

IMPROVING ORAL HEALTH AND DENTAL CARE FOR AUSTRALIANS

Prepared for the National Health and Hospitals Reform Commission

**By Professor John Spencer
and Dr Jane Harford
ARCPOH
The University of Adelaide**

December 2008

Contents

<i>List of tables</i>	3
<i>List of figures</i>	4
<i>Summary</i>	5
Dental services program	5
Dental education and residency program	5
Oral health promotion program	6
<i>Preamble</i>	7
<i>Introduction</i>	7
<i>Dental services program</i>	9
Financing dental services for adults	9
Strengths and weakness of different directions for financing access to dental care	9
i. Direct public subsidy.....	9
ii. Rebates for Private Health Insurance (PHI)	10
iii. Vouchers	10
iv. Dental savings accounts (DSAs)	10
v. Social Insurance	11
Priorities for early implementation	11
The matrix of financing approaches and target population subgroups	14
Scope of dental services	16
Phased extension of financial support	17
<i>Dental education and residency program</i>	17
Costings for a residency program	19
<i>Investments in future oral health</i>	19
Oral health promotion program	19
Extend the coverage of water fluoridation	19
Support for oral health promotion	20
Revitalise the school dental services	20
Cost of stimulating oral health promotion	21
<i>Appendix A: Pattern of dental visiting</i>	22
<i>Appendix B: The dental labour force</i>	30
<i>Appendix C: Oral health of children</i>	35
<i>Acknowledgements</i>	38
<i>Glossary of terms</i>	38

References	39
-------------------------	-----------

List of tables

Table 1. Matrix of funding options by targeted groups	15
Table 2. Scope of dental services—diagnostic and preventive, routine and elective services	16
Table A 1. Visiting pattern by age and sex.....	23
Table A 2. Unfavourable pattern of visiting by social characteristics	23
Table A 3. Receipt of specific services in the last year by pattern of dental visiting	24
Table A 4. Oral health of dentate adults by age and sex	24
Table A 5. Oral health of dentate adults by social characteristics.....	25
Table A 6. Oral health of dentate adults by pattern of dental visiting	26
Table A 7. Avoiding or delaying dental visits among dentate adults due to cost by social characteristics.....	26
Table A 8. Age distribution of dentate adults and percentage each age group concession cardholders	27
Table A 9. Adult dentate population by cardholder status and place of last visit.....	27
Table A 10. Adult dentate population by cardholder and insurance status.....	28
Table A 11. Adult dentate population by cardholder and insurance status and place of last visit.....	28
Table A 12. Distribution of the adult dentate population by age and household income.....	28
Table B 1. Dental labour force by occupational distribution, area of practice, rate per 100,000 population and type of practice, 2005	30
Table B 2. Rate of dental providers per 100,000 population by remoteness area of main practice 2005.....	31
Table B 3. Australian domestic graduates, actual DEST completions 2003 to 2005 and estimated completions 2006 to 2020.....	31
Table B 4. Projection of the dentist labour force 2005–2020	32
Table B 5. Projected capacity of dentists and all dental providers 2005–2020	32
Table B 6. Projected supply and demand for dental visits (millions) in Australia 2005, 2010, 2015 and 2020..	34
Table C 1. Dental visiting in last 12 months by Australian children 1996–2005 and percentage who visited SDS at last visit.....	37
Table C 2. Percentage of children who last visited SDS in 1996 and 2005 by state and territory	37

List of figures

Figure B 1. Dentate per capita demand by age group	33
Figure B 2. Per capita demand for dental visits by dentate persons, 1979 to 2005	33
Figure C 1. Deciduous caries experience in 6-year-old children in Australia from 1977 to 2002.	35
Figure C 2. Caries experience in 12-year-old children in Australia from 1977 to 2002	35
Figure C 3. Deciduous caries experience in 6-year-old children in Australia, 2020, by small area social characteristics.	36

Summary

Australia's latest survey of oral health and dental care has described two worlds in Australian dentistry. The first constitutes approximately 39% of adults who enjoy a favourable pattern of dental visiting and better oral health. The second constitutes a majority of some 61% who have an unfavourable (29%) or intermediate (32%) pattern of dental visiting and poorer oral health. These individuals have more untreated oral disease. Further, those with an unfavourable pattern of dental visiting receive fewer preventively-oriented services and many times the rate of tooth extractions. As a result more have an inadequate dentition. This has consequences for their quality of life and through a range of pathways may impact on their experience of systemic disease and their general health.

Therefore, the purpose of this paper is to stimulate thinking about possible policy directions to be pursued and the pace at which to move forward in improving oral health and dental care for all Australians.

Dental services program

Unfavourable dental visiting is prevalent among those who are eligible for public dental care, but a high prevalence also extends into low-moderate and moderate income households. Those adults with more supportive financial arrangements, like private dental insurance, are less likely to have an unfavourable visiting pattern than their counterparts with similar household income, but no private dental insurance. Therefore financial arrangements are required that support better access to dental services for the sizeable proportion of the Australian population who have unfavourable patterns of dental visiting as a result of the affordability of dental services. While universal financing approaches have in-principle support, the gross costs represent a many fold increase in government funding for dental services. This might be ameliorated by transfers from existing expenditure, for instance associated with social insurance arrangements. However, universality in benefits is likely in the short term to lead to little change in visiting patterns, especially under a constrained supply of dental visits because of a dental labour force shortage.

A targeted approach with a priority order for a staged implementation seems more immediately feasible and may have a better short-term outcome than full coverage of the population for dental benefits. A number of directions should be considered for financing arrangements: direct public funding; a dental insurance subsidy; a dental voucher scheme; dental savings plans; and social insurance. These can be considered alongside age (young adults or older adults) or income (lower income adults i.e., less than \$60,000 household income) targeted population subgroups. A priority order should be established among competing population subgroups.

A second element of targeting should include the scope of dental services included as benefits. Services should be selected for their potential to prevent future oral disease, assist with early diagnosis and prompt treatment and for low technology, less invasive approaches to restoring form and function. They should be cost-effective in improving oral health-related quality of life. Less agreement exists in the dental profession about the services to be included than might be expected.

Finally, financing arrangements should be capable of a phased implementation, with acceptable short-term outcomes as well as long-term aspirations.

Dental education and residency program

Whatever financing arrangements are selected for supporting for large numbers of adults in better access to dental services, there will be individuals who are still at a disadvantage in seeking their care from private general dentists and who private general dentists will be less enthusiastic about treating under a fee-for-service system. Such individuals with special care needs should be the target of public dental services. Public dental services have a very limited capacity of provide dental services. While this could be altered somewhat within a general response to the dental labour force shortage, it will be more directly affected by programs that are specifically tailored to the capacity of the public dental services. The interaction between the university education of dental providers and the public dental services represents the most fertile ground in which to positively increase the capacity and reshape the public dental services.

Australia is rapidly expanding its number of university dental schools, but there are substantial issues in appropriately supporting existing dental schools which have expanded graduate numbers and the new schools which will struggle to develop infrastructure. A key element is how dental education integrates with the state/territory public dental services. This might be aided by a hub and spokes model for clinical teaching facilities and a new national dental residency program.

A national dental residency program has academic, clinical and public health merit. A period of transition between undergraduate study and autonomous practice would provide a supported transition for graduates, with an emphasis on continued professional development and consolidation of clinical expertise. At present recent graduates face an uncertain lottery of whom with and how they try to make this transition.

Placing recent graduates in a residency program would build the dental labour force in the public dental services by over 50%, greatly increasing its capacity to provide public dental care to those eligible and targeted for such services. A residency program would provide an opportunity for dental graduates to hone their skills in a learning-for-service model, engage in community service, including settings-based oral health promotion activities, and to continue their professional development in a managed way, including some teaching and research opportunities. This would have positive implications for the graduates, the environment and culture of public dental services and the community.

Oral health promotion program

The levels of dental disease encountered among Australian children and young adults have greatly reduced across the last two to three decades. Young adults have half the number of teeth with decay experience than their parents did at the same age. However, primary school children's oral health has plateaued and then deteriorated by around 20% across the last 8–10 years.

Australia needs to restore its investment in child oral health so tomorrow's adults have as good oral health as is possible. The deterioration of the oral health of Australia's children is a concern for the present generation of children and it will precede higher levels of oral disease when they reach adulthood. There is a need to restore child oral health promotion to its previous levels of importance.

Several areas of investment in child oral health (and future adult oral health) should be considered:

- extension of water fluoridation;
- support for oral health promotion; and
- revitalization of the school dental services.

The extension of water fluoridation has been largely covered by the recent commitment to fluoridate announced by the Queensland government. This leaves support for oral health promotion, with good integration into general health promotion programs, and the revitalization of the school dental services as significant challenges. A dental residency program could boost the provision of both oral health promotion and school dental services. However, for school dental services to be the predominant source of dental care for children substantial infrastructure and program activity increases would need to occur. Increased program activities would require altered quotas on selection of oral health therapist students into Australian universities and recruitment of graduates into the school dental services. Alternatively, financing arrangements need to be extended for children and/or adolescents to seek routine dental services from private dentists. However, there would still be a need for the public (or school) dental services to assume an organizational responsibility for population-wide oral health promotion activities and a managed service delivery through private dentists, even if its coverage of the child population for dental services is far less extensive.

IMPROVING ORAL HEALTH AND DENTAL CARE FOR AUSTRALIANS

Preamble

The purpose of this paper is to stimulate thinking about possible policy directions to be pursued to improve oral health and dental services in Australia. While the paper strongly urges boldness in the scale of the policies considered, a single one size fits all policy is not seen as capable of delivering benefit to sufficient numbers of the appropriate people in our community. A bundle of policies drawing on each section of this paper would be the preferred approach. Most of those policies aim to increase access to preventively-oriented primary dental services. The pace at which access to such services can be improved is dependent on growth in supply capacity and development of new infrastructure. As a result, there are decisions required on both preferred directions and the phases through which they can be implemented.

The paper is divided into a general introduction and then consideration of three main program areas: a dental services program; a dental education and residency program; and, an oral health promotion program. The overall description of the key problems and the suggested program directions are supported by data presented in three appendices at the end of the paper.

Introduction

Australia's latest survey of oral health and dental care has described two worlds in Australian dentistry.¹ The first constitutes approximately 39% of adults who enjoy a favourable pattern of dental visiting and better oral health. These adults visit the same dentist, at least once a year and usually for a check-up. The second constitutes a majority of all adults among whom some 29% who have an unfavourable and 32% a mixed or intermediate pattern of dental visiting. Adults with an unfavourable visiting pattern don't usually visit the same dentist, they visit less than once a year and they usually visit for a problem. Nearly a third (32%) of adults has an intermediate pattern with a mixed pattern of visiting. In addition to these aspects of the frequency, intention and continuity of visiting, the pattern of visiting can be labeled favourable to unfavourable based on the type of dental services received, especially preventive (favourable) and extraction (unfavourable) services. Among adults with an unfavourable visiting pattern half the percentage receive preventive services and four times the percentage receive extractions as compared with those adults with a favourable visiting pattern. These differences in services received across time have cumulative consequences for the recurrence of disease and oral health outcomes. Ultimately these variations in dental visiting and services received are associated with a strong social gradient in untreated disease and oral health outcomes such as having an adequate or inadequate dentition.

Untreated diseases, whether dental caries or periodontal disease, are associated with infection, discomfort and pain. Delays in treatment led to more severe symptoms and greater interference in usual roles. There is also a higher probability that disease will be managed by tooth extraction, with impacts on oral health related quality of life through impairment, and social, physical or psychological disability, even handicap. While dental disease is important in and of itself, there are also pathways linking dental disease or inadequate dentitions with systemic disease and general health. These pathways open up a range of indirect consequences as a result of dental disease.

An unfavourable pattern of visiting and poor oral health outcomes are linked to social characteristics like income, Indigenous status, residential location, concession cardholder status and private dental insurance (see Appendix A). These social characteristics are also associated with affordability of dental services, indicating that dental visiting is potentially responsive to policy on the financing of dental services. Several aspects of people at a disadvantage in visiting and oral health outcomes are important in shaping a policy response. First, collectively they are a considerably larger group than just those who hold a government concession card and who have traditionally been eligible for state and territory public dental services. In addition to the 4.2 million adults who hold a concession card and of whom 42% (1.7 million) have an unfavourable visiting pattern, there are a further 2.8 million non-cardholder adults who have an unfavourable dental visiting pattern and likely poorer oral health outcomes.² Second, those who have an unfavourable dental visiting pattern are made up of a number of qualitatively different socio-demographic subgroups. These include pensioners, people receiving unemployment benefits, low-wage workers and their dependents, many rural dwellers and Indigenous Australians. Acknowledgement of the number and heterogeneity of those who have unfavourable dental visiting patterns and poorer oral health should increase attention to the structural issues in the way dental care is organised and delivered and reduce the focus on the individual, and its frequent companion, victim blaming. However, it also increases the

complexity of policy analysis and response. Policy responses face a series of questions of where, what and how should better dental care be provided to more than a quarter of all adult Australians, and a further third require improvements in some aspect of their dental visiting.

