equates to \$341 per active pension card holder. This government benefit is balanced against the associated government costs.

The benefits and costs of the Broad Policy Option can now be compared. Above, it was estimated that the average benefit to government is \$341 per active pension card holder. The average cost per active pension card holder was reported as \$830. Clearly the estimate of the cost is more precise than the broad estimate of the average benefit. Nevertheless, the average cost outweighs the benefit. This is expected because the government would pay the full cost of the improved dental access, yet the government does not receive all of the saving in health costs, as some of that benefit is received by individuals. Of course savings received by the private sector should be taken into account in assessing the proposal from a public policy standpoint. This highlights the inappropriateness of using the estimated net cost to government as the public policy indicator. The next subsection of this report outlines the social costs and benefits of the policy.

Applying the average saving per active pension card holder of \$341 to the estimated 860,323 Age Pension Card holders who are expected to access the new dental benefits gives an annual saving to government of \$294 million, as shown in Table 7.1 and Chart 7.1.

The annual net cost to government of the Broad Policy Option is estimated at \$379 million (see Chart 7.1). This is the difference between the gross cost (\$672 million) and the savings offset (\$294 million). This estimate of \$379 million can be interpreted as the net cost to government in a typical year. It is expected that the gross cost and saving offset would be fairly constant on an annual basis.

Chart 7.1
Annual Government Costs and Benefits of Broad Policy Option (2005-06, \$m)



Source: Econtech estimates

Social Costs and Benefits

The social costs and benefits of the Broad Policy Option are compared in this subsection. In the above subsection, it was estimated that the average benefit of this policy is \$830 per active pension card holder. The cost per extra older Australian with access to the new dental benefits was reported as \$781. The estimated average social benefit outweighs the cost of the Broad Policy Option.

As such, the net social benefit per additional older Australian with access to the new dental benefits is \$48. This is the difference between the estimated benefit of \$830 and the cost of \$781 shown in table 7.2.

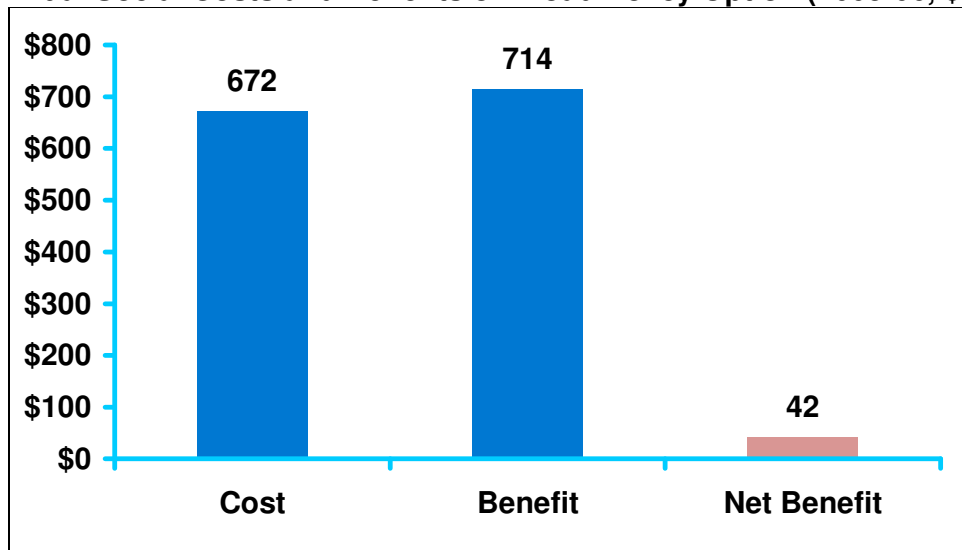
Table 7.2
Annual Net Social Benefit – Broad Policy Option

Gross Cost	
Number of people expected to access new dental benefits	860,323
Average cost per older Australian who accesses new dental benefits	\$781
Cost (\$ million)	\$672
Gross Benefit	
Number of people expected to access new dental benefits	860,323
Average benefit per older Australian who accesses new dental benefits	\$830
Benefit (\$ million)	\$714
Net Benefit (\$ million)	\$42

Source: Econtech estimates

The annual net benefit to the nation of the Broad Policy Option is therefore estimated at \$42 million (see Chart 7.2). This is calculated by applying the estimated net benefit per active pension card holder of \$48 to the 860,323 active pension card holders.

