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# **Australia's dental generations**

**The National Survey of  
Adult Oral Health 2004–06**

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## Overview of results

This report describes the state of oral health of the Australian adult population at the beginning of the twenty-first century. The findings are drawn primarily from the 2004–06 National Survey of Adult Oral Health (the Survey) in which 14,123 people aged 15–97 years were interviewed and 5,505 people were dentally examined.

## Survey aims

The survey aimed to describe levels of oral disease, perceptions of oral health and patterns of dental care within a representative cross-section of adults in all states and territories of Australia. This report focuses on four ‘dental generations’ who experienced different historical influences on their oral health:

- the earliest generation, born before 1930, reached adulthood during an era when oral disease was widespread, and frequently was treated by extraction of teeth;
- two intermediate generations, each born in two-decade periods after 1930, were more likely to retain teeth, but they experienced historically high rates of decay;
- the generation born since 1970 was exposed to more dental prevention than any preceding generation, particularly through fluorides in toothpaste and drinking water.

A further aim was to evaluate trends in oral health during the 17 years that have elapsed since the nation's first oral examination survey, conducted in 1987–88.

## Survey methods

A random sample of Australian adults was interviewed by telephone and those with their own teeth were asked to undergo a standardised dental examination conducted in a local clinic by one of 30 dentists trained in the Survey methods.

The 14,123 people interviewed represented 49% of those asked to participate, while the 5,505 people examined, represented 44% of interviewed people who were invited to the examination.

Analysis of response patterns and comparisons with Census data revealed that participants differed from non-participants in some characteristics that influence oral health.

The survey therefore probably underestimated some aspects of oral disease and overestimated the frequency of favourable dental attendance, although the degree of variation was found to be 3% or less for most oral health indicators.

Accuracy of 29 survey examiners was assessed by comparing their examination findings with those of the Survey's principal examiner. The observed levels of

agreement for most oral health indicators were equivalent to benchmarks reported for national oral health surveys conducted in the United Kingdom and the United States.

## Oral health status

Approximately 1-in-20 Australian adults (6.4%) had lost all their natural teeth. Among the 93.6% who were dentate (that is, people who had one or more natural teeth), an average of 4.5 teeth per person had been extracted because of dental decay or gum disease, leaving 11.4% of people with an inadequate natural dentition, defined as fewer than 21 teeth.

A slightly higher percentage of dentate Australian adults (14.9%) wore one or two removable dentures. An average of 1.3 missing teeth per person had been replaced, either by wearing a denture or by the presence of a fixed bridge.

- Generations born in the first half of the twentieth century had profoundly greater levels of tooth loss and tooth replacement than more recent generations.
- Both tooth loss and tooth replacement were considerably more frequent among people who were eligible for public dental care compared with people who were not, and among people who completed year 9 or less of schooling compared with people who completed at least year 10.
- Although the relationship was less pronounced, dental insurance and a usual pattern of dental attendance for a check-up were both associated with lower levels of tooth loss and lower frequency of denture wearing.

Experience of dental decay was ubiquitous within the adult population. Over 95% of people born before 1970 had some experience of dental decay, and the figure dropped only to 76% among people in the most recent generation, born 1970–90. The average number of teeth affected by decay per person ranged from 4.5 in the 1970–90 generation to 24.3 in the pre-1930 generation.

Much of the decay was treated, predominantly by fillings in recent generations and by a combination of fillings and extractions in earlier generations.

Yet one-quarter of Australian adults had untreated decay, and the figure varied by no more than 5% among generations. Additionally, 6.7% of Australian adults had untreated decay on exposed root surfaces, a condition that was much more frequent in the pre-1930 generation (17.3%) than the 1970–90 generation (1.6%).

- Levels of untreated decay were more than twice as high among Indigenous Australians (57.0%) compared with non-Indigenous Australians (25.1%)
- There was a similar two-fold difference in prevalence of untreated decay associated with a pattern of dental attendance for treatment of dental problems.

- Although less pronounced, untreated decay was also more frequent among males, people who lived outside capital cities, people with no dental insurance and those eligible for public dental care.

Approximately one in five Australian adults had moderate (20.5% of people) or severe (2.4% of people) gum disease, also called 'periodontitis'. Similar prevalence rates were found using a range of case definitions reported for previous studies. The definitions refer to the destructive forms of periodontitis in which there is loss of tissue that attaches the tooth to the jaw.

Periodontitis was strongly associated with age, occurring among 60.8% of people aged  $\geq 75$  years. Yet even in that age group, signs of periodontitis were found in only one or two anatomical sites around the mouth, on average, from among the 84 sites measured per person.

- Periodontitis occurred more frequently among males, people who completed year 9 or less of schooling, people with no dental insurance, those eligible for public dental care, and people who attended the dentist for treatment of dental problems.
- One in five Australian adults (19.7%) additionally had signs of gum inflammation (redness, swelling or bleeding). The frequency of inflammation, which can be a precursor to destructive periodontitis, did not vary meaningfully among generations.