The existing system of dental care delivery strongly influences where and how better dental care can be delivered. Some 83% of Australian dentists are in private practice and 84% are general practitioners.³ Australia has a predominantly private practice, fee-for-service delivery system with only a residual public dental service. The public dental service has two main programs: the school dental services; and, adult public dental services. Increasingly these programs are being integrated into multi-function dental clinics, but the division of resources to these two programs and their interaction shapes the actual level of service delivery to child and adult Australians. The capacity of the adult public dental services is extraordinarily limited. The 1,098 dentists in the public sector provide general dental care, in theory, to 4.2 million eligible adults in addition to playing a role in the school dental services. The rate of public sector dentists is 26.8 per 100,000 eligible adults.⁴ This is in contrast to the 62.5 private general dentists per 100,000 population of adults ineligible for public dental care. It is estimated that only about 7% of all Australian adults receive dental care from public dental services in any year.²

If one wishes to increase the delivery of dental services to those currently having an unfavourable pattern of dental visiting, two strands of policy are almost self-evident. First, a heavy reliance must be placed on the participation of private dentists. They constitute the dominant segment of the labour force, they are dispersed in location (although highly maldistributed against the population) and working examples are available on arrangements that have been found successful in their participation in publicly-funded, privately provided dental care. Second, a combination of adverse circumstances for lower income Australians to gain entry into the fee-for-service mode of payment of private dentists will put some of those with an unfavourable pattern of dental visiting at a disadvantage in accessing private dentists. Maldistribution combined with travel costs or limitations, hours of practice, language and cultural or social hegemony discourage some people from visiting private practices. Further, chronic disease and complex needs, disability, or disastrous oral health all lead to more time and resources needing to be devoted to service delivery for many such adults. Fee-for-service payment struggles to accommodate such demands on the private dentist, leaving such patients less attractive to private dentists. For these reasons a parallel emphasis must also be placed on building the capacity of the public dental services to provide choice for some Australians in where they seek their dental services.

A related overarching issue is the dental labour force shortage in Australia. Better access to dental care for 4.5 and 4.9 million Australian adults who have an unfavourable or mixed visiting pattern respectively requires growth in supply capacity (See Appendix B). This supports the current emphasis on increasing the number of graduating dentists and other dental providers. However, while a reasonable increase in supply is essential to provide private dentists for the 'main street', there needs to be consideration of how to increase the supply in key shortage areas: the public dental services; and, rural areas. The labour force issue is just as much about altering the distribution and delivery of dental services as it is about increasing numbers of providers.

There is also a need to invest in improvements in population oral health. Water fluoridation is the single most effective measure in improving experience of dental caries and it should be extended to the 30% of Australian who are currently not covered. However, this cornerstone in the improvement of oral health needs to be joined by new efforts to promote oral health, possibly in integrated health promotion programs. The school dental services in each state and territory have been at the forefront of dental health education. They need to move into an age of community-based health promotion, alongside their role as a delivery system for general dental services for children. School dental services have been contracting in their child population coverage, putting their position as the lead organization in jeopardy.

Three broad programs can address most of the issues raised. These are an Australian dental services program, a dental education and residency program, and a program of oral health promotion.

Dental services program

A dental services program would aim to work towards equity of access to dental care for all groups in the Australian population and to maximise the oral health gain from future growth in the capacity to supply dental services in Australia. The following section canvasses a number of directions for public financing of dental care to improve equity of access, population groups towards whom those efforts could be aimed and types of programs that should be considered.

Financing dental services for adults

There is a need to give direction to public policy on financing access to dental services that promotes an equitable use of dental services relative to need, ensures that the financing mechanism is transparent and accountable to the population, promotes quality and efficacy in service delivery, and has low administrative overheads.

Currently in Australia, most public subsidy for dental care occurs as direct provision of care by state or territory public dental services or through rebates for private dental insurance. Some care is subsidized under Medicare but these are recent or uncertain programs.

The Commonwealth Government's contribution to the funding of dental services currently consists of a tax rebate on private dental insurance, funding for Department of Veterans' Affairs programs and for oral and dental services through Medicare. Medicare funded oral and dental services include in-patient dental services and treatment under the Cleft Lip and Cleft Palate Scheme. A voucher system exists for the Medicare Teen Dental Plan, administered through a single Medical Benefits Schedule item for routine diagnostic and preventive services only, but the still continuing Medicare Dental Services for People with Chronic Disease or Complex Conditions scheme involves a full range of dental services as recognized by the Australian Dental Associations Schedule of Dental Services. The program of dental care funding through Medicare for people with chronic diseases was due to be discontinued, but the required amendment to the Medicare Act has been blocked in the Senate. This has led to a delay in the re-introduction of the Commonwealth Dental Health Program, where the Commonwealth contracts the states and territories to provide additional public dental services with funds from special purpose grants.⁵ All states and territories provide dental care programs for children through the school dental services and for low income adults, through public dental services. These are currently wholly funded by direct state expenditure.

Out-of-pocket expenditure by individuals accounts for the bulk of dental expenditure in Australia (67%). Approximately 14% of expenditure is by private dental insurers while the Commonwealth and state or territory governments pay the balance (9 and 10% respectively).⁶

Strengths and weakness of different directions for financing access to dental care

The following sections discuss the strengths and weakness of different directions for financing access to dental services.

i. Direct public subsidy

Direct subsidy can provide a number of advantages as a vehicle for public financing of dental services. Direct subsidy can support choice of provider and maintain the principle of equity and cost-effective management. It can do this under circumstances where patients are able to make informed decisions about their care, which the current system of financing assumes is the case in relation to dental services in Australia. Direct public subsidy occurs for medical services through Medicare, which is uncapped and there is scope to incur large expenditures. Currently, Medicare does not restrict its subsidy to cost-effective services, nor is there a limit to the amount of expenditure that an individual can incur. Because they are not restricted, Medicare style subsidies do not necessarily ensure that those who currently do not receive care benefit from the subsidy or that new, more appropriate styles of provision are developed to service groups who have special need for care. However, they can ensure that financial considerations are not a major barrier to receipt of services according to need.

ii. Rebates for Private Health Insurance (PHI)

Rebates for PHI currently exist in Australia at three different levels, with higher levels provided to older groups in which health service usage is greatest. The current distribution of health insurance in Australia means that high income households benefit most ⁷ and the build of subsidy goes to households that would hold PHI in its absence. In its current form, the subsidy on PHI does not further the aim of achieving equity of access to dental care for all groups in the Australian population

iii. Vouchers

Vouchers can be used to stimulate demand for services that are underutilized from a social welfare perspective.⁸ They can also be useful where it is important to target a specific population with the subsidy. However, vouchers can have high administrative costs and these need to be balanced against the expected benefits of using vouchers rather than other demand subsidies.

Vouchers can provide a number of advantages as a vehicle for public subsidy of dental services. Vouchers can support choice of provider and maintain the principle of equity and cost-effective management. They can do this under circumstances where patients are able to make informed decisions about their care, which the current system of financing assumes is the case in relation to dental services in Australia. They are also most effective where there is competition between providers and where the voucher is restricted in the scope of services covered to effective or cost-effective interventions.⁹ Ideally, a voucher system has clearly defined eligibility for consumers and providers, as well as the range of effective or cost-effective services that can be utilised with the vouchers. Some state dental services currently operate a system of approvals, which operate in a similar way to vouchers, to fund capped, specified emergency dental care provided by dentists working in the private sector.

In this context, they simply serve to ensure access to timely emergency care, but do not contribute to other goals as choice is limited in an urgent situation and care provided is generally limited to dealing with the immediate problem.

iv. Dental savings accounts (DSAs)

In the United States (US)¹, where health savings accounts (HSAs) are more widely used, they are held in conjunction with a low premium, low rebate health insurance plan and used to cover the gap between the fee charged for care and the rebate paid by the insurance company (the excess payments).¹⁰ It is argued by their proponents that HSAs encourage saving for future health care expenses, allow the patient to receive needed care without a gate keeper to determine what benefits are allowed and make consumers more responsible for their own health care choices because their own savings pay a large part of the cost of care. They are most attractive to those who are very healthy or very unhealthy. Conversely, having large excess payments, which must be funded from a patient's own resources, even if they have already been saved, may be a disincentive to use non-urgent, but needed care, especially preventive care, which is an increasingly important element of dental services. In the US, HSAs are publicly subsidized via tax concessions on contributions; however, a public subsidy paid into the account is also feasible. At pre-determined points in time, individuals can withdraw unused funds from their accounts and pay an "income" tax and a 10% penalty on the withdrawal. One potential limitation of HSAs for people on low incomes is that the costs of care outstrip the contributions they can afford to make. HSAs also reduce the risk pooling/redistributive element of insurance. In most countries where HSAs have been implemented, the policy objective has been to reign in medical cost inflation, rather than to facilitate more widespread and equitable access to health care.

One option for dental services is to have publicly funded DSAs involving a regular contribution to be made to a DSA on behalf of an eligible person. Balances need not be used in the year in which they are contributed to the account and some part or all of the outstanding balances can be rolled over from year to year. In order to encourage appropriate use of services, there should be minimum requirements of use

¹ Singapore also has a compulsory medical savings program (Medisave) that is complemented by a voluntary low premium low deductible insurance program (Medishield). Medisave is only available for inpatient and high cost outpatient care, including some dental procedures. Additional direct public subsidies also apply for hospital care.

of dental services for outstanding balances to roll over. For example, a person cannot roll over entire balance every year, only the balance less an amount for a check-up and preventive care every two years. Individuals would self-finance dental costs above those provided for by the DSA. The DSA funds could only be used for an approved scope of services, based on cost-effectiveness and social benefit criteria. A determination would need to be made on what happens to unused funds. It could also be possible for the DSA to function as a credit facility for high some high cost services. With prior approval, these services could be funded by a “loan” from the DSA to be repaid by future fund contributions. It might apply, for example, to expensive work that preserves or replaces a critical tooth.

Alternatively, DSAs could be used to complement PHI for dental services, which may, in turn, be subsidized. This insurance could provide a high level of rebate for check-ups and preventive care (and possibly routine restorations), with lower levels of rebates for a wider range of treatment. This could be complemented by a subsidized dental savings plan that could be used to cover excess payments on a range of defined dental care services.

DSAs could be nominated as single person or family accounts, with the balance available for shared use among family members.

v. Social Insurance

Social insurance provides a basis for an insurance scheme that is geared towards equity of access .A social insurance model can provide a full- or partially funded subsidy financed from contributions from members. Contributions can be income-based, but benefits are paid according to need. Unlike DSAs, individuals do not own their contributions. It works best when there is wide pooling of risks (i.e. a large and diverse population), clear definition of the scope of services covered and benefits provided, clear definitions of eligibility and amount of coverage provided, specific premium, contribution or tax rates required to meet (or partially meet) the expected costs of the system. Social insurance for health services are designed to redistribute funds from the healthy to the sick and at the same time from those with high incomes to those with low incomes. This redistributive element from those on high to low incomes is what distinguishes social insurance from health insurance. Currently, in Australia, a system of community rating for premiums ensures that PHI also redistributes funds from the healthy to the sick. Compulsory participation in the program and heavy public subsidy may be needed to ensure that most eligible individuals choose to participate to achieve wide pooling of risks. Social insurance may be publicly managed (as in the Medicare levy) or it can be privately managed. All adults might compulsorily have to take social insurance through a private insurer. Private insurers would be required to provide access to an agreed scope of dental services with maximum gap to the full cost of dental care. Insurers could compete to gain membership share. Private insurers might also offer dental insurance to cover the gap and/or those services not covered in the agreed scope of services.

Priorities for early implementation

Reform should, according to the National Health and Hospital’s Reform Commission (NHHRC) principles result in care that has a strong foundation in primary health care, is provided in convenient sites, and supports education and research to ensure the future health of the system. The final criterion identified by the NHHRC is universality.

Universality as a principle has not been at the forefront of policy on dental services. While school dental services were introduced with a strong element of universality and some jurisdictions might claim that enrolment is universally available, the school dental services have provided services to be a bare majority of primary school children in the past and that majority status has been lost in recent years. However, concerns over patterns of dental visiting among adults have led to universality being a loud catch cry.

Universality in access to dental services seems unlikely to be reached in a single step, even in a number of steps. At present the Federal government plans to spend approximately \$850 million a year on all aspects of dental services – direct programs including the Commonwealth Dental Health Program, Medicare Teen Dental Plan and Department of Veterans’ Affairs and indirect programs such as the 30% private health insurance rebate.⁵ A universal dental program, even with some curtailing of the scope of services to restrict elective treatments, would cost possibly 65% of the estimated current dental expenditure of approximately \$6.5 billion, or \$4.2 billion. At nearly five times planned gross expenditure this seems an improbable leap across a large chasm.

