

Dental caries experience in the Australian adult population

Australian Research Centre for Population Oral Health, The University of Adelaide, South Australia*

INTRODUCTION

Dental decay is a process in which the hard mineral structure of teeth is dissolved by acids produced by bacteria.¹ The process produces a cavity on the crown of the tooth or a softening of the root surface. In its early stages the damage can be reversed with the use of fluoride. Once a cavity has formed a filling is needed to restore the form and function of the tooth. If decay is left untreated pain and infection may occur. Coronal decay may be asymptomatic in its early stages. Without regular dental care people are often unaware of the condition, whereas those who usually seek dental care for a check-up are more likely to have dental decay treated in a timely manner. Dental decay can occur on any tooth surface and is a health issue for all age groups.

This paper reports the prevalence and severity of dental caries experience in the Australian adult population in the 2004–2006 period. It also reports the trend of caries experience in the population during the preceding 17-year period.

METHODS

The most recent information about dental caries experience in the Australian population comes from the National Survey of Adult Oral Health 2004–06 (NSAOH).² Subjects for the Survey were sampled at random from a database of residential phone numbers listed in the electronic white pages. Sampling was stratified between metropolitan and non-metropolitan parts of each State/Territory, and phone numbers were clustered within selected postcodes. The sample was initially approached with a telephone interview detailing socio-demographic characteristics and dental health behaviours. Respondents were then followed with invitation to be clinically examined by specially trained dental teams. A standardized examination protocol and clinical conditions was applied. Some 5505 adults, defined as people aged 15 years or more, were interviewed and clinically examined.

For this analysis, data were weighted to reflect the age-, gender- and State/Territory distribution of the Australian population in 2005. Permission was sought and received for all aspects of data collection from the Human Ethics Committee of The University of Adelaide.

The number of decayed, missing and filled teeth (DMFT) reflects a person's lifetime experience of dental caries. This is because cavities in enamel cannot "heal", and because

treatment of dental decay leaves a permanent mark, either through the presence of a filling or the loss of the affected tooth by extraction. Each person's total number of teeth (T) that are decayed (D), missing because of pathology (M) or filled (F), is a measure that is widely referred to as the DMFT. The DMFT index was only calculated among examined people who had at least one natural tooth.

National Oral Health Survey of Australia 1987–88

The 1987–88 National Oral Health Survey of Australia (NOHSA) was an examination survey of a representative sample of Australian adults and children living in the six States and the Australian Capital Territory. They were sampled at random from residential dwellings located within selected Census Collection Districts using a stratified, clustered sampling design. The survey collected similar information to NSAOH, although from an independent sample of people.

For this analysis, data were weighted to reflect the age, gender and State/Territory distribution of the Australian population, excluding the Northern Territory, in 1986. The passage of time between population surveys captures two dimensions of time. One dimension represents the effects of age and events that occur between surveys on the life course of individuals in the population. The other reflects the unique historical experiences of the different birth cohorts – also called generations – that constitute the populations studied in each survey. Changes attributable to effects within generations and between generations can be assessed using birth cohort analysis, whilst age group analysis aims to describe the amount of change in population health for selected age groups.

RESULTS

National Survey of Adult Oral Health 2004–06 findings

The indicators of dental caries experience of the Australian adult population for the period 2004–2006 are presented in Table 1. Untreated tooth decay was experienced by one in four Australians. On average, the number of tooth surfaces affected was almost one per person (0.8) and almost 13 teeth with caries experience per person.

The percentage of people with untreated disease did not differ notably between generations. However, the average number of decayed tooth surfaces was lower among the older generations. This difference can be partly explained by the lower number of remaining teeth among older people. Mean DMFT represents an historical record of accumulation of

*Prepared by LG Do and KF Roberts-Thomson.

