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Projected demand for dental care to 2020



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 AUSTRALIA



Demand for dental care reflects people's want or desire for care and willingness to pay for services. Demand is expressed as the use of dental services and hence is measured in dental visits received in a given year. This report provides information on the change in demand for dental care among Australians during the period 1979 to 2005. It also presents projected demand for dental care through to 2020.

Main findings

- The rates of edentulism have decreased substantially from 15.4% in 1979 to 5.2% in 2005.
- The number of dental visits per dentate person (per capita demand) has increased by half, from 0.99 in 1979 to 1.50 in 1995; however, in the decade from 1995 to 2005, per capita demand has remained stable.
- The number of services supplied per dental visit has increased by one-third (33%) over the period 1983 to 2003.
- Between 1983 and 2003 the largest increase in number of services provided per dental visit occurred for diagnostic, preventive and endodontic services.
- Per capita demand is expected to increase by 22.7% in the 65–74 years age group compared to 1.8% in the 25–34 years age group between 2005 and 2020.
- The number of dental visits is projected to increase from 28.2 million visits in 2005 to 38.8 million visits in 2020.
- Demand for dental services is projected to increase from 65.5 million services in 2005 to 94.6 million services in 2020.

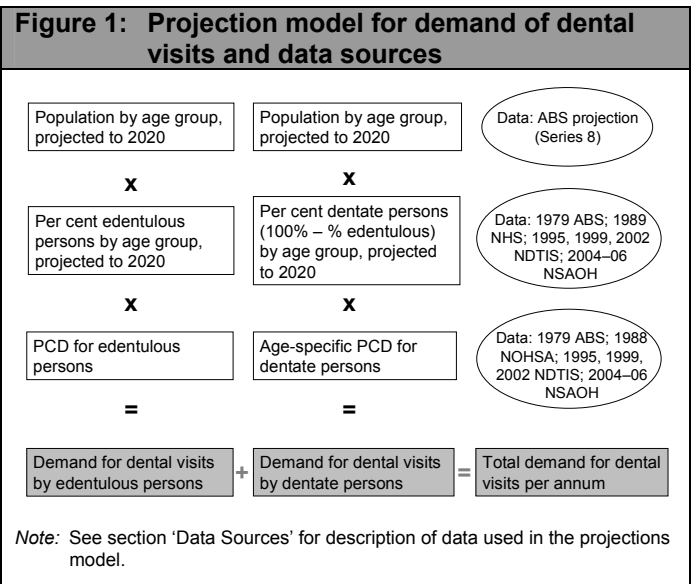
Demand for dental care

For the purposes of this report demand for dental care is equivalent to expressed demand. Historical patterns of usage are used to estimate future demand. This definition does not take into account clinically determined 'need' for dental care or the occurrence of people wanting or seeking care but unable to access care.

Per capita demand (PCD) for dental visits is represented by the average number of dental visits per person per year. It is estimated separately for dentate (some natural teeth) and edentulous (no natural teeth) persons as demand among edentulous persons is substantially lower than that for dentate persons.

Total demand for dental visits is therefore a function of the size and age of the population, the percentage of edentulous persons and the PCD.

Projections of total demand for dental visits per year are estimated by multiplying age-specific PCD rates for dentate and edentulous persons by the number of persons projected to be in those age groups (Figure 1). For a detailed description of the methods used, see Teusner et al. 2008.