The above position on universality rests on the assumption that the full costs are borne by public funding out of general taxation revenue. Alternatives are available which would reduce the dependency on general taxation revenue. For instance, under social insurance all individuals could pay a set percentage of income toward their insurance and the shortfall in actual contributions from low, low-moderate, and moderate income earners could be made up by a contribution of public funding. This would in effect move a large portion of the current private expenditure on dental services into a pool which would then be subsidized to make up the difference in expected costs of the social insurance plan. Given a current private expenditure of approximately \$5.3 billion and 65% of that expenditure being for services in scope then \$3.4 billion might be transferred from private-expenditure into a social insurance pool via a special taxation levy. While the actual estimates require elaborate cost modeling, these coarse estimates indicate the potentially substantial difference between gross and net costs. If much of the existing expenditure can be redirected through a financing mechanism the net costs or additional public funding to be found can be markedly reduced. (In principle this applies to any proposed financing mechanism).

However, there are stronger arguments for caution in a universal approach to financing dental services. Those who have a current favourable pattern of dental visiting and better oral health outcomes are likely to remain at the front of the beneficiaries of any new universal financing arrangement for dental services. These people, drawn disproportionately more from middle and upper income households are already patients-of-record of private dentists who will be in better supply in their local community. A high proportion of the subsidy will be readily used by people without the greatest need but with the greatest personal resources available to already demand and purchase dental services. This will be particularly so when new programs are implemented when supply capacity is constrained. This has been the response to the 30% private health insurance rebate which is universally available, but was predominantly taken up by those with existing dental insurance, or those new to dental insurance from middle and upper income households. In order for equitable service use relative to need to be provided, proactive approaches to targeting public subsidies to those with unfavourable patterns of visiting and poorer oral health need to be pursued.

A number of directions for targeted support should be considered:

- government concession card holders could be supported in accessing adequate dental care;
- segments of the adult population can be targeted that have a high proportion of their members who would be low income earners. Older adults and possibly younger adults meet this criterion;
- adults can be targeted directly on the basis of income in programs that have a sliding scale of subsidy relative to income, features that are characteristic of income support programs like the Family Tax Benefit Part A; or
- some combination of these might be considered.

Whatever the decisions on targeting among adults, the dental services required should be predominantly provided by private dentists. This is where most, some 66%, of those adults means tested eligible for public dental care and all of those low income wage earners are already receiving dental care, albeit dental care frequently compromised by affordability, make their dental visits. These adults need to continue to seek their dental services from private dentists. What is required is support for more favourable visiting patterns and to reduce the proportion of people whose care is compromised because of cost. If possible some level of additional outsourcing among eligible adults is required to bring the remaining demand on public dental services into line with the resources available (even with an expansion of these resources under a residency program-see later).

A number of directions might be considered including:

- a targeted program of government concession card holders e.g. those on waiting lists
- a targeted program for elders
- a targeted program for young adults
- a program of subsidy support for low wage earners.

A priority order should be established among these (and any other) competing population subgroups.

Reportedly 650,000 adults are currently on the waiting lists of public dental services. The length of the wait for general dental services is a stimulus for seeking emergency dental services, possibly stringing together several such visits over time until they approximate a course of care. However, the nature of dental care in this circumstance is highly skewed to extraction of teeth. While some public dental services have made good ground on managing the demand for emergency dental care, reducing the resources that go to providing emergency dental services, and therefore making those resources available to move to general dental care, is essential. Most, if not all, public dental services need a circuit breaker from their current difficult position.

A program to reduce waiting lists could be instituted via a dental voucher scheme for those on waiting lists. State and territory public dental services are well used to outsourcing some care and could readily administer this type of program. However, it is suggested that such a program is attractive only as an initial measure. It needs to be linked to reform of public dental service patient priority systems and scaled down as one or more other programs targeted to adults are established and grow.

Approximately two thirds (64%) of adults aged 65+ years old are government concession card holders with full or partial age pensions.² The elderly make up nearly 40% of all adults eligible for public dental care.² Targeting the elderly is equitable in that they have high needs, but generally limited resources in the retirement years. As a targeting approach it is modestly efficient in reducing the burden on public dental services for routine general dental care. As many of the elderly have had a lifetime history of seeking their care in the private sector, subsidizing their continued visits to private dentists is a logical continuation of past practice. Those elderly who are not concession cardholders are also more likely to be distributed among middle and low income earners.

At present some 35% of all 65+ year olds hold private dental insurance.² The combination of the 30 percent private health insurance rebate and lifetime health cover has not led to any sizeable increase in the percentage of the elderly with private dental insurance.¹¹ The limited increase in the rebate to 35 and 40 percent depending on age has also had little impact on insurance coverage.

The elderly could be offered a higher rebate on private dental insurance, say 60 or more percent, with a suspension of the lifetime health cover provisions. However, there is no evidence to support the actual tipping point in terms of the percentage rebate required to encourage the elderly to take up private dental insurance. Alternatively older adults could be offered a dental 'voucher' of \$500 every year for a course of dental care or every adult could have a dental savings plan with the ability to roll their savings into future years. Private dentists would claim against the voucher or savings plan through Medicare Australia using the DVA Licensed Dental Officer fees for an agreed scope of services that would be covered. Cost above the voucher or savings would be borne by the individual. Eligible older adults might be able to choose to still seek their care from a public dental service. The public dental services might redeem costs against the vouchers or savings at a discount rate.

Young adults (18–29 years old) are not eligible for school dental services, but are frequently uninsured and the majority have an unfavourable dental visiting pattern.² While the oral health of young adults has greatly improved over several decades, too many forego dental check-ups and preventive care. Young adults should be supported in receiving a periodic check-up and preventive services and low-level routine interventions. The rationale for targeting young adults is to stem the deterioration in oral health which has been a focus of investment in the child and teen years and to prevent movement into tooth loss as a result of dental disease. A low percentage of young adults are concession cardholders (18.4%). However, despite the percentages who are middle-income earners, young adults also face pressure on their disposable income as they seek to buy a home and establish a family. As a result, this age group has the lowest percentage with a favourable visiting pattern.

A basic package of dental services covered by private insurers could be negotiated and again a high (e.g. 60) percent rebate could be provided against the basic package. This would stimulate coverage across a period of life when many young adults are vulnerable to the full costs of dental care. Alternatively a dental 'voucher' of \$300 could be provided for a course of dental care or \$300 per year towards a dental savings plan. Private dentists would claim against the voucher or savings plan through Medicare Australia using the DVA Licensed Dental Officer fees. Costs above the voucher or accumulated savings would be borne by the individual. Again, eligible young adults might be able to choose to take their voucher to a public dental service. The public dental service might redeem treatment costs at a discount rate.

A different approach under social insurance would be to mandate membership for all 18–29 year olds and charge a levy of 0.5% of taxable income, with the residual funded out of general taxation revenue. There is no evidence on what percentage of this age group would demand services per year under such a financing arrangement. However it needs to be acknowledged that such an arrangement may be associated with higher demand than present insurance because it would eliminate individual out-of-pocket contributions (these are currently still about 50% of the cost of dental care under private dental insurance). For illustrative purposes it has been assumed that dental visiting might increase to 85% of young adults visiting at least once per year. It would be possible to extend the age range initially included through to 35 or 40 years old.

This would target the 'post-fluoride' generation and cover all those young and middle-age subgroups who have a high percentage of adults with an unfavourable visiting pattern.

An alternative to the age targeting of the elderly or young adults is a targeting based on income. While this could be restricted to the 4.2 million concession cardholders who predominantly have an income of less than \$20,000 per year, many other low income adults face substantial affordability issues, so much so that cost interferes with their dental visiting and, importantly, the care they are recommended and receive. Such adults receive less than adequate dental care in scope, receiving less preventively-oriented care and more tooth extraction, and less severe problems maybe left untreated only to progress at a later stage. Another large sub-group of the adult population joins with government concession cardholders in this position. Low wage earners, either singles or families, swell the number of Australian adults for whom a favourable visiting pattern and adequate dental care is less likely than among upper-middle and high income earners.

Low wage working singles or families fall above the means-tested eligibility for public dental care support, but below income levels that make the purchasing of private dental insurance more likely and therefore face the full cost of dental care without any government support. Policy is required that supports better access to dental care for concession cardholders and low wage earners, a combined group of some 8.5 million Australians.

Low-wage earners could receive assistance on a sliding scale to purchase private dental insurance. Eligibility could be linked to income support assessments with a limited number of steps in increased rebates of 45 to 60% depending on level of support received. Vouchers or contributions of different value to a dental savings plan could be issued, again linked to income support payments. Such a voucher would need to assist in seeking a check-up, preventive services and low-level routine interventions. Vouchers might be at the level of \$250- \$400 per adult per year. Alternatively equivalent contributions could be made to a dental savings plan so that support can be accumulated. This might also allow pooling across family members.

The matrix of financing approaches and target population subgroups

The following matrix presents a brief overview of the options available for long-term directions in financing dental services. The matrix has funding options on one axis and targeted groups on the other axis. There is a summary of the size of the target group, some relevant characteristics and a basis for a gross cost estimate included for each cell.

Table 1. Matrix of funding options by targeted groups

Targeted population sub-group	Financing mechanism				
	Direct public funding	Private health insurance	Voucher	Dental savings plan	Social Insurance
Eligible adults on public dental service waiting lists. 4.1 million eligible adults; 650,000 on waiting lists. Waiting list clearing	-	-	\$450/person for routine services. Gross cost \$293 million. Could be phased across several years	-	-
Young adults 18-29 yrs old 3.4 million Continuing improved oral health into adulthood, preventively-orientated, stimulating visiting	Assuming 75% visit p.a. and average billing of routine services at \$350 p.a. Gross cost would be \$893 million p.a.	Assuming 36.7% currently insured and this could increase to 60% with a 60% PHI rebate on a singles cover (\$185 p.a.) Gross cost would be \$377 million p.a.	Assuming vouchers issued to all, but redeemed by 75%. Voucher \$300 p.a. Gross cost \$765 million p.a.	Assuming contribution to a dental savings account of \$300 p.a. Gross cost \$1,020 million p.a.	Assuming 85% visit p.a. and average billing of routine services at \$350 p.a. Gross cost \$1,012 million p.a. Contribution proportional to income from 18-29 yr olds @ 0.5% = \$988 million p.a. with residual funding from general taxation revenue \$24 million p.a.
Older adults 65+ years old 2.7 million	Assuming 70% visit p.a. billing of routine services at \$500. Gross cost would be \$945 million p.a.	Assuming 35.2% currently insured and this could increase to 60% with a 60% PHI rebate on a singles cover (\$185 p.a.) Gross cost would be \$300 million p.a.	Assuming vouchers issued to all, but redeemed by 70%. Voucher of \$500 p.a. Gross cost \$851 million p.a.	Assuming contribution to savings account of \$500 p.a. Gross cost \$1,215 million p.a.	
Low-moderate income adults Total adult population 15.8 million Income: Low < \$20,000 p.a. 13.5% Low-mod < \$40,000 p.a. 34.2% cumulative Mod < \$60,000 p.a. 54.1% cumulative	Assuming 65% visit p.a. and billing of routine services at \$400 for 54.1% of all adults. Gross cost would be \$2,223 million p.a.	Assuming 4.2% of low and 14% of low-mod income adults insured and this could increase to 40% of low and 50% of low-mod income adults with a 60% and 50% rebate on a singles cover (\$185 p.a.) Gross cost would be \$810 million p.a.	Assuming vouchers issued to all, but redeemed by 65%. Voucher for low income \$400 and low-mod income \$325 and mod income \$250 p.a. Gross cost \$1,756 million p.a.	Assuming contribution to savings account of \$400 p.a. for low and \$325 for low-mod income and \$250 for moderate income adults p.a. Gross cost \$2,702 million p.a.	

Scope of dental services

The scope of dental services for which financial support is provided is a crucial issue in determining the outcome of any financing mechanism. In principle, the scope of dental services should be determined by the requirements for consultation and comprehensive examinations, followed by decisions on what diagnoses are of dental and public health importance and established standards of care, both preventive and treatment services for those diagnoses. There is far less professional agreement on these areas than is assumed. This leads to considerable debate over the inclusion of necessary care or exclusion of unnecessary care where programs are being established. An essential early step in giving direction to the development of financing mechanisms is to achieve a consensus on the scope of dental services to be subsidised. Inclusion or exclusion of specific services will be guided by the philosophy behind the dental services program. For instance, the philosophy might be to emphasize preventive clinical services, to diagnose dental diseases early and encourage prompt low level interventions to address disease, and to restore function in as cost-effective manner as possible.