Table 1. Dental caries experience in the Australian adult* population 2004–06

	% with untreated decay	Mean decayed tooth surfaces	Mean DMFT#
Age			
All ages	25.5	0.8	12.8
15–34 years	25.8	0.8	4.5
35–54 years	27.1	0.9	14.4
55–74 years	22.6	0.6	22.2
75 years	22.0	0.5	24.3
Gender			
Male	28.2	1.0	12.4
Female	22.7	0.7	13.3
Indigenous identity			
Indigenous	57.0	2.7	14.8
Non-Indigenous	25.1	0.8	12.8
Residential location			
Capital cities	21.5	0.7	12.3
Other places	32.8	1.1	13.8
Year level of schooling			
Year 9 or less	29.2	1.1	17.2
Year 10 or more	25.0	0.8	12.3
Eligibility for public dental care			
Eligible	32.9	1.2	15.8
Ineligible	22.9	0.7	11.8
Dental insurance			
Insured	19.4	0.5	13.5
Uninsured	31.1	1.1	12.6
Usual visit to dentist			
For a check-up	16.3	0.4	12.2
For a problem	37.0	1.4	13.7

*People aged 15 years or older.

#Mean number of teeth with caries experience (includes decayed, missing because of decay or filled teeth).

dental decay, and hence was markedly higher among the older generations.

Females had less evidence of untreated disease, on average, than males. Indigenous Australians were more likely to have untreated decay. The population outside of capital cities had higher levels of untreated decay as well as higher mean DMFT values. Less schooling was associated with higher mean DMFT. Eligibility for public dental care was associated with both higher untreated decay and mean DMFT values. People who had no dental insurance had higher levels of untreated disease. Likewise, people who visited for dental problems were more likely to have untreated decay, more untreated decayed tooth surfaces and overall greater mean DMFT values.

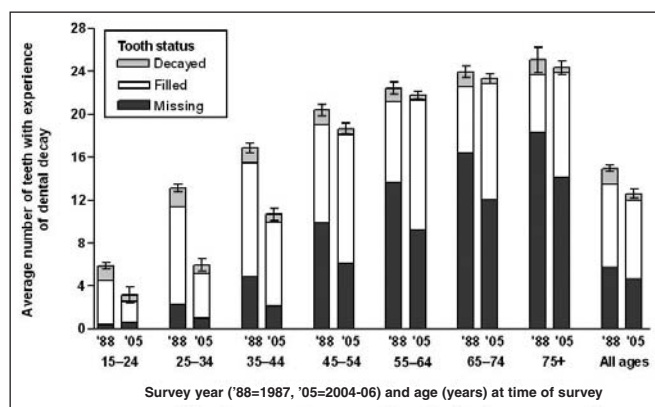


Fig 1. Age group trends in dental decay experience among dentate Australians, 1987–88 to 2004–06.

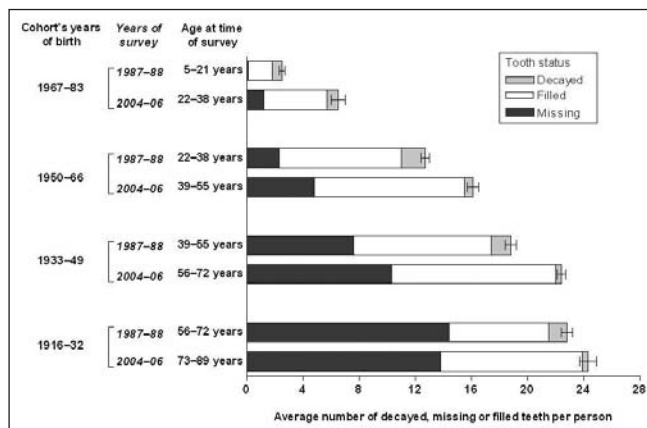


Fig 2. Birth cohort trends in dental decay experience among dentate Australians, 1987–88 to 2004–06.

Age group analysis

The stacked vertical bars in Fig 1 present the average number of teeth that were affected by dental decay per person. By convention, dental decay experience is quantified as the sum of three components: decayed (D), missing (M) and filled (F) teeth (T). The index is cumulative, so an individual's DMFT index cannot decrease over time. However, individual components of the index may change in either direction.