Rates of edentulism in the Australian population

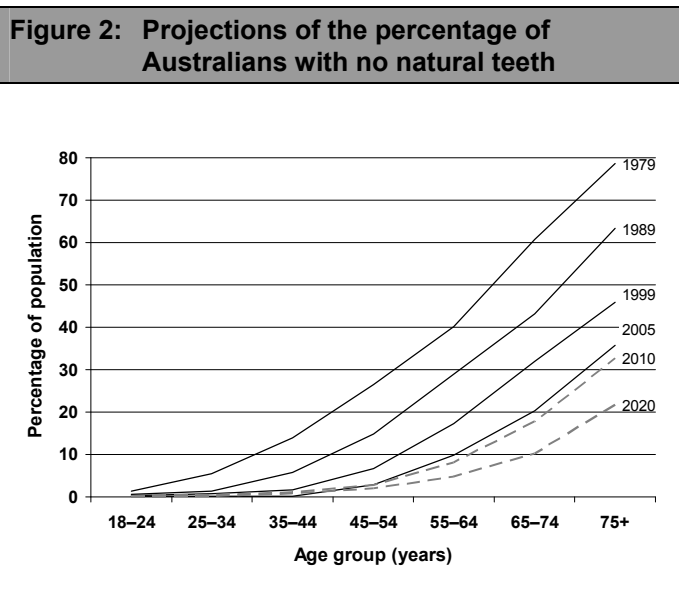
There has been a dramatic reduction in the prevalence of edentulism in Australia in the 26-year period to 2005. The percentage of edentulous persons in the population has decreased from 15.4% in 1979 to 5.2% in 2005 (Table 1).

Table 1: Percentage of the population with no natural teeth, 1979, 1989, 1999 and 2005

Age (years)	Year			
	1979	1989	1999	2005
0–17	0.0	0.0	0.0	0.0
18–24	1.3	0.6	0.2	0.2
25–34	5.4	1.4	0.7	0.2
35–44	14.0	5.7	1.7	0.2
45–54	26.5	14.9	6.6	2.9
55–64	40.2	28.9	17.3	9.8
65–74	60.7	43.2	31.9	20.3
75+	78.6	63.4	45.9	35.7
Total	15.4	10.8	6.5	5.2

Sources: ABS SSS1 1979; NHS 1989; NDTIS 1999; NSAOH 2004–06.

Among those aged 75 years and over, edentulism is projected to decline to approximately one in three persons by 2010 and approximately one in four persons by 2020 (Carter & Stewart 2003) (Figure 2).

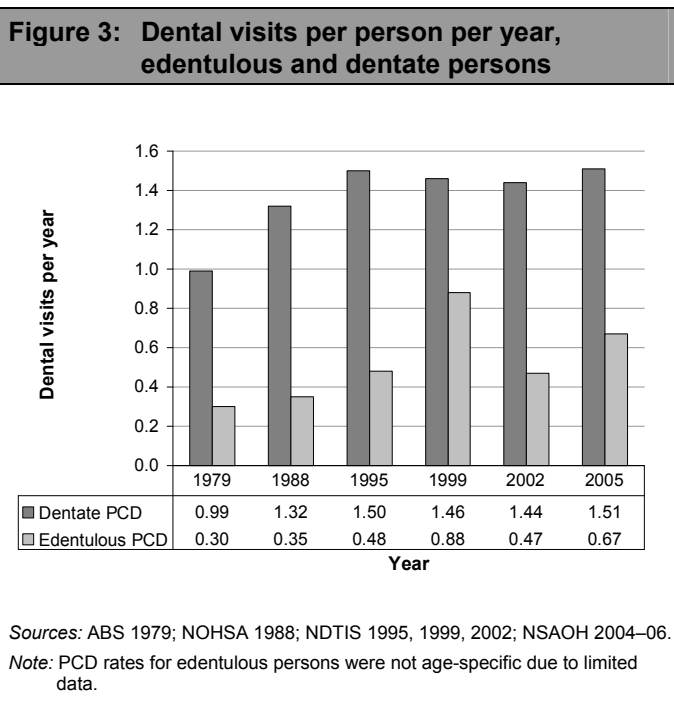


Dental visits per year (per capita demand)

The number of dental visits per year for edentulous persons increased from 0.30 in 1979 to 0.88 in 1999, decreased to 0.47 in 2002 and then increased to 0.67 in 2005 (Figure 3).

For dentate persons, the number of dental visits increased from 0.99 in 1979 to 1.50 in 1995, decreased to 1.44 in 2002 and then increased to 1.51 in 2005 (Figure 3).

Reasons for the plateau in PCD are unclear. One possible explanation may be that the capacity to supply visits by the dental labour force is capping growth in demand. Alternatively, limited growth in demand could be related to accessibility issues, for example affordability and uneven distribution of dental professionals.