Chart 7.2
Annual Social Costs and Benefits of Broad Policy Option (2005-06, \$m)



Source: Econtech estimates

The annual net benefit to the nation, estimated at \$42 million, is clearly positive, which supports the Broad Policy Option of introducing DVA Gold Card dental benefits to Age Pension Card holders. On public policy grounds, this net benefit to the nation is the appropriate indicator for assessing the proposal, not the net cost to government.

The net cost to government is an inappropriate indicator for two reasons. First, it inappropriately excludes cost savings that are received by the private sector. Second, it inappropriately includes transfers from the government to the private sector that do not affect national income, specifically the dental benefits paid to people who would have accessed the same type of dental care irrespective of the proposed dental benefits. Nevertheless, the net cost to government is always a matter of interest to government and so that issue is considered above.

7.2 Narrow Policy Option

This section considers a more restrictive policy option where the dental benefits provided to DVA Gold Card holders are extended to Centrelink Pension Card holders that reside in aged care facilities. This policy is referred to as the “Narrow Policy Option” in this report because the dental benefits are applied to a smaller group of older Australians than the Broad Policy Option.

Residential aged care facilities are mainly provided by religious organisations, private providers, community-based providers and charitable organisations. In 2005-06, there were about 152,000 permanent residents of aged care facilities. The majority of these residents (96 per cent) were aged 65 or over. According to the AIHW, 71 per cent of permanent aged care facility residents hold Centrelink Pension concession cards⁵⁹. This equates to 107,521 Centrelink Pension card holders residing in aged care facilities. Under the Narrow Policy Option, the dental benefits provided to DVA Gold Card holders would be offered to this group of older Australians.

The National Oral Health Plan states that people in residential aged care facilities suffer from poor oral health, implying that the current approach to oral health care for older Australians needs to be improved. This policy would help to address the issue of poor dental health among older Australians that reside in aged care facilities.

Government Costs and Benefits

The estimated annual net cost to government of the Narrow Policy Option is shown in Table 7.3. The government costs and benefits of the Narrow Policy Option were estimated the same way as the Broad Policy Option costs and benefits. That is, the average costs and benefits per older Australian who is expected to access the new dental benefits is the same under the Narrow and Broad Policy Options. The difference between the two options is the group of people that would be offered the new dental benefits.

⁵⁹ AIHW, *Residential aged care in Australia 2005-06: a statistical overview*, Aged Care Statistics Series, Number 24, June 2007.

Table 7.3
Annual Net Cost to Government – Narrow Policy Option

Gross Cost	
Number of people expected to access new dental benefits	48,341
Average cost per older Australian who accesses new dental benefits	\$781
Cost (\$ million)	\$38
Savings Offset	
Number of people expected to access new dental benefits	48,341
Average benefit per older Australian who accesses new dental benefits	\$830
Direct Benefit	\$375
Indirect Benefit	\$455
Government Benefit (75%)	\$341
Offset (\$ million)	\$17
Net cost to Government (\$ million)	\$21

Source: Econtech estimates

As explained earlier, there are approximately 107,500 permanent aged care facility residents with Centrelink Pension Cards. Assuming that the new dental benefits offered under the Narrow Policy Option were accessed at the same rate as the DVA Gold Card dental benefits, approximately 48,341 people would access the new dental benefits. The average benefit per older Australian who accesses the new dental benefits is estimated to be \$781 per year. By applying the average annual dental benefit of \$781 to the number of people that are expected to access the new benefits under this policy (48,341), the gross cost of the Narrow Policy Option to the government would be around \$38 million annually (see Table 7.3).

As with the Broad Policy Option discussed in Section 7.1, the cost to government of the Narrow Policy Option is offset by a saving to the government. This saving is incurred because more older Australians would have improved dental health and therefore be generally healthier under this policy. This would save the government some expenditure on dental-related medical conditions.

Under the Broad Policy Option, it was estimated that the average expected benefit per older Australian who accesses the new dental benefit is \$830 per year. This is based on the dental health permanent improvement rate of 22 per cent and the present value of each poor dental health permanent improvement of \$3,730. The average expected benefit of \$830 is comprised of direct and indirect benefits. These direct and indirect benefits are the same as under the Broad Policy Option because the dental benefits offered under the two policies are the same. Hence, the direct benefits accrued from treating poor dental health are estimated to be \$375 per older Australian who is expected to access the new dental benefits. The indirect benefits, incurred due to the savings accrued from a lower incidence of dental-related medical conditions, is estimated to be \$455 per older Australian who accesses the new dental benefit.