The amount of reduction in dental decay experience is depicted in Fig 1 as the difference in height between pairs of vertical bars. In the 17 years between the 1987–88 NOHSA and the 2004–06 NSAOH the average number of teeth with dental decay per person reduced by 16 per cent from 14.9 affected teeth to 12.6 affected teeth. The reduction was most pronounced within the two youngest age groups. Average DMFT per person decreased 46 per cent for the 15–24 year-old age group, (from 5.9 to 3.2 affected teeth) and 45 per cent for the 25–34 year-old age group (from 13.1 to 5.9 affected teeth). A more modest decrease of 37 per cent occurred for adults aged 35–44 (from 16.9 to 10.7 affected teeth). The decrease was less than 10 per cent for the 45–54 year-old age group and among older age groups there were only trivial differences in average DMFT of 2 or 3 percentage points.

Finally, there was a consistent trend between surveys of reductions in the average number of teeth with untreated decay. The reduction was observed for all age groups and was somewhat larger in younger age groups than older age groups. Part of this decrease may reflect the difference in diagnostic criteria employed in the two surveys. Sharp dental explorers were used to probe suspected cavities in the 1987–88 survey, whereas the 2004–06 survey relied solely on visual evidence of a break in enamel. Intergenerational effects are examined in the following section to clarify whether changes in dental decay experience can be mainly explained by ageing or by an exposure to an event between surveys, such as the introduction of fluoride.

Birth cohort analysis

Within-generational trends in dental decay experience are depicted in Fig 2 as a comparison of paired bars, while between-generational trends are depicted by a comparison of

same-aged adults in consecutive generations. The within-generation comparison shows that the rate of increase in dental decay experience over the 17-year period was approximately equal in three birth cohorts born since 1933. The largest absolute increase occurred in the 1967–83 cohort, where the average DMFT index increased from 2.5 to 6.4 affected teeth per person in 17 years.

Comparison between generations showed that the 1967–83 cohort had markedly less experience of dental decay at 22–38 years of age than people of the same age in their parents' generation (born between 1950 and 1966). This represents a "generation gap" in oral status. On average the 1967–83 cohort had 6.4 affected DMF teeth at 22–38 years of age while the 1950–66 cohort had 12.6 DMF teeth at that age. For the later-born cohort this represents a comparative oral health gain of six teeth per person and a halving of decay experience. This gain may be attributable to protective effect of fluorides that were introduced into the water supplies and toothpastes in Australia, predominantly during the 1960s and 1970s.

DISCUSSION

These findings provide the latest picture of dental caries experience in the population. They confirm the overall improvement of oral health in Australia. An improvement related to the fluoridation period in Australia can be seen in the findings.

A notable finding was that people who were born and have lived their life during the fluoridation period had significantly lower dental caries experience measured by either number of decayed tooth surfaces or total number of decayed, missing and filled teeth. The 22–38 year-old group born in the fluoridation period had a DMFT score half of that of the same age people who were born in pre-fluoridation period. The period of the 1970s and 1980s was also associated with increased use of fluoridated toothpaste by the population.

This trend is considered as an example of the effectiveness of the community fluoridation programmes.

However, the data have again shown a socio-economic gradient in the oral health of the population. People who were in lower socio-economic positions, measured by a number of indicators, had significantly poorer oral health as compared with the well-off group. Behaviour toward visiting a dentist was also of concern. However, the behaviour of usually visiting because of a dental problem may be related to either ignorance of oral health or inability to afford frequent dental visits. More effort will be required at all levels to address this issue.

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Address for correspondence:

Australian Research Centre for Population Oral Health
School of Dentistry
Faculty of Health Sciences
The University of Adelaide
Adelaide, South Australia 5005
Fax: + 61 8 8303 3070
Email: loc.do@adelaide.edu.au