PCD varied by age group. In 2005 PCD was highest for teenagers in the 12–17 years age group. Between 1995 and 2005 PCD was stable within age groups with the exception of 5–11-year-old children and adults aged 55–64 years and older, where PCD increased (Table 2).

Table 2: Dental visits per dentate person per year

Age (years)	Year					
	1979	1988	1995	1999	2002	2005
0–4	0.20	0.20	0.20	0.20	0.20	0.20
5–11	1.18	1.65	1.85	1.56	1.63	1.64
12–17	1.49	1.90	2.17	2.40	2.14	2.17
18–24	1.15	1.13	1.34	1.09	1.14	1.27
25–34	1.06	1.06	1.11	1.15	1.08	1.14
35–44	0.97	1.23	1.41	1.40	1.33	1.33
45–54	0.82	1.13	1.52	1.47	1.44	1.55
55–64	0.91	1.26	1.54	1.53	1.68	1.71
65–74	0.75	1.26	1.49	1.44	1.39	1.63
75+	0.69	1.13	1.40	1.35	1.51	1.53
Total	0.99	1.32	1.50	1.46	1.44	1.51

Sources: ABS 1979; NOHSA 1988; NDTIS 1995, 1999, 2002; NSAOH 2004–06.

Note: No data was available for the 0–4 years age group. Figures presented in the table are based on anecdotal evidence.

Services per dental visit

The Longitudinal Study of Dentists' Practice Activity (LSDPA) provides information on the number of services provided per dental visit by patient characteristics. The LSDPA collected data from a representative sample of dentists at 5-yearly intervals from 1983–84 to 2003–04.

The total number of services provided per dental visit has increased from 1.72 in 1983–84 to 2.29 in 2003–04. In the younger age groups the number of services per dental visit was generally higher in 2003–04 than in 1983–84, although there were some fluctuations in the intervening years. For most adult age groups over 25–34 years, the increase in the number of dental services per visits was more consistent (Table 3).

Table 3: Number of dental services per dental visit by age group

Age (years)	Year				
	1983–84	1988–89	1993–94	1998–99	2003–04
0–4	1.22	1.35	1.45	1.33	1.21
5–11	1.64	1.60	1.73	1.75	2.01
12–17	1.73	1.65	1.94	2.03	2.18
18–24	1.75	1.81	2.08	2.08	2.46
25–34	1.76	1.82	2.09	2.16	2.35
35–44	1.85	1.90	2.13	2.23	2.35
45–54	1.61	1.70	2.06	2.19	2.43
55–64	1.73	1.78	2.10	1.94	2.13
65–74	1.53	1.75	1.83	2.02	2.26
75+	1.74	1.78	1.86	2.00	2.21
Total	1.72	1.78	2.02	2.09	2.29

Source: LSDPA.

Note: Data includes dentate and edentulous persons; edentulous comprised only 1.3% of all patients in 2003–04.

Service mix

The mix of services provided at each dental visit has also changed between 1983–84 and 2003–04. Over the 20-year period there has been an increase in diagnostic, preventive and endodontic services provided per visit, while the remaining services have remained relatively stable (Table 4).

Table 4: Mix of dental services provided at each visit, 1983–84 to 2003–04

Area	Year				
	1983–84	1988–89	1993–94	1998–99	2003–04
Diagnostic	0.49	0.49	0.60	0.62	0.80
Preventive	0.27	0.30	0.34	0.37	0.44
Periodontic	0.01	0.02	0.02	0.02	0.02
Oral surgery	0.09	0.09	0.09	0.08	0.07
Endodontic	0.06	0.06	0.11	0.14	0.12
Restorative	0.61	0.60	0.63	0.62	0.63
Crown & bridge	0.03	0.06	0.07	0.07	0.07
Prosthetic	0.11	0.09	0.10	0.11	0.08
Orthodontic	0.01	0.02	0.02	0.01	0.01
General misc.	0.04	0.05	0.05	0.04	0.04
Total	1.72	1.78	2.02	2.09	2.29

Source: LSDPA.

Note: Dental service categories based on the Australian Dental Association's Schedule of 10 main service areas.