In general the scope of dental services can be divided into three tiers: diagnosis and preventive; routine; and elective services. The areas of service included against each might include:

Table 2. Scope of dental services—diagnostic and preventive, routine and elective services

Tiers	Areas of service	% of current services	% of current costs
Diagnostic and preventive	Consultations	1.72	0.73
	Dental examinations	18.16	6.72
	Radiographs	13.09	3.88
	Scaling/cleaning	11.56	8.02
	Specific preventive services including fluoride treatments	6.31	1.90
Routine	Consultations	0.14	0.06
	Services associated with dental caries	34.88	37.61
	Restorations		
	Endodontics (some)		
	Services associated with periodontal disease	0.51	0.44
	Periodontics (some)		
Services associated with replacement of lost teeth	2.67	6.48	
	Partial and complete dentures (some)		
Sub-total		89.05	65.84
Elective	Crowns and Inlays	2.45	19.75
	Bridgework	0.23	0.93
	Implants	0.11	0.79
	Orthodontics	1.02	0.41
	Cosmetic dentistry including restorations placed without a diagnosis of caries and issues like tooth whitening	1.24	1.66
	Laser dentistry	0	0
	Other	5.86	10.63
Sub-total		10.91	34.16

Sources: LSDPA 2003/04; DVA Fee Schedule of Dental Services for Dentists and Dental Specialists.

The listing of the areas within routine services obscures the difficulty in developing criteria under which they would be financed. For instance, endodontics on single rooted teeth might be included, and molar endodontics included, but their use subject to a system of approvals. Less invasive periodontal services (root planning, curettage) might be included, but periodontal surgery and soft tissue laser techniques excluded.

Full arch dentures and partial dentures replacing upper anterior teeth might be included, but other partial dentures excluded.

Elective services should be those services for which there are alternative, acceptable services at a lower level which can be linked to particular diagnoses or where no treatment is a real option. This framework leaves the area of specialists services largely unaccounted. This is in keeping with an emphasis on primary health care. It also recognises that some specialist services are supported by existing arrangements, for example oral cancer, dental and maxillofacial trauma and surgical removal of impacted third molars with associated pathology.

Phased extension of financial support

A targeted approach to financial support not only directs support preferentially to those most in need it also allows for the desired growth in use of dental services to be realistic, that is within the capacity of the dental labour force to provide. It is therefore desirable to consider particular subgroups who are targeted as offering the potential of phased expansions of the population coverage within a financing mechanism. For instance, coverage may initially be limited to young adults, then low-income adults. The actual order which coverage might be extended could reflect a combination of community preferences, budgetary circumstances and the capacity of the labour force and the feasibility of policy to direct resources to meeting new demand for dental services.

It is possible to target direct publicly funded or social insurance approaches to particular age groups. For instance a social insurance approach might be initially targeted to young adults 18–29 years old. This age range could subsequently be extended to follow the lead birth cohort as it ages. This not only has merit in terms of targeting and capacity of the dental labour force it is also compatible with ‘an incremental care program’ whereby all effort is being focused on maintenance of oral health as individuals age.

A phased approach to achieving a high level of coverage might also be possible within a target group. It would be preferable to provide an effective level of financial support to smaller number of adults than a potentially ineffective support across larger numbers of the population. Effective support is that which is required to change people’s pattern of dental visiting and the dental services they receive to preventively-oriented dental care on a periodic basis and with a reduction in tooth extraction as an approach to managing dental disease.

Dental education and residency program

Even with the implementation of a financing system for dental services targeted by age or income, particular subgroups of those who receive financial support and some from more widely across the community would wish to use public dental services. Some subgroups of those eligible for public dental services, those who face the double jeopardy of low income and one or more other factors that act as a barrier to private dental care such as rural dwelling and social or cultural hegemony, would not have improved access to dental care.

A minority of government concession cardholders and others targeted for subsidy would still perceive that they have limited control over accessing private dental services and would continue to seek care from the public dental services. A further group of adults, not necessarily eligible for public dental services, would be at a disadvantage in accessing private dental care. These adults include some of those with chronic disease and/or complex needs who have had an unfavourable pattern of dental visiting and now require additional time and resources to treat. An example might be those with blood borne viral infections or mental illness. Public dental services are the provider of choice to some eligible adults and others for whom they can provide special services and in a manner not readily accommodated in the fee for service remuneration private system. It is suggested that what is required is a re-orientation of public dental services to become centres of specialised service provision to subgroups for which traditional fee-for-service dentistry does not provide an appropriate model of care.

A comprehensive response to the needs of such subgroups in the population would seize the opportunity to redress the resource scarcity in the public sector as well as an opportunity to re-shape the education of dental providers and the public dental services in very positive ways. There are some key basic elements:

- an expanded University dental education sector;
- a greater level of integration of the education sector with public dental services; and
- a national dental residency program.

While Australia has had ample documentation of dental labour force shortages, discussion of policy directions and actions to address the labour force within the National Oral Health Plan 2004–2013¹², there is a disconnect between federal and state responsibilities and portfolio interests. This is leading to an apparently uncoordinated and fragmented response. There is an urgent need for national leadership on the dental labour force.

There is a clear statement in the National Oral Health Plan 2004–2013 that Australia should work toward a sustainable, self-sufficiency in its dental labour force and the identification of some of the short- and long-term actions that are needed.¹² What is absent is a mechanism for coordinating the many stakeholders and building a level of accountability for actions. One of those actions is the increase in Australia's university sector dental education. Australia is expanding the number of domestic graduates from its dental schools (see Appendix B). The aggregate number of domestic dentist graduates will increase from the 217 per annum across the later 1990s to an expected 347 across 2009 to 2013 and 498 across 2014 to 2020.

Most of this increase will be met from the existing six dental schools together with the three further new dental schools recently approved for commencement. Total capacity to supply dental services will increase by some 7 million visits per year by the early 2020s and will allow for population growth, a transition away from edentulism and some real increase in per capita visiting. There is less of an imperative for further increases in dentist graduate numbers. Instead the distribution of the new capacity to supply dental visits to address unfavourable visiting should be the focus. This can be achieved by the targeting of particular population subgroups as already discussed. However, it can also be aided by using undergraduate students and new graduates in new, innovative arrangements between dental education and public dental services so as to address access to dental care among those people who seek public dental care.

New arrangements between education and public dental services might involve some form of hub and spokes model. Such models involve the identification of key academic oral health service sites or dental teaching hospitals which form a hub in the system and linkages from these to dispersed smaller oral health service centres in urban and rural areas. These arrangements should encourage the building of oral health service centres with a strong integration of education into public dental service delivery. This is analogous to the University rural health schools which have been developed in medical education.

Integration of education with the public dental services will greatly assist with the provision of clinical teaching services. A hub and spokes model can be used to provide effective undergraduate experience in under-served locations through rotations or electives. Such undergraduate teaching clinics need direct support so that public dental services do not face an opportunity cost for their involvement. However, there is a reciprocity that also needs emphasis. The clinical teaching provides a valuable dental service back to the community.

A high level of integration and reasonable support for undergraduate dental education would lay a foundation for a national dental residency program. A national dental residency program has academic, clinical and public health merit. A period of transition between undergraduate study and autonomous practice would reduce time pressures on the undergraduate curriculum, allowing a better paced and possibly more varied undergraduate experience. It would provide a supported transition for graduates, with an emphasis on continued professional development and consolidation of clinical expertise. At present, recent graduates face an uncertain lottery of who with and how they try to make this transition. Some succeed, but others fare poorly. Placing recent graduates in a residency program would build the dental labour force in the public dental services with a capacity to provide a substantial increase in public dental services to those who choose to use such services. A residency program would provide an opportunity for dental graduates to hone their skills in a learning-for-service model, engage in community service, including settings-based oral health promotion activities, and to continue their professional development in a managed way, including some teaching and research opportunities. This would have positive implications for the graduates, the public dental services and the community.

Given a projected graduation of some 498 domestic dentists and 200 dental hygiene and therapy graduates each year, a full residency program would increase the public dental labour force by over 50% at a time when other avenues for recruitment into the public dental services are difficult. Experience across a one year program could be tailored to greatly extend recent graduates' competency in geriatric dentistry, special needs dentistry, rural services, dentistry for the intellectually and physically disabled as well as routine general dental care for special subgroups of Australians. Such experience needs to be well supported with a

mix of professional development and extension of skills into advanced areas as well as mentoring of more routine dental practice.

Not only would a residency program greatly expand the capacity of the public dental labour force when other approaches seem limited, it will provide an opportunity to alter the environment or culture of public dental services. If well supported and managed, greater numbers will choose to extend their transition by joining the public dental services. A resident needs a competitive salary package with support for travel and accommodation on rotations. Consideration might be given to HECS relief as recognition for 'community service'. Their activities need mentoring and an adequate level of administrative support. Clinical activities also need a good level of dental assistant and reception support, and a more open approach to supplies and the scope of services provided. Finally, continuing professional development should be formally structured and should be rewarding. While such support will be at a cost, the expansion of the public dental services is likely to be achieved in a cost-efficient manner in comparison to all other approaches.

The greatest barrier to such a program is the needed infrastructure. A program of matching capital expenditure between the Commonwealth and the states and territories is needed to expand the multi-chair clinics, co-located with other health services, where residents can practise. As this infrastructure will take time to build, a phased voluntary residency might be required across initial years with a set target year for full implementation of a residency program.

Costings for a residency program

The following costings are for the infrastructure development of academic oral health service centres that could accommodate a fully implemented graduate residence program and the annual costs of operating a residency program for all dental graduates (dentist and oral health graduates).

Infrastructure could be developed under a matching contribution from states and territories. In order to build the capacity of the hubs (i.e. dental teaching hospitals) a new hub would be required each year for five years. The spokes, or academic oral health service centres, barely exist at present. Some 10 such centres would need to be established each year for five years to build the capacity toward the 700 graduate residents. These developments would require some \$150 million p.a. The full operating cost of the residency program would be \$152 million p.a. Just less than half this cost is for residents' salaries and the remainder for appropriate support for the residency program and their service provision.

Investments in future oral health

Oral health promotion program

Australia needs to restore its investment in child oral health so tomorrow's adults have as good oral health as is possible. Unfortunately, child oral health has been deteriorating for nearly a decade (see Appendix C). The deterioration of oral health of Australia's children is a concern for the present generation of children and it will precede higher levels of oral disease when they reach adulthood. There is a need to restore child oral health promotion to its previous levels of importance.

Several areas of investment in child oral health (and future adult oral health) should be considered:

- extension of water fluoridation;
- support for oral health promotion; and
- revitalization of the school dental services.

Extend the coverage of water fluoridation

Water fluoridation is a safe, effective and socially equitable public health measure for the prevention of dental decay across all age groups. Some 30% of Australians do not have access to water fluoridation. Fortunately this will be reduced by the Queensland government decision to fluoridate over 2008/09. Over 90% of Australians will be covered by water fluoridation at the end of its implementation in Queensland. Those without access to fluoridated water are concentrated in lower social position households. They include some of Australia's most vulnerable groups for poorer oral health: Indigenous people and rural dwellers. All remaining treated potable water supplies should be fluoridated. A government cost sharing agreement on capital costs of water fluoridation should be reached so as to stimulate the implementation of water fluoridation in the prevention of dental caries. No other single measure can be taken to improve oral health that would achieve the cost-effectiveness of water fluoridation. It provides improved child, adolescent and young adult oral health that is a platform for all other oral health promotion activities and ongoing

maintenance of oral health. Its extension into areas with a bias toward lower socio-economic households and its increased benefit for those most at risk would contribute to reducing inequalities in oral health.

Support for oral health promotion

Community-wide efforts to re-shape the context in which people's oral risk and protective behaviours are formed and maintained are essential. Dental diseases share a number of risk factors in common with the major national health priority areas. Not only are there common risk factors, such factors tend to cluster in population groups with a lower socio-economic status. These are persuasive reasons for integrating oral health promotion into general health promotion. With appropriate tailoring and targeting of programs it would be expected that vulnerable groups might receive the greatest benefit.

Opportunities abound for oral health promotion to be integrated into general health promotion, from the cradle to the grave. For instance, the growing concern over childhood obesity draws attention to dietary patterns and nutrition as well as physical activity levels. Dental decay is a diet-related disease and therefore health promotion programs directed at childhood obesity can also incorporate a focus on the reduction of dietary hits of extrinsic sugars and highly acidic drinks. Further, evaluation of such programs should include consideration of the oral health outcomes.

Another timely example is the current interest in healthy ageing. Health checks at age 75 years with general medical practitioners can readily incorporate oral disease screening questions and lead to assistance that offers to improve the appalling state of oral health when older adults enter into residential care.