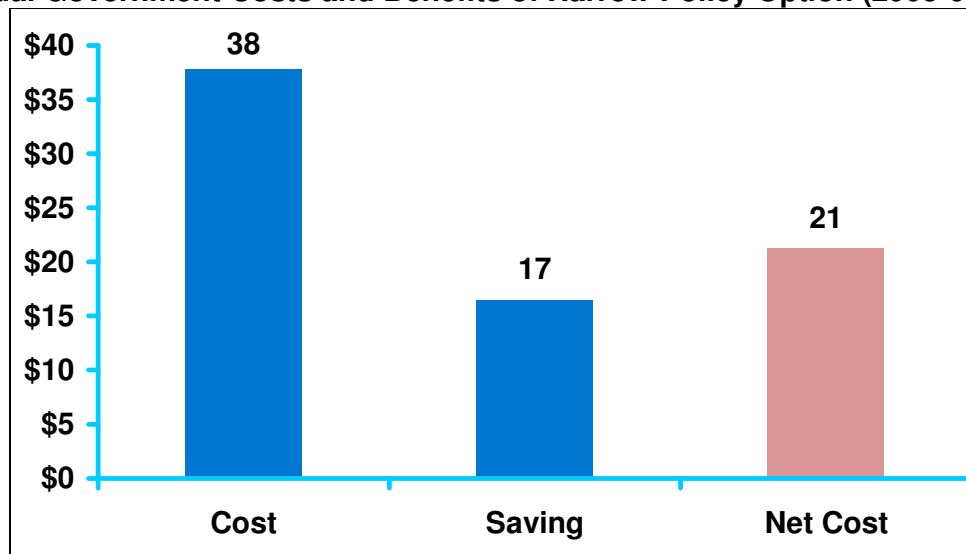
The indirect benefits would be shared by government and non-government sources. Hence, the government benefit of this policy is estimated to be 75 per cent of the indirect benefit (\$341 per older Australian who accesses the new dental benefit). This expected government benefit is balanced against the associated government costs.

It is expected that the government would incur a net cost from introducing the Narrow Policy Option. This is because the government would pay the full cost of the improved dental access, yet receive only some of the saving in direct health costs. Savings received by the private sector should be taken into account in assessing the proposal from a public policy standpoint. The next subsection of this report outlines the social costs and benefits of the policy.

Applying the government saving (\$341 per older Australian who accesses the new dental benefits) to the estimated number of Centrelink Pension Card holders living in aged care facilities that are likely to access the new dental benefits (48,341), the annual saving to government is estimated to be \$17 million, as shown in Table 7.3 and Chart 7.3.

The annual net cost of the Narrow Policy Option to government is estimated at \$21 million. This is the difference between the gross cost and the savings offset reported in Chart 7.3. This estimate of \$21 million can be interpreted as the net cost to government in a typical year.

Chart 7.3
Annual Government Costs and Benefits of Narrow Policy Option (2005-06, \$m)



Source: Econtech estimates

Social Costs and Benefits

The social benefits and costs of the Narrow Policy Option are compared in this subsection. In the above subsection, it was estimated that the average benefit of the narrow policy is \$830 per older Australian who is expected to access the new dental benefit (see Table 7.4). The cost per older Australian who is expected to access the new dental benefit was reported as \$781. The estimated average benefit outweighs the cost of introducing the Narrow Policy Option.

The net social benefit per additional older Australian who accesses the new dental benefits is \$48. This is the difference between the estimated benefit of \$830 and the cost of \$781 per older Australian who is expected to access the new dental benefit.