Projected per capita demand for dental visits

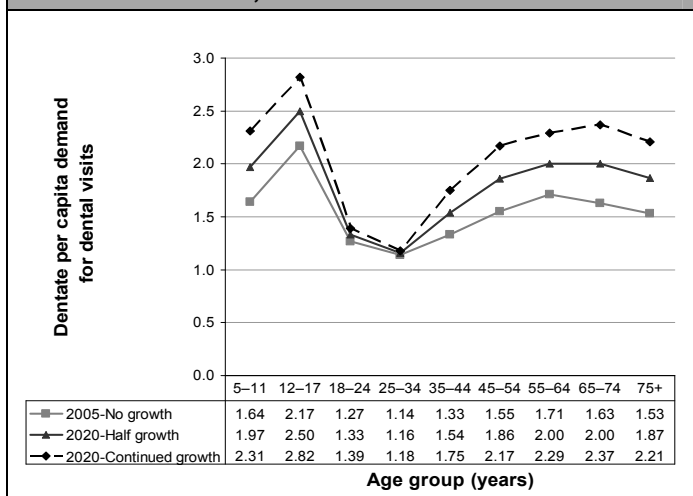
Per capita demand for dental visits is a key input into the projection model described in Figure 1. Three scenarios of future growth in PCD were developed. The first, 'no PCD growth', assumes that no growth in PCD will occur between 2005 and 2020. The second, 'continued PCD growth', assumes that growth between 2005 and 2020 will continue at the same rate observed between 1979 and 1995. The third, 'half PCD growth', assumes that growth in PCD will continue at half the rate observed between 1979 and 1995.

Under the 'half PCD growth' scenario the largest projected increase in dentate demand occurs in the 65–74 years age group (22.7%), while the 25–34 years age group is only expected to increase by 1.8%. In contrast, under the 'continued PCD growth' scenario, increases for the 65–74 and 25–34 years age groups are expected to be 45.4% and 3.5%, respectively (Figure 4).

For edentulous persons, demand in 2020 is projected to increase from 0.67 to 0.83 visits under

the 'half PCD growth' scenario and to 0.96 visits under the 'continued PCD growth' scenario (a 23.9% and 43.3% increase, respectively).

Figure 4: Dentate per capita demand for dental visits by age group, 2005, and projected demand, 2020



Projected services per dental visit

The past trend in the provision of dental services was used as the basis for projecting dental services at each dental visit. While the overall number of services provided at each visit increased between 1983-84 and 2003-04, trends across age groups varied. Hence age-specific service rates were used to project the dental services per visit. Past trends in dental services were extrapolated to 2005 and projected to 2020 so as to align the years for projections of dental visits and services (Table 5).

Between 2005 and 2020 the number of services per visit is projected to increase from 2.36 to 2.82. The greatest number of services per visit is expected for adults in the 45-54 and 18-24 years age groups.

Table 5: Projected number of dental services per dental visit by age group, 2005 and 2020

Age (years)	Year	
	2005	2020
0-4	1.32	1.36
5-11	1.95	2.23
12-17	2.23	2.63
18-24	2.49	3.07
25-34	2.47	3.01
35-44	2.48	2.98
45-54	2.55	3.22
55-64	2.19	2.54
65-74	2.28	2.79
75+	2.18	2.52
Total	2.36	2.82

Note: Estimates assume that the trend in dental visits observed between 1983-84 and 2003-04 will continue until 2020.

Projected service mix

The age-specific trends in dental services per visit for each of the 10 service areas were used to project the demand for specific services. Past trends in each service area were extrapolated for 2005 and 2020. Table 6 presents the total number of services per visit for specific areas for 2005 and 2020. Diagnostic, restorative and preventive services comprise the largest areas of dental care.

Table 6: Projected service mix for specific service areas for all age groups, 2005 and 2020

Area	Year	
	2005	2020
Diagnostic	0.78	1.01
Preventive	0.44	0.57
Periodontic	0.02	0.02
Oral surgery	0.07	0.06
Endodontic	0.18	0.27
Restorative	0.64	0.66
Crown & bridge	0.08	0.11
Prosthodontic	0.09	0.08
Orthodontic	0.01	0.01
General misc.	0.04	0.04
Total	2.36	2.82

Note: Estimates assume that the trend in dental visits observed between 1983 and 2003-04 will continue until 2020.