While programs for oral health promotion should be integrated into general health promotion, there is a need for expertise to be developed and maintained around the key oral health problems for the Australian population. Research, demonstration activities, and input into the design, implementation and evaluation of larger scale programs are required to foster oral health promotion. Two different levels of activity are required. Each state and territory needs to be stimulated into establishing or expanding its own oral health promotion unit. However, there also needs to be a coordination of knowledge and activities so that there is a minimum of duplication. This is hoped to be achieved through the Oral Health Promotion Clearing House as proposed in Australia's National Oral Health Plan 2004–2013.¹² While not a substantial budgetary measure, these types of commitments are required to affirm the importance and raise the effectiveness of oral health promotion activities.

Revitalise the school dental services

Three decades of improving child oral health have come to an end and oral health among the 50 per cent of Australian children cared for in the school dental services has deteriorated over the last eight to ten years. This deterioration is uneven across ages and states and territories, but nationally there has been an increase of around 20% in the number of teeth with caries experience. Child oral health is not solely an outcome of dental care and it is likely that the school dental services have played a modest role in past achievements. However, the organisation/infrastructure and critical mass in each state and territory make it appropriate that the school dental services assume a greater responsibility for reacting to the deterioration observed. This reaction should see a re-vitalisation of the school dental services. The revitalisation should include:

- a commitment to population child oral health promotion. Quite specific oral health promotion activity needs to be initiated in the areas of maternal and child oral health, preschool oral health, and school oral health. There needs to be an emphasis on health promotion that helps decrease risk and increase protective behaviours or exposures;
- a commitment to expansion of school dental service coverage among the child population, especially lower socio-economic children who slip through its safety net;
- a strong emphasis on clinical prevention on the basis of risk identification and management as part of the provision of dental services; and
- consideration of the wider mission of the school dental services as a context in which attitudes and behaviours are being shaped among children.

Such activities must aim to improve oral health among vulnerable children and serve as an investment in their longer-term oral health as adults. Unfortunately policies surrounding school dental services have reduced its coverage of primary school children. For instance, between 1996 and 2005 the proportion of children reported to have made their last dental visit to a school dental service declined from just over 50% to just over 40% (see Appendix C, Table C2). Alongside the reduction in coverage for treatment, school dental services may be playing less of a role in oral health promotion across the child population.

Funding for a re-vitalization of the school dental services needs to be directed at three key areas:

- the education of dental therapists;

This needs to be integrated into the support for Australian dental education. The specific issues are scholarships that will assist in attracting and retaining Bachelor of Oral Health (BOH) graduates to work as dental therapists for the school dental services. Consideration will also be needed for growth in commonwealth-supported BOH places in universities.

- the re-building or extending of school dental service infrastructure;

The school dental services were developed under tied or special purpose Commonwealth grants for infrastructure predominantly in the 1970s. To stimulate re-building and/or extension of school dental service infrastructure, special purpose capital grants should be made available on a 1:1 matched basis with states and territories.

- incentives for the states and territories to expand school dental service coverage;

In order to stimulate the states and territories to expand their population coverage with school dental services special purpose operating grants should be made available on a 1:1 matched basis with new funding from states and territories.

The child and teen population coverage by the school dental service varies considerably by state and territory (see Appendix C). The school dental service is the provider to the majority of children in five out of eight states and territories. However it is the provider to a minority in NSW, Victoria and the ACT. While it is certainly possible to extend the coverage of the school dental service in those states and territories, it may be equally feasible to create a mixed school dental service and private dentist system. A transition from one provider to another at the teen years might also be feasible. This would be in line with the recently introduced Medicare Teen Dental Plan. However, even if child dental services delivery includes private dentists there are two essential roles for the public/school dental services. One is as an organizational body with an administrative oversight of both the access to dental services and the provision of services by private dentists. Such activity is necessary in order to assure that children will visit at an appropriate interval (possibly determined by a caries risk assessment) and that services provided by private dentists have an emphasis on clinical preventive and routine dentistry. It would also be desirable for child dental services provided by private dentists to involve dental therapists and hygienists. The second role is as a collective group organized along jurisdictional lines which has the critical mass of resources to plan and deliver oral health promotion activities for the Australian population on behalf of the dental profession.

Cost of stimulating oral health promotion

The cost of stimulating oral health promotion activities would be very modest. A recurrent expenditure of some \$5–10 million p.a. would dramatically increase the levels of integration of oral health into general health promotion and specific oral health promotion activities at a state/territory level and through a clearing house.

A revitalization of the school dental services could be partially accommodated within the proposed dental residency program, but would require additional funds to build specific infrastructure, for instance linked to the emerging super schools and new oral health service centres, and to an expansion of the numbers of dental therapists employed. A matched contribution of states and territories might be required. Existing infrastructure is also ageing and a revitalization and extension of the school dental services infrastructure might require a total of \$50 million p.a. for five years. It is estimated that the school dental services have a recurrent cost of approximately \$100 million p.a. A 50% expansion of their coverage of primary and secondary school children would require \$50 million total from all levels of government.

All three of these funding proposals need to recognise that states and territories are at very different stages in the operation of a school dental service. Two states, NSW and Vic, and one territory, ACT, have very much less well developed school dental services. Funding will necessarily need to be disproportionately directed toward those states that have a more substantial challenge in revitalizing their school dental services, still on a matched basis. If a mixed school dental service and private dentist model is pursued, infrastructure expenditure may be proportionally less but operating costs are likely to be higher.

Appendices

Three appendices are presented to accompany the policy directions presented in the main paper. The purpose of the appendices is to introduce data that help describe the key problems, analyze the three policy directions proposed and provide additional detail that might be useful in assessing the policies proposed.

Appendix A aims to describe access to dental services among Australian adults and the resultant oral health outcomes. The proposition is that access to dental services varies by social characteristics and that this inequality, which stretches well into the middle income range, has an accumulative effect on key oral health outcomes. Arrangements for the financing of dental services, like private dental insurance and eligibility for public dental services, have a marked effect on access to dental services, indicating the potential to influence access through policy that addresses issues like affordability of dental services. The pattern of dental visiting by age, private dental insurance and cardholder status and the association of age and income provide ways of segmenting the adult population for the purpose of targeting those most in need if policy is to focus on less than universality. Appendix A draws on largely unpublished data from the National Survey of Adult Oral Health (NSAOH) 2004-2006 and its associated National Dental Telephone Interview Survey (NDTIS) 2005.

Appendix B aims to describe the dental labour force in Australia and projections of the demand for and capacity of the labour force to supply dental visits through to 2020. This provides a background to dental education in Australia, and the relative contribution of different occupational groups within dentistry to the supply of dental visits. This is useful so as to understand the size of the graduation pool each year, particularly for consideration of a dental graduate residency program. A key proposition from Appendix B is that the growth in capacity to supply dental services, even with a number of new dental schools established in the last year, only modestly exceeds the expected population growth in Australia and further inescapable changes like the increasing percentage of the population that is dentate. Dentate adults experience the full range of dental problems and as a consequence use more dental services. In this constrained labour force environment there is only limited opportunity for adults to demand and make additional dental visits over and above current levels. This is an important influence on the feasibility of some policy directions. This also establishes a major imperative for consideration: who will be advantaged in receiving the additional dental services the labour force will have the capacity to deliver? Appendix B draws heavily on the labour force research conducted by ARCPOH using the National Dental Labour Force Data Collection (NDLFDC).

Appendix C describes child oral health in Australia and children and teens' use of dental services. This is to provide a background for considering the need for oral health promotion programs in Australia so as to improve child oral health and invest in better oral health among tomorrow's adults. A proposition from Appendix C is that Australia's special program for access to dental services for children, the school dental service, has seen a decline in coverage and is now only a minority provider, especially in two states and one territory. Considerable effort would be required to either re-establish the school dental services as the major provider of child dental services or to support access to private dentists. Even if the later path is pursued it needs to be recognized that the public/school dental services have the critical mass required to conduct population oral health promotion programs and oversight of the provision of dental services to children and teens. Appendix C draws on data from the AIHW Child Dental Health Survey (CDHS) and for children's and teen's visiting pattern on unpublished data from the National Dental Telephone Interview Survey 2005.

Appendix A: Pattern of dental visiting

Less than half (39%) of Australian dentate adults have a pattern of dental visiting which can be described as favourable. These adults visit the same dentist, at least once a year and usually for a check-up. In contrast a little more than a quarter (29%) of adults have an unfavourable pattern of visiting. These adults don't usually visit the same dentist, they visit less than once a year and they usually visit for a problem. Nearly a third (32%) of adults have an intermediate pattern with a mixed pattern of visiting.

An unfavourable pattern of dental visiting is associated with age and sex with a higher percentage of young adults 25–29 years old and adults 30–34 and 35–44 years old and men having an unfavourable pattern of dental visiting.

Table A 1. Visiting pattern by age and sex

	Unfavourable	Intermediate	Favourable
Age			
All adults 18+	28.5	32.2	39.3
18–24	26.0	33.6	40.4
25–29	36.5	39.7	23.8
30–34	29.1	38.3	32.6
35–44	31.4	32.1	36.4
45–54	25.9	31.1	42.9
55–64	24.7	29.3	46.0
65–74	28.1	27.4	44.5
75+	27.7	22.0	50.3
Sex			
Male	33.5	32.5	34.0
Female	23.5	31.8	44.6

Source: NDTIS 2005

After adjusting for age and sex, an unfavourable pattern of dental visiting is associated with a range of social characteristics.

Table A 2. Unfavourable pattern of visiting by social characteristics

% Unfavourable pattern of dental visiting					
All Adults	28.5				
Income		Indigenous		Concession cardholders	
<\$20,000	43.4	Indigenous	40.2	Cardholder	41.7
\$20,000–\$40,000	35.8	Non-Indigenous	28.2	Non-cardholder	23.7
\$40,000–\$60,000	27.3				
\$60,000–\$80,000	24.3	Urban/rural		Private dental insurance	
\$80,000+	16.9	Urban	27.1	Non-insured	39.7
		Rural/remote	38.0	Insured	15.9

Age and sex adjusted estimates

Source: NDTIS 2005

The pattern of attendance is labeled favourable to unfavourable because it is associated with both the frequency of visiting and the type of dental services received. Half the percentage of adults who had visited in the last year with an unfavourable pattern of dental visiting receive preventive services compared to adults with a favourable pattern of dental visiting. Nearly five times the percentage of adults with an unfavourable compared to a favourable pattern of dental visiting receive an extraction in the last year. The receipt of restorative services by pattern of dental visiting show less marked variation, but is lower among those with a favourable pattern of dental visiting.

Table A 3. Receipt of specific services in the last year by pattern of dental visiting

Pattern of dental visiting	% Adults receiving services in last year		
	Preventive	Restorative	Extraction
Favourable	83.8	38.3	8.9
Intermediate	58.7	51.6	19.1
Unfavourable	42.5	44.7	32.4

Age and sex adjusted estimates

Source: NDTIS 2005

Inequality exists in the pattern of dental visiting and the receipt of dental services. These subtle differences in dental services received at any time have cumulative consequences for the prevention of oral disease and oral health outcomes for adults.

Oral health of Australian adults

The two most common dental diseases are dental caries and periodontal disease. The total past and present experience of dental caries is measured by the DMFT index – the sum of Decayed, Missing and Filled teeth. The amount of untreated decay reflects more recent disease and whether it has been treated. Periodontal disease is more readily measured by its prevalence – the percentage of people with moderate or severe destruction of the teeth supporting tissues at any one time. The number of teeth which have caries experience and the percentage of adults with periodontal disease are strongly age-related. Both are irreversible and tissue destruction associated with each disease worsens over time. The DMFT index tends to plateau across older age groups. However, this is more a methodological feature of the measure than an age-related feature of dental caries. Disease activity continues, but more and more disease affects previously affected teeth and is not reflected in any change of the measure. The prevalence of periodontal disease tends to increase more across older age groups. How these diseases are managed influences the oral health outcomes for people. One outcome measure is the presence of less than 21 natural teeth, what might be called an inadequate dentition. The prevalence of an inadequate dentition remains low in young adult age groups, but increases sharply across adult age groups as more of the dental disease experience is treated by tooth extraction. Male adults have similar levels of caries experience but slightly more have untreated decay than female adults. More male adults have periodontal disease, but similar percentages of male and female adults have an inadequate dentition.

Table A 4. Oral health of dentate adults by age and sex

Age	DMFT	% Untreated decay	% Moderate/severe periodontal disease	% <21 teeth dentate adults
All	13.5	25.7	24.2	12.5
18 – 24	3.7	25.7	2.8	0.1
25 – 34	5.9	27.2	11.9	0.2
35 – 44	10.7	29.7	18.5	2.8
45 – 54	18.5	24.3	31.4	10.2
55 – 64	21.7	23.2	40.9	25.4
65 – 74	23.3	21.6	48.9	43.1
75+	24.3	22.0	60.8	55.8
Sex				
Male	12.9	28.6	28.1	12.5
Female	14.1	22.7	20.2	12.6

Source: NSAOH 2004–06

These four measures (DMFT, untreated decay, prevalence of periodontal disease and an inadequate dentition) can be used to look at variation in oral health by social characteristics and pattern of dental visiting. As these measures are age- and sex-related, associations with social characteristics are examined after adjusting for age and sex.