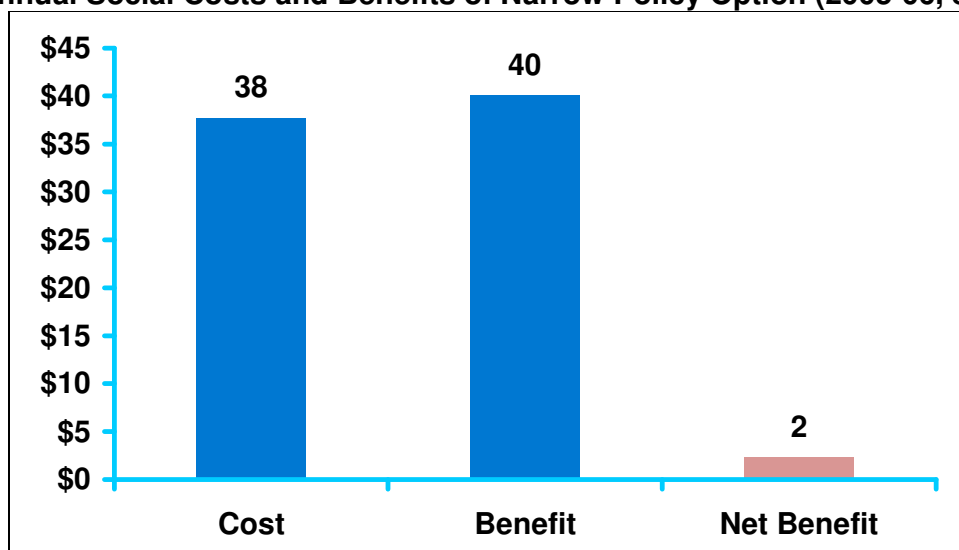
Table 7.4
Annual Net Social Benefit – Narrow Policy Option

Gross Cost	
Number of people expected to access new dental benefits	48,341
Average cost per older Australian who accesses new dental benefits	\$781
Cost (\$ million)	\$38
Gross Benefit	
Number of people expected to access new dental benefits	48,341
Average benefit per older Australian who accesses new dental benefits	\$830
Benefit (\$ million)	\$40
Net Benefit (\$ million)	\$2.3

Source: Econtech estimates

The total social benefits and costs depend on the number of additional older Australian who are expected to access the new dental benefits under the Narrow Policy Option. The annual benefit to the nation of the Narrow Policy Option is therefore estimated at \$40 million (see Chart 7.4), and the cost is estimated at \$38 million. Hence, the annual net national benefit is \$2.3 million.

Chart 7.4
Annual Social Costs and Benefits of Narrow Policy Option (2005-06, \$m)



Source: Econtech estimates

The annual net benefit to the nation, estimated at \$2.3 million, is clearly positive, which supports the Narrow Policy Option to introduce DVA Gold Card dental benefits to Centrelink Pension Card holders who reside in aged care facilities. On public policy grounds, this net benefit to the nation is the appropriate indicator for assessing the proposal, not the net cost to government.

As mentioned earlier, the net cost to government is an inappropriate indicator. This is because it inappropriately excludes cost savings that are received by the private sector. It also inappropriately includes transfers from the government to the private sector that don't affect national income.

8. Conclusions

This report finds that dental health among older Australians is poorer than among younger Australians. For example, the incidence of periodontal disease is nearly twice as prevalent in older Australians at about 54 per cent, compared to young Australians, at about 25 per cent. It therefore analyses two policies that could be introduced to improve dental health among older Australians.

Expenditure on dental services almost doubled between 1997-98 and 2004-05 from \$2.6 billion to \$5 billion⁶⁰. The majority of dental health care is paid by individuals (67 per cent) and the remainder is paid by the government, private health insurance funds and other sources. Of this \$5 billion, approximately \$627 million (12 per cent) is attributed to older Australians (aged 65 and over). Approximately \$339 million of dental services expenditure directly relates to dental illness among older Australians.

Poor dental care can lead to a range of medical conditions including coronary heart disease, stroke, peripheral vascular disease and pancreatic cancer. The indirect cost of these four medical conditions that can be attributed to periodontal disease for older Australians is \$412 million per annum (2005/06 prices).

Two policy options to improve dental health care among older Australians were analysed. First, a policy under which the dental benefits that are received by Department of Veterans Affairs (DVA) Gold Card holders are extended to Age Pension Card holders was considered (Broad Policy Option). Second, a more restrictive policy was analysed, under which only those who reside in aged care facilities and hold Centrelink Pension cards would have access to the same dental benefits that are received by DVA Gold Card holders (Narrow Policy Option).

The annual net benefit of the Broad Policy Option is estimated at \$42 million. This is the difference between the cost (\$672 million) and the benefit (\$714 million). The annual net benefit of the Narrow Policy Option is estimated at \$2 million. This is the difference between the cost (\$38 million) and the benefit (\$40 million). These annual net benefits to the nation are clearly positive, which supports the proposal to introduce a policy to improve dental health among older Australians.

⁶⁰ AIHW, *Health Expenditure 2003-04*, table 1997-98 Aus; AIHW, *Health Expenditure 2004-05*, table A3.