Total demand for dental visits

Total demand for dental visits was calculated from a 2005 baseline to the year 2020. Total demand for visits is the product of the dentate and edentulous population estimates by age group and the estimated PCD for dental visits.

Between 2005 and 2020 the overall population is expected to increase by 16.6%. According to the ABS population projections, slight reductions are expected in the 5-11 and 12-17 years age groups, together with substantial increases in the 55-64 and 65-74 years age groups.

In addition to population and demographic changes, the number of edentulous persons is expected to decrease by 1.4%, while the number of dentate persons is expected to increase by 18.3% (Table 7).

Table 7: Estimated number of dentate and edentulous persons ('000s) in 2005 and projected number in 2020

Age (years)	2005			2020		
	Dentate	Edentulous	All	Dentate	Edentulous	All
0-4	1,248.6	—	1,248.6	1,265.7	—	1,265.7
5-11	1,883.1	—	1,883.1	1,797.2	—	1,797.2
12-17	1,674.1	—	1,674.1	1,626.0	—	1,626.0
18-24	1,983.5	4.0	1,987.5	2,064.3	—	2,064.3
25-34	2,894.9	5.8	2,900.7	3,205.4	6.4	3,211.8
35-44	3,021.6	6.1	3,027.7	3,198.4	22.5	3,220.9
45-54	2,722.6	81.3	2,803.9	3,135.6	60.7	3,196.4
55-64	1,984.2	215.6	2,199.7	2,865.5	141.3	3,006.8
65-74	1,115.5	284.1	1,399.7	2,186.6	248.4	2,435.0
75+	815.0	452.5	1,267.4	1,534.5	425.3	1,959.7
Total	19,343.2	1,049.3	20,392.5	22,879.1	904.6	23,783.7

Sources: NDTIS 2005; ABS population projections 2003 (Series 8).

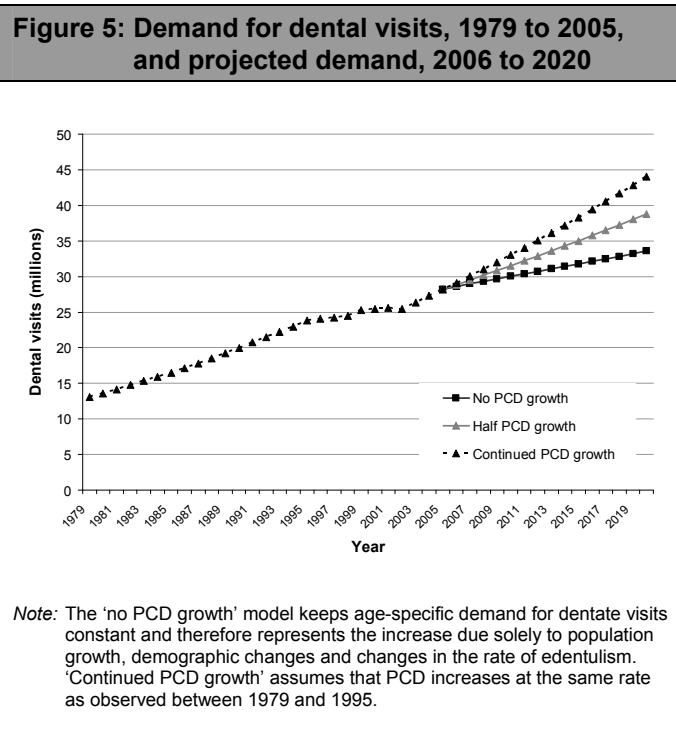
These population estimates and projections were then multiplied by the age-specific PCD rates for dentate and edentulous persons under each of the three PCD growth scenarios (Table 8).

Under the 'no PCD growth' scenario there was an 18.9% increase in the total demand for dental visits, from 28.2 million visits in 2005 to 33.6 million in 2020. This scenario assumes that the per capita demand will remain static until 2020. The increase is mainly attributable to population growth and, to a lesser degree, declining edentulism. Demographic changes (ageing of the population) only account for a marginal increase.