The number of teeth with caries experience shows only modest variation by social characteristics. While modest, the social gradient is usually in the expected direction. On the other hand, the prevalence of periodontal disease in advantaged population subgroups is substantially lower than among those with various social disadvantages. Even greater differences exist for oral health outcomes like the presence of untreated decay or an inadequate dentition.

Table A 5. Oral health of dentate adults by social characteristics

	DMFT	% untreated decay	% Moderate/severe periodontal disease	<21 teeth dentate adults
Income				
< \$20,000	15.0	39.8	33.5	21.4
\$20,000 – \$40,000	14.5	27.5	28.9	16.3
\$40,000 – \$60,000	14.2	29.5	28.8	10.4
\$60,000 – \$80,000	14.4	21.8	27.9	9.7
\$80,000+	13.3	17.3	18.1	5.2
Indigenous status				
Indigenous	15.2	49.3	34.2	19.6
Non-Indigenous	14.0	25.3	26.7	14.2
Urban/rural				
Urban	14.0	24.8	26.1	13.8
Rural	14.4	31.7	32.8	18.5
Concession card holders				
Card holder	14.7	35.3	32.1	19.8
Non-cardholder	13.9	22.4	24.4	11.3
Private dental insurance				
Non-insured	14.1	31.1	31.4	18.0
Insured	14.2	19.7	21.7	11.0

Age and sex adjusted estimates

Source: NSAOH 2004–06

A contribution to the explanation for these associations lies with access to dental services. This is seen by examining the four measures across patterns of dental visiting. There is no difference in number of teeth with caries experience across unfavourable to favourable pattern of visiting. This reflects the greater success in dental practice in the repair of damaged tooth tissue than in preventing the future incidence of caries or its recurrence at already affected sites. A favourable pattern of visiting is associated with a lower prevalence of periodontal disease, either because positive dental behaviours like visiting also cluster with better tooth cleaning and not smoking, or because of some level of efficacy of dental treatment in preventing periodontal disease. A favourable pattern of dental visiting is also associated with much lower prevalence of untreated decay and better oral health outcomes. More of those adults with an unfavourable pattern of dental visiting have an inadequate dentition.

Table A 6. Oral health of dentate adults by pattern of dental visiting

	DMFT	% untreated decay	% Moderate/severe periodontal disease	% <21 teeth dentate adults
Pattern of dental visiting				
Unfavourable	13.9	38.4	31.1	23.3
Intermediate	14.4	26.9	29.7	14.5
Favourable	14.1	14.4	21.2	9.4

Age and sex adjusted estimates

Source: NSAOH 2004–06

Inequality exists in oral health among adults. While the inequality in underlying caries experience is small, larger inequalities exist in untreated decay. Interestingly marked inequality also exists in the experience of periodontal disease. Though different service-mixes that are associated with visiting pattern, marked inequality emerges in oral health outcomes as reflected by the presence of untreated disease and an inadequate dentition.

Affordability of dental services

Nearly one-third, 31.2%, of dentate adults in Australia report that they avoided or delayed visiting due to cost. While cost of dental care is not alone as a barrier to care, it receives attention because to is amenable to change through public policy.

Table A 7. Avoiding or delaying dental visits among dentate adults due to cost by social characteristics

		% Avoiding or delaying dental visits			
All Adults	31.2				
Income		Indigenous status		Concession cardholder status	
<\$20,000	46.6	Indigenous	37.9	Cardholder	44.0
\$20,000 – \$40,000	40.7	Non-Indigenous	31.1	Non-cardholder	27.2
\$40,000 – \$60,000	32.2	Urban/rural		Private dental insurance	
\$60,000 – \$80,000	26.7	Urban	31.4	Non-insured	42.1
\$80,000 +	20.0	Rural	29.6	Insured	19.7

Age and sex adjusted estimates

Source: NDTIS 2005

While there is a social gradient in the percentage of adults reporting cost as a barrier by income, this is not as steep as might be expected. This may in part be due to varying perceptions of the actual cost of care likely to be associated with a dental visit. Delaying a visit due to the cost associated with an examination and extraction is different from delaying a visit associated with an examination and several restorations or even on endodontic treatment and subsequent crown.

A similar difference in cost as a barrier is reported for Indigenous status and concession cardholder status. The difference by concessional cardholder status maybe somewhat attenuated by a minority of cardholders, 31.3% , making their last visit to a public dental service which will be at least largely publicly subsidized. Almost no difference in cost as a barrier is seen by urban/rural location. In contrast, a marked difference in the prevalence of cost as a barrier is seen by insurance status. Those who are non-insured report a high prevalence of cost as a barrier, 42.1%, more than twice that reported by those who are insured. Given the presence of cardholders who visit public dental services among the non-insured, it is likely that cost as a barrier is most prevalent among non-cardholders who are not insured and lower or middle income.

Avoiding or delaying a dental visit is the start of a process which compromises dental care. Over half of those who avoid or delay visiting due to cost, also report that cost prevents them proceeding with recommended dental treatment. In contrast less than one in ten, 8.9%, report that cost prevented recommended dental treatment if they did not avoid or delay a dental visit due to cost. Ultimately cost rations the treatment received. Twice the prevalence of tooth extractions is reported among those for whom cost prevented recommended dental treatment than among those for whom cost did not prevent recommended dental treatment. It is the repetitive nature of this impact of cost on the manner in which oral disease is managed across number of years in the lifespan that influences oral health outcomes such as the retention of teeth or the slide into an inadequate dentition.

Segmenting the adult population

A number of characteristics can help segment the adult population into subgroups if anything less than universality in public subsidy is being considered. These characteristics include age, cardholder status and insurance status. Age and cardholder status have been the dominant characteristics used in segmenting the population for targeted public subsidy.

Breaking the adult population into 10 year age groups produces roughly equal proportions in the first four age groups followed by a smaller proportion in the 65+ year old age group. The percentage of adults who are cardholders is strongly age-related. Therefore, targeting by age can capture very different proportions of adults who are concession card holders. While some 18.4% of young adults are cardholders, this drops to a low of 13.7% among 30–39 year olds and 14.3% among 40–49 year olds before increasing to 20.5% among 50–64 year olds and finally 64.1% among 65+ year olds. As a result, nearly 4 in 10 cardholders are 65+ years old.

Table A 8. Age distribution of dentate adults and percentage each age group concession cardholders

Age	% Adult dentate population	% Cardholders in each age group
All	100.0	23.2
18 – 29	23.0	18.4
30 – 39	20.6	13.8
40 – 49	20.5	14.3
50 – 64	22.6	20.6
65+	13.4	64.2

Source: NDTIS 2005

Among all dentate adults, 86.5% last visited a private dentist. Just more than one in ten dentate adults last visited a public dental clinic. A small percentage made their last visit to other providers such as dental insurer clinics or dentists employed by corporations. Just less than a quarter of all dentate adults are cardholders. While adult cardholders are eligible for publicly subsidized public dental care, only a minority of cardholders' place of last visit was a public dental clinic. Two-thirds of adult cardholders made their last visit to a private dentist, leaving only 31.3% of adult cardholders last seeking their dental care from a public dental service.

Table A 9. Adult dentate population by cardholder status and place of last visit

Cardholder status	% Adult dentate population	Place of last visit			
		Public	Private	Other	Total
All		11.3	86.5	2.2	100.0
Cardholder	23.2	31.3	66.7	2.1	100.0
Non-cardholder	76.8	5.3	92.5	2.2	100.0

Source: NDTIS 2005

This pattern of eligibility versus place of last visit emphasizes the perceived resource constraints of the public dental services which leave eligible adults to seek their dental care from private dentists, even with the associated affordability issues of private dental care for these low income adults.

The visiting of private dentists by cardholders also reflects the heterogeneity of cardholders as a population subgroup. Cardholders vary greatly in their life history. There are substantial differences between an unemployed young adult, a middle-aged single mother or person with a disability pension and a retiree who has an age pension. Cardholders' dental history will also vary. As a result, a surprisingly high percentage of cardholders have dental insurance. Many will be age pensioners with a history of favourable visiting, assisted by long-term cover by dental insurance.

Table A 10. Adult dentate population by cardholder and insurance status

Cardholder status	Insurance status	
	Insured	Non-insured
Cardholder	27.1	72.9
Non-cardholder	53.0	47.0

Source: NDTIS 2005

A similar percentage of those adults who are cardholders and have insurance visit private dentists as found among non-cardholders. This indicates the potential to support cardholders in seeking their dental care in the private sector, decreasing the dependence on public dental services and thus allowing some focusing of public dental care on particular sub-groups of those adults deemed eligible. It also points to residual subgroups, who for a variety of reasons may still be best served by eligibility and use of public dental services.

Table A 11. Adult dentate population by cardholder and insurance status and place of last visit

Cardholder status	Private dental insurance	Place of last visit		
		Public	Private	Other
Cardholder	Yes	6.9	92.1	1.0
	No	40.1	57.4	2.5
Non-cardholder	Yes	1.7	97.5	0.8
	No	9.2	86.9	3.8

Source: NDTIS 2005

Segmentation of the adult population by cardholder status is a coarse dichotomy that leaves many non-cardholder, low income adults without any targeted public subsidy. Income may also be used in a finer grade segmenting of the population.

Table A 12. Distribution of the adult dentate population by age and household income

	Household income				
	<\$20,000	\$20,000–\$40,000	\$40,000–\$60,000	\$60,000–\$80,000	\$80,000 +
All	13.5	20.7	19.9	16.5	29.3
Age					
18–29	6.3	18.6	20.3	19.0	35.7
30–39	5.7	17.5	23.9	19.8	33.1
40–49	7.4	15.8	21.4	19.9	35.5
50–64	13.8	22.9	20.0	14.9	28.5
65+	47.2	33.6	10.1	4.8	4.3

Source: NDTIS 2005

These data indicate that household income categorized by \$20,000 bands roughly equates to quintiles of population, with a lower percentage of adults in the lowest household income category and a higher percentage in the highest household income category. A ceiling of \$80,000 reduces the target population by nearly 30% and \$60,000 by 45%. Income can be used to target eligibility above the cardholder dichotomy so as to both capture lower and middle-income adults, but exclude higher income adults. Such combinations improve the equity of financing arrangements and may at the same time reduce the costs by limiting eligibility. Combinations of age and income are also possible for targeting.

Appendix B: The dental labour force

Australia entered this decade with a growing shortage in the dental labour force. Labour force projection models indicated that by 2010 there would be a shortage of 1500 dental providers who could provide some 3.8 million dental visits per year.¹³

The dental labour force in Australia is dominated by general dentists, with specialist dentists and dental therapists the next major groups of providers, followed by dental hygienists and dental prosthetists.

Table B 1. Dental labour force by occupational distribution, area of practice, rate per 100,000 population and type of practice, 2005

Dental labour force	Number	Rate per 100,000	Number by type of practice		
			Private	Public	Other
Dentists	10,074	49.5	-	-	
General practice	8,483	41.7	7292	1098	93
Specialist practice/ Restricted practice	1,185	5.8	1006	157	21
Administration/Teaching/ Research/Other	407	2.0	33	344	30
Dental therapists	1,521	7.5	326	1169	27
Dental hygienists	873	4.3	696	128	48
Dental prosthetists	862	4.2	774	79	9

Source: NDLFDC 2005

These data emphasise the role of general practice dentists. It needs to be further emphasised that the majority of general practice dentists have their main type of practice in the private sector and this is even more so with specialist dentists. This is also the situation for dental hygienists. They predominantly work in private specialist practices with orthodontists or with private general practice dentists. This is in contrast to dental therapists whose main type of work is in the public sector, until recently exclusively within the school dental services.

There are a number of implications of this profile of the dental labour force. The predominance of private general practice indicates that policy impacting on access to dental services for most Australian adults needs to impact on access to private general practice delivered dental services. Public dental services, which rely heavily on public general practice dentists and dental providers undergoing either undergraduate or postgraduate education offers at present a more limited resource for delivery of dental services. Further, the expansion of dental therapist and/or dental hygienist numbers, although crucial to specific programmes like the school dental services or to shifting the occupational mix toward prevention and lower technology services like traditional and non-tradition dental hygiene services has to be, by necessity, focused on more limited objectives. The numbers of these providers is too few to be dispersed across a large proportion of the population.

The need for reflection on occupational and sectorial distribution of the dental labour force has to be extended to consideration of the geographic distribution of the dental labour force. There is substantial variation in the rate of dentists, hygienists and prosthetists per 100,000 population by remoteness area. However, dental therapists are distributed more evenly by remoteness area, with higher rates outside major cities.

Table B 2. Rate of dental providers per 100,000 population by remoteness area of main practice, 2005

Remoteness area of main practice	Dental providers			
	Dentists	Therapists	Hygienists	Prosthetists
Major city	58.6	6.6	5.0	4.4
Inner regional	34.6	8.5	3.1	4.8
Outer regional	28.5	10.9	2.5	3.0
Remote	19.8	8.1	2.6	0.6
Total	49.5	7.5	4.3	4.2

Source: NDLDC 2005

Dental therapists, employed predominantly in the public sector and within a targeted program, the school dental service, show a geographic distribution that would aid equitable access to dental services among school children. These data lend support for the potential of policy to match specific portions of the dental labour force to targeted population sub-groups with a favourable outcome in terms of geographic distribution.

Capacity to provide dental visits is central to maintaining existing patterns of dental visiting, and more importantly, altering patterns of dental visiting that are unfavourable or mixed in character toward a favourable visiting pattern.

Australian universities are expanding the number of dental graduates from existing dental schools and establishing new dental schools.¹⁴ While the impact of this has been limited so far because of the lag in time between entry into dental education and actual graduation, the number of graduates available for recruitment into the dental labour force is about to increase at an accelerating rate.

Table B 3. Australian domestic graduates, actual DEST completions 2003 to 2005 and estimated completions 2006 to 2020

Institution	Year					
	2003	2004	2005	2006–2008	2009–13	2014–20
University of Melbourne	48	45	49	47	70	70
University of Sydney	61	96	44	67	75	85
University of Adelaide	45	34	62	47	58	58
University of Queensland	47	1	43	45	45	50
University of Western Australia	26	44	32	34	45	45
Griffith University					54	70
James Cook University						50
La Trobe University						30
Charles Sturt University						40
University of New Castle						
Total	227	220	230	240	347	498

Source: NDLDC 2005

By 2014 Australian domestic graduate numbers will have increased over two-fold against the numbers in the early years of the 2000 decade. In the meantime, there has been an earlier substantial increase in overseas trained dentists being recruited to Australia. This recruitment is made up of two separate streams: those overseas trained dentists who hold degrees that are accepted for registration with Australian dental boards (United Kingdom, Ireland and NZ) and those dentists whose degree provides a pathway into the Australian Dental Council (ADC) examinations. These streams across 2005–2008 are contributing 57 and 141 dentists

respectively to the labour force each year. Projection models assume that the first pathway will maintain its level, while recruitment from the ADC pathway is estimated to be to 100 dentists per year. This is somewhat lower than ADC examination completions as it is estimated that only two-thirds of ADC completions led to practising in Australia.

Projections of the dentist labour force through to 2020 show a substantial increase in numbers and to a slightly lesser extent the rate per 100,000 as a result of population growth¹⁵. Capacity to supply dental visits also increases, but to a considerably lesser extent because of extrapolated trends of reduced number of dental visits supplied per dentist per year. In the past this rate of dental visits supplied per year per dentist has decreased as a result of an increased number and overall complexity of services supplied per visit, thereby extending the time taken for a visit. A future contributor to the trend in annual visits supplied may also be reduced hours worked per year reflecting a new work/family/leisure balance.

Table B 4. Projection of the dentist labour force 2005–2020

	Projected dentist labour force			
	2005	2010	2012	2020
Number of dentists	10,067	11,551	13,216	15,042
Male	7,210	7,736	8,349	9,063
Female	5,858	3,815	4,867	5,979
Rate dentists per 100,000 population	49.4	53.6	58.3	63.2
Capacity to supply dental visits (million)	25.1	27.3	29.6	32.3

Source: AIHW DSRU^{14,15}

The changing numbers of dental therapists, hygienists and prosthetists and their capacity to deliver dental visits also need to be projected. Projection models for dental therapists, hygienists and prosthetists show that the numbers of therapists and prosthetists are declining, but numbers of hygienists are increasing.

Importantly, the three groups add only modestly to the capacity to supply dental visits and the additional number of visits is relatively unchanged across 2005 to 2020.

Table B 5. Projected capacity of dentists and all dental providers 2005–2020

	Capacity to supply dental visits			
	2005	2010	2015	2020
Dentists	25.1	27.3	29.6	32.3
All dental providers	29.2	31.5	34.0	36.6

Source: AIHW DSRU^{14,15}

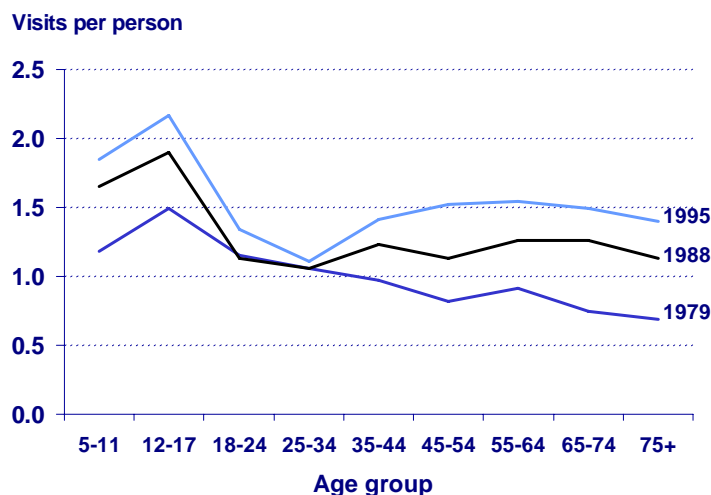
The crucial policy issue associated with this increase in the capacity to deliver dental visits is just to whom, where and how those additional visits will be provided. At one extreme those visits could be provided to those with an already favourable pattern of dental visiting who could increase their number of visits per year. Alternatively, those visits could be provided to those with a mixed or unfavourable pattern of visiting who would increase their number of visits per year. The projected changes in the dental labour force provide scope for policies to impact upon the pattern of dental visiting and number of visits per year made by different population subgroups by social characteristic and associated patterns of dental visiting.

Demand for dental visits in Australia

The effective demand for dental visits, or number of dental visits made per year, has been studied over nearly 30 years. The total demand for dental visits is the product of the estimates of the population size multiplied by mean number of dental visits made by each age and dentate state-specific (dentate; edentulous) population subgroup. There is a trend for the total demand for dental visits to be increasing, driven by increasing population size, decreasing percentages of adult age groups who are edentulous (and low demanders of dental visits) and increased number dental visits demanded each year per person (possibly associated with new technology opening up more treatment alternatives and raising expectations about the value of dental treatment).

The pattern of number of dental visits demanded per year is strongly age-related, with a peak in adolescence, trough in young adulthood, and long tail across the adult age groups. Over time child, adolescent and adult age groups 35+ years old have increased their mean number of dental visits demanded each year.¹⁶

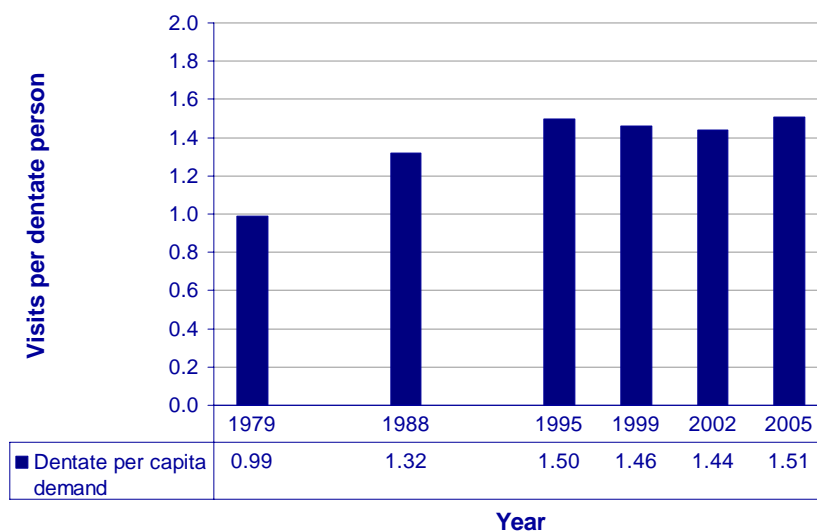
Figure B 1. Dentate per capita demand by age group¹⁵



Source: AIHW DSRU NDTIS (1995 – 2005), NOHSA (1988), ABS (1979)

This increase was dramatic for adult and older adult age groups from 1979 to 1995. Overall, the mean number of dental visits demanded each year rose from 0.99 in 1979 to 1.32 in 1988 and on to 1.50 in 1995. A good part of this increase was related to an increasing proportion of the population visiting at least once per year (which increased from 53 to 62 % from 1988 to 1995). However, in the 10 years since, there has been little change in the percentage of adults reporting visiting at least once per year or the mean number of dental visits demanded each year.

Figure B 2. Per capita demand for dental visits by dentate persons, 1979 to 2005¹⁵



Source: AIHW DSRU NDTIS (1995 – 2005), NOHSA (1988), ABS (1979)

One explanation for why the mean number of dental visits demanded per person per year did not change across 1995 to 2005 is that the emerging shortage of supply of dental visits acted as a 'cap' on the growth in total demand for dental visits, analogous to an infrastructure bottleneck. However, a real growth in capacity to supply dental visits removes or loosens this cap though to 2020. The policy issue which remains is how this opportunity for growth in demand beyond that driven by population growth and changes in dentate status will be distributed across age groups and segments of the population in terms of their usual number

of visits demanded per person per year. The key focus needs to be on shaping the fit between the policy and increases in demand from those with unfavourable or mixed patterns of dental visiting.

The most recent supply and demand projections show supply capacity increasing by some 7.4 million visits between 2005 and 2020.^{14,16} However, population growth and increased visiting associated with changing proportions of the adult population who are dentate or edentulous alone require an increase in capacity to supply visits of about 5.4 million visits. There is limited growth in capacity to supply visits would be readily available for people with an unfavourable pattern of visiting to move their visiting to a more favourable (and more frequent) pattern. This is an added challenge when considering policy on financing dental services. This is estimated to be in the order of 3 million visits per year by 2020. (It was estimated that in 2005 there was 1 million visits supply capacity above the depressed demand due to the infrastructure cap. This represents either idle capacity in well supplied areas or more simply error margins around both the demand and supply estimates).

Table B 6. Projected supply and demand for dental visits (millions) in Australia 2005, 2010, 2015 and 2020

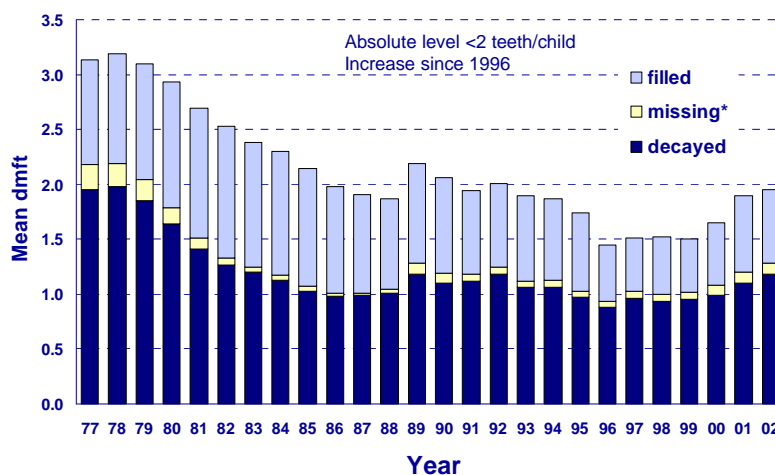
	Capacity to supply dental visits			
	2005	2010	2015	2020
Demand	28.2	31.3	34.5	37.9
Pop growth/dentate/Half growth in PCD				
Pop growth/dentate only	28.2	30.0	31.8	33.6
Supply	29.2	31.5	34.0	36.6
Excess supply over demand	1.0	1.5	2.2	3.0
Pop growth/ dentate				

Source: AIHW DSRU^{14,16}

Appendix C: Oral health of children

Australian children and adolescents now enjoy greatly improved oral health compared to their parents when they were children or adolescents. The reduction in the prevalence of dental caries and the mean number of teeth affected at any age have been marked across the last two and a half decades.