Table 8: Total demand for dental visits ('000s), 2005 and projected to 2020 by PCD growth assumptions and age group

Age (years)	2005	2020		
	Baseline	No PCD growth	Half PCD growth	Continued PCD growth
Dental visits ('000s)				
0-4	249.7	253.1	253.1	253.1
5-11	3,083.9	2,943.2	3,545.3	4,147.5
12-17	3,636.0	3,531.4	4,059.8	4,588.1
18-24	2,522.4	2,622.3	2,747.1	2,871.9
25-34	3,315.6	3,671.3	3,726.9	3,782.6
35-44	4,030.8	4,278.0	4,949.6	5,621.3
45-54	4,279.7	4,908.5	5,886.2	6,863.9
55-64	3,528.9	4,986.3	5,848.3	6,710.4
65-74	2,010.9	3,741.6	4,579.1	5,416.7
75+	1,547.6	2,639.5	3,220.4	3,801.4
Total	28,205.5	33,575.1	38,816.0	44,056.8

Under the 'half PCD growth' scenario the projected demand for dental visits is expected to increase from 28.2 million visits in 2005 to 38.8 million visits in 2020, a 37.5% increase. The 'continued PCD growth' scenario projects an increase to 44.1 million visits in 2020, a 56.2% increase (Table 8 and Figure 5).



Total demand for dental services

The total demand for dental services was projected from a 2005 baseline to 2020. Total demand for dental services is the product of the total demand for visits by the total number of services per visit by age group. Projections for each of the 10 service areas were then summed across age groups.

The projections in Table 9 are based on the assumption that PCD for dental visits continues at half the rate of growth observed between 1979 and 2005 ('half PCD growth' scenario presented above). The projected numbers of services were estimated under three scenarios. The 0% growth scenario assumes that there is no increase in the number of services per visit. The 100% growth scenario assumes that the trend observed between 1983-84 and 2003-04 will continue through to 2020. The 50% growth scenario assumes the trend will continue at half the rate observed between 1983-84 and 2003-04.

In 2005 it was estimated that 28.2 million dental visits were supplied in Australia. This equates to an estimated 65.5 million services provided. The projected number of services in 2020 varies considerably under the different scenarios. Under the 0% growth scenario (where the number of services per visit remains constant through to 2020) the total number of services increases from 65.5 million in 2005 to 81.7 million services in 2020. At 50% of the trend the total number of services is projected to increase to 94.6 million services, while a 100% continuation of the trend results in a projected 108.0 million services (Table 9).

Increases in the projected number of services vary considerably by age group. Under the 50% growth scenario the projected number of services is expected to increase by 16% in the 18–24 years age group and 141% in the 65–74 years age group (Table 9).

As the total demand for dental services was projected from the number of services in each service area, the demand for services within service areas can also be calculated. Table 10 presents the total demand for specific service areas for 2005 and projected to 2020 under the assumption of a 50% continuation in the dental services per visit trend and a 50% continuation in the dental visits per person per year trend.

Table 9: Total demand for dental services ('000s), 2005 and projected to 2020 by trend assumptions and age group

Age (years)	Year			
	2005	2020		
		Percentage of past trend in services per visit continued over 2005–2020		
		0%	50%	100%
0–4	329.7	333.1	336.3	345.1
5–11	6,028.2	6,497.0	7,177.6	7,920.8
12–17	8,097.9	8,288.9	9,474.2	10,668.6
18–24	6,292.6	6,128.3	7,272.1	8,424.0
25–34	8,177.6	8,281.8	9,736.8	11,234.6
35–44	9,994.8	11,209.7	12,889.4	14,750.0
45–54	10,903.7	13,152.1	16,050.8	18,949.5
55–64	7,740.3	11,972.1	13,318.8	14,878.6
65–74	4,583.4	9,353.6	11,056.3	12,758.9
75+	3,374.8	6,519.4	7,310.4	8,101.3
Total	65,522.9	81,736.0	94,622.6	108,031.4

Note: Projection assumes a 50% growth in per capita demand for dental visits from 2005 to 2020.

In 2005 diagnostic services accounted for one-third (34.4%), preventive services for one-quarter (25.3%) and restorative services for one-fifth (21.0%) of all dental services. Periodontic and orthodontic services were in the least demand, accounting for 0.7% and 0.9% of all dental services.

Table 10: Projected total demand for specific service areas ('000s), 2005 and 2020

Area	Year	
	2005	2020
Diagnostic	22,510.7	32,389.6
Preventive	13,771.1	19,605.8
Periodontic	448.0	658.0
Oral surgery	2,126.7	2,708.3
Endodontic	4,502.1	6,838.1
Restorative	16,555.0	23,968.9
Crown & bridge	1,905.6	3,232.1
Prosthodontic	1,797.7	2,724.9
Orthodontic	767.7	898.7
General misc.	1,138.5	1,598.2
Total	65,522.9	94,622.6

Note: There is an assumption of half PCD growth for dental visits and a 50% continuation in linear trend in demand for dental services per visit.

The projected demand for services indicates considerable increases in the number of services required for diagnostic, preventive, restorative and endodontic services. In terms of percentage increases, crown and bridge services (69.6%), endodontic services (51.9%) and prosthodontic services (51.6%) showed the largest increases, although these were from a relatively small base. Orthodontic and oral surgical services showed the smallest increases (17.1% and 27.3%, respectively).

Discussion

The aim of this report was to describe the change in demand for dental care between 1979 and 2005 and to provide projections of future demand through to 2020. It did not explore the factors underlying the change in demand or the interrelationship between supply and demand. Instead, this report provided projections based on a range of possible scenarios from no growth to full continuation of past trends for both PCD and number of services per visit.

Between 1979 and 1995 there were substantial increases in PCD for dental visits across most age groups. This was followed by a plateau in PCD for dental visits between 1995 and 2005. In addition to the change in PCD for dental visits, there was also a marked increase in the number of services per visits.

Although PCD has remained relatively stable across the decade to 2005, it has been argued that this was an artefact produced by the supply infrastructure 'bottleneck', whereby the capacity to supply visits by the dental labour force effectively capped growth in demand for dental visits (Teusner et al. 2008). The recent establishment of a dental school at Griffith University and the announcement of up to three new dental schools is likely to reduce the bottleneck, potentially improving accessibility to dental care.

The increase in the capacity to supply dental visits due to increasing access to dental care is likely to result in an increase in PCD. This provides support for demand projections exceeding the 'no PCD growth' scenario.

In terms of the number of dental services per visit, past trends indicate an intensification of service delivery, particularly for diagnostic, preventive and restorative services.

Any continuation of past trends in terms of demand for dental visits per person per year, or the number of services provided per visit, will only increase demand. For example, assuming that PCD increases at 50% of the trend between 1979 and 1995 and the number of services per visit increases by 50% of the previous trend, total demand for dental visits is projected to increase by 37.6% and the total number of services by 44.4%.

Data sources

This report uses population level data on dentate (some natural teeth) and edentulous (no natural teeth) persons and dental visits collected across a number of social surveys. These include:

- The Australian Bureau of Statistics Special Supplementary Survey of Sight, Hearing and Dental Health 1979 (ABS 1980)
- The National Oral Health Survey of Australia 1987/88 (NOHSA 1988) (Barnard 1993)
- The National Health Survey 1989 (NHS 1989) (ABS 1991)
- The National Dental Telephone Interview Surveys 1995, 1999, 2002 and 2004–2006 (NDTIS 1995, 1999, 2002, 2004–06) (Brennan et al. 1997; Carter & Stewart 2002, 2003; Slade et al. 2007).

Information on the number and types of services received during dental visits was collected from the Longitudinal Study of Dentist Practice Activity (LSDPA) in 1983–84, 1988–89, 1993–94, 1998–99 and 2003–04 (Brennan & Spencer 2002, 2006).

Finally, in order to estimate the Australian population's demand for dental visits or services, the Australian Bureau of Statistics Population Projections Series 8 (ABS 2003) was used through to 2020.

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