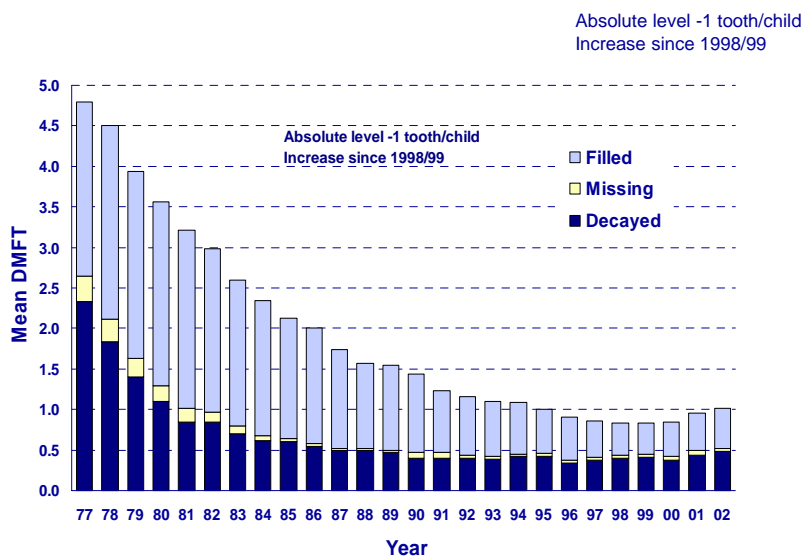
Figure C 1. Deciduous caries experience in 6-year-old children in Australia from 1977 to 2002¹⁷



* includes indicated for extraction for 1977-88

Source: AIHW Child Dental Health Survey (excl NSW 1996 onwards)

Figure C 2. Caries experience in 12-year-old children in Australia from 1977 to 2002¹⁷

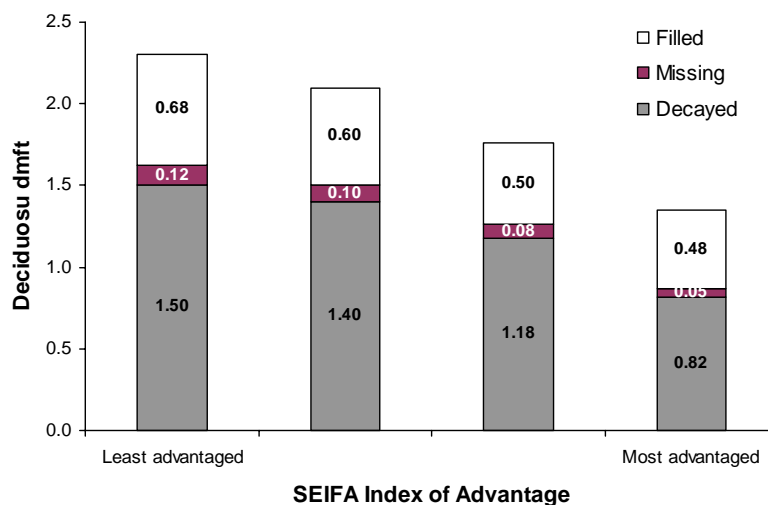


Source: AIHW Child Dental Health Survey (excl NSW 1996 onwards)

Most of the improvement is associated with exposure to fluoride, either in water supplies or in toothpaste. It is also probable that preventively-oriented dental services have contributed modestly, especially in the permanent teeth. The dramatic improvements over the long term provide the context for considering the current situation. Three features of the nature and distribution of child caries experience need to be recognised:

- the majority of the caries experienced is concentrated in a minority of children, with those children in the poorest oral health experiencing high levels of disease;
- there is a modest social gradient in the experience of dental caries with children in the least advantaged areas experiencing about one and a half times the number of teeth with dental caries as those in the most advantaged areas.

Figure C 3. Deciduous caries experience in 6-year-old children in Australia, 2001, by small area social characteristics¹⁸



Source: AIHW Child Dental Health Survey 2001

- the prevalence of caries experience and mean number of teeth affected has been increasing for most age groups and in most states and territories since the mid to later part of the 1990s. While the absolute increase is sometimes small, the relative increase is more substantial, coming off a low base.

Research has indicated that the likely reasons for the increases are changed exposure to fluoride – reduced consumption of fluoridated water associated with changed patterns of fluid consumption and increased proportion of water consumed being low or negligible in fluoride concentration (bottled waters, filtered water, rain tank water). Alternative hypotheses are associated with increased risk exposure through higher consumption of acidic or sugary fluids or foods. While the increase in childhood obesity provides an attractive concomitant change over time, the actual evidence of altered dietary patterns as a factor in the population wide changes in caries over recent times is lacking.

The caries experience of school children is a key indicator of both earlier and later oral health issues. The genesis of the increase in caries experience among school children is caries experienced early in life, called early childhood caries. Early childhood caries can be diagnosed as young as 18 months of age. If unchecked this can lead to infection and pain that ends with hospitalization and treatment under a general anaesthetic. Such early life experience reflects an imbalance of risk and protective factors. However, this imbalance can continue to shape the later oral health outcomes of schoolchildren. There is a need to intervene at as early a stage as possible to reduce the risk of a young child being on a higher caries experience trajectory.

The caries experience of school age children is also the best predictor of their ongoing risk of further caries development as adolescents and young adults. Those in poorer oral health at a younger age tend to remain among those in poorer oral health at an older age. In addition they are joined by increasing numbers who were initially in good oral health but move on to develop some level of caries experience. When age cohorts are followed over time there is a steady accumulation of additional teeth with past or present caries experience.

The oral health of Australian children calls out for an emphasis on early interventions among pre-school children and their parents and for renewed investment in preventing more children developing caries experience and especially reducing the increment in teeth affected among those with early experience.

Dental visiting by children and teens

A high percentage of Australian children have visited a dental provider within the previous 12 months. While this is a frequently used indicator, it needs to be noted that some children and teens under regular dental care are recalled at intervals longer than 12 months. Therefore, the percentage not visiting in the previous 12 months is not a direct measure of those receiving inadequate dental care.

Table C 1. Dental visiting in last 12 months by Australian children 1996–2005 and percentage who visited SDS at last visit

Age	Year			
	1996	1999	2002	2005
Children (5–11)				
% visited last 12 months	80.8	77.3	83.0	82.7
% visited SDS at last visit	52.1	57.0	53.8	42.3
Teens (12–17)				
% visited last 12 months	76.0	78.5	74.3	78.9
% visited SDS at last visit	32.0	36.1	31.4	34.1

Source: NDTIS 1996; 1999, 2002; 2005

The percentage of Australia children and teens visiting in the last 12 months has remained high. However, there is a sharp divide between the percentage who reported their last dental visit was to the school dental services (SDS) between children and teens. While the percentage was higher among children this decreased markedly between 2002 and 2005. The school dental services have become the place of last visit for a minority of children, as they were for teens across the whole period 1996 to 2005. This undermines the universality of the school dental services and their role in contributing to the oral health of all children and teens. This situation is most apparent in two states and one territory: NSW; VIC; and the ACT.

Table C 2. Percentage of children who last visited SDS in 1996 and 2005 by state and territory

State/Territory	Year	
	1996	2005
NSW	37.4	24.8
VIC	35.0	28.6
QLD	67.5	56.8
SA	77.2	65.7
WA	69.3	60.6
TAS	77.7	67.9
ACT	69.4	31.6
NT	90.7	86.1
AUST	52.1	42.3

Source: NDTIS 1996; 2005

The capacity of the school dental services to provide care to a substantial proportion of children and teens is important as this is a largely subsidized direct service program which removes financial barriers from accessing dental services. However, the school dental services also establish a critical mass and focal point for the conduct of oral health promotion activities. While other mechanisms can be envisaged to provide services, it is vital that actual use of services and treatments received is managed. This is a role that school dental services can play, even if they are not the majority provider of dental services to children and/or teens. It is equally important that outreach oral health promotion activities be positioned in organizations with a capacity to develop and sustain those activities across the whole population. Again, the public/school dental services have this capacity at a state or territory level and are networked across Australia.

Acknowledgements

The authors received tremendous assistance from a number of colleagues at ARCPOH at The University of Adelaide in access to national data and specific analyses that helped address our interests. Appendix A draws on data from the National Survey of Adult Oral Health 2004-2006 and its associated National Dental Telephone Interview Survey 2005. These data were analyzed by Anne Ellershaw of ARCPOH. While some aspects of these data have been published, most of the specific data presented are unpublished. Appendix B draws heavily on the labour force research conducted by ARCPOH, particularly by Dana Teusner, Sergio Christopoulos and David Brennan. Most of these data are published in AIHW Dental Research Series publications and research reports released in 2008. Appendix C draws on data from the AIHW Child Dental Health Survey, particularly publications by Jason Armfield and data on children and teens' visiting pattern from the National Dental Telephone Interview Survey 2005 analyzed by Anne Ellershaw of ARCPOH. Key aspects of these data have been used within the paper proper. The text and tables and figures were prepared by Silvana Marveggio and the whole document edited by Ali McLean.

Glossary of terms

Caries Bacterial disease which causes the demineralisation and decay of teeth and can involve inflammation of the central dental pulp.

Dentate Having some natural teeth.

Edentulism/edentulous Having no natural teeth.

Endodontics The study, treatment and prevention of diseases of the pulp of teeth — a major part of treatment is root canal treatment.

Orthodontics The branch of dentistry which is concerned with the growth and development of the face and jaws and the treatment of irregularities of the teeth.

Periodontics The branch of dentistry which is concerned with the tissues that support and attach the teeth and the treatment and prevention of periodontal diseases.

Periodontal disease Damage to the gums and deeper tissues in the tooth socket resulting from chronic inflammation

Prosthetist A trained dental professional (but not a dentist) who makes dentures, bridges and implant-retained prostheses.

References

- ¹ Spencer AJ, Sendzuik P, Slade G & Harford J. Chapter 9, Interpretation of findings. In: Slade GD, Spencer AJ, Roberts-Thomson KF. Australia's dental generations: The National Survey of Adult Oral Health 2004-06. Canberra: Australian Institute of Health and Welfare, 2007.
- ² National Telephone Interview Survey 2005. ARCPOH, The University of Adelaide. Unpublished data.
- ³ Teusner DN, Chrisopoulos S, Brennan DS. Geographic distribution of the Australian dental labour force, 2003. Cat. no. DEN 168. Dental statistics and research series no. 37. Canberra: Australian Institute of Health and Welfare, 2007.
- ⁴ National Dental Labour Force Data Collection, Australian Institute of Health and Welfare's Dental Statistics and Research Unit, ARCPOH, The University of Adelaide. Unpublished data.
- ⁵ Biggs A. Overview of Commonwealth involvement in funding dental care. Research paper. Canberra: Department of Parliamentary Services, Parliament of Australia, 2008.
- ⁶ Australian Institute of Health and Welfare. Health Expenditure Australia 2005-06. Canberra: AIHW, 2007.
- ⁷ Spencer AJ. What options do we have for organising, providing and funding better public dental care? Australian Health Policy Institute Commissioned Paper Series 2001/02. Sydney: Australian Health Policy Institute, The University of Sydney, 2001.
- ⁸ The World Bank. A guide to competitive vouchers in health. The International Bank for Reconstruction and Development. Washington: The World Bank, 2005.
- ⁹ Watts J, Segal L. Vouchers for health care? Poster presentation at International Association of Health Economics Conference, Barcelona, 2005.
- ¹⁰ U.S. Department of Treasury. All about HSAs. Washington, DC: U.S. Department of Treasury, 2007. PowerPoint presentation accessed at http://www.ustreas.gov/offices/public-affairs/hsa/pdf/all-about-HSAs_072208.pdf. Last accessed on 3 September 2008
- ¹¹ Butler, J. (2002). "Policy change and private health insurance: did the cheapest policy do the trick?" Australian Health Review 25(6): 33-4
- ¹² Australian Health Ministers' Conference, National Advisory Committee on Oral Health. Healthy mouths, healthy lives. Australia's National Oral Health Plan 2004-2013. Adelaide: Government of South Australia on behalf of AHMAC, 2004.
- ¹³ Spencer AJ, Teusner DN, Carter KD, Brennan DS. The dental labour force in Australia: the position and directions. AIHW cat. no. POH2. Canberra: Australian Institute of Health and Welfare, 2003.
- ¹⁴ AIHW Dental Statistics and Research Unit. Dentist labour force projections, 2005-2020. Adelaide: AIHW DSRU, The University of Adelaide, 2008.
- ¹⁵ Teusner, DN, Chrisopoulos, S, Spencer AJ. Projected demand and supply for dental visits in Australia: analysis of the impact of changes in key inputs. Cat. no. DEN 171. Canberra: AIHW, 2008.
- ¹⁶ AIHW Dental Statistics and Research Unit. Projected demand for dental care to 2020. Adelaide: AIHW DSRU, The University of Adelaide, 2008.
- ¹⁷ Armfield JM, Slade GD, Spencer AJ. Water fluoridation and children's dental health; the Child Dental Health Survey, Australia 2002. Cat. no. DEN 170. Canberra: AIHW, 2007.
- ¹⁸ Armfield JM, Slade GD, Spencer AJ. Socioeconomic differences in children's dental health; the Child Dental Health Survey, Australia 2001. Cat. no. DEN 152. Canberra: AIHW, 2006.