There were 25.9% of Australian adults who had wear visible on their lower front incisor teeth, to the extent that it had worn through the tooth's hard, enamel edge. More severe wear was observed among 3.3% of adults in whom at least half of the height of the lower incisors had worn away. This severe level of wear was much more frequent in the pre-1930 generation (12.0%) than the 1970–90 generation (0.5%).

- Severe wear of one or more lower incisors was three times more likely among males compared with females, and among Indigenous compared with non-Indigenous Australians.
- Although the associations were less pronounced, severe wear was also more frequent among people who lived outside capital cities, the uninsured and people who attended the dentist for treatment of dental problems.

## **Patterns of dental attendance**

Nearly 60% of adults visited a dentist during the 12 months preceding the Survey, while only one in eight reported attending at least 5 years ago. More than four-fifths of Australian adults attended a private dentist (83.1%) and 91.4% paid out of pocket for the visit. Approximately one-half of adults usually visited a dentist at least once a year (53.1%), while 56.2% usually visited for a check-up. Most Australian adults (78.6%) usually visited the same dentist. When three 'favourable' patterns of dental care were considered in combination, 44.5% of dentate Australian adults reported visiting the same dentist at least once a year for a check-up.

- Favourable patterns of dental attendance were more likely among dentate people, the insured, residents of capital cities and people with higher levels of schooling.
- In contrast, favourable patterns of dental care were less likely among Indigenous Australians and those who were eligible for public dental care.

### **Perceived need for dental treatment**

Only 7.2% of adults said that they needed a new or repaired denture, although the figure was 20.4% among people in the pre-1930 generation.

Nearly six of every ten dentate adults said that they needed a dental check-up, although it was only 39.5% in the pre-1930 generation.

One-third of dentate adults felt they needed an extraction or filling, a proportion that was not dissimilar from the one-quarter of dentate people found to have untreated decay.

- All perceived dental treatment needs were markedly more frequent among people who usually attended the dentist for treatment of a dental problem, the uninsured and people with relatively lower levels of schooling.
- Indigenous Australians were more likely to report a need for fillings or extractions than non-Indigenous Australians.

### **Perceptions of oral health and dental care**

Sixteen per cent of Australians rated their oral health as fair or poor, 22.6% had experienced orofacial pain in the preceding month, 15.1% had experienced toothache in the preceding 12 months, and 17.4% said that they had avoided some foods due to problems with their teeth, mouth or dentures.

- All four maladies were reported more frequently by the uninsured and by people who usually attended the dentist for treatment of a dental problem.
- Indigenous Australians and people eligible for public dental care were more likely to report fair/poor oral health, toothache and food avoidance than non-Indigenous Australians.

Thirty per cent of Australians reported avoiding dental care due to cost, 20.6% said that cost had prevented them from having recommended dental treatment and 18.2% reported that they would have a lot of difficulty paying a \$100 dental bill.

- All three barriers to dental care were more likely to be reported by Indigenous Australians, the uninsured, people eligible for public dental care and people who usually attended the dentist for treatment of a dental problem.

## Trends in oral health: 1987–88 to 2004–06

In order to distinguish historical influences on oral health that occurred before the 1987–88 survey from the effects of time between surveys, trends in oral health were evaluated among generations born during 17-year intervals. Additional comparisons were made among 10-year age groups in each survey.

During the 17 years since the first Australian oral health examination survey, the percentage of Australian adults who had no natural teeth more than halved, from 14.4% to 6.4%.

- Almost all of the reduction occurred because of the passing of older generations that had experienced an ‘epidemic’ of dental extractions during the first half of the twentieth century. Within generations, levels of complete tooth loss did not change meaningfully as members of each generation aged 17 years between surveys.
- During the next four decades, with the passing of older generations that experienced historically high rates of tooth loss, the decline in prevalence of complete tooth loss is projected to continue, falling to 1% or less by the 2040s.

Among dentate people (those who had one or more natural teeth), there were similar large reductions in the percentage with an inadequate natural dentition, defined as fewer than 21 teeth.

- As they aged during the 17 years between 1987–88 and 2004–06, no more than 7% of people in any single generation lost sufficient teeth to leave them with an inadequate natural dentition.

However, dental decay progressed markedly in generations born since 1930: during the 17-year interval between surveys, decay in previously healthy teeth developed in an average of 3–4 teeth per dentate person.

- The same rate of decay in previously healthy teeth was observed, even in the ‘fluoride generation’ of people born 1967–83, and exposed to more dental prevention than any previous generation.
- Yet as young adults, members of the fluoride generation had about half the level of decay that their parents' generation had developed as young adults. This finding provides evidence that exposure to fluoride in water and in toothpaste during childhood produced substantial benefits for oral health among Australian adults.
- These two findings illustrate that fluoridation of water and toothpaste is not the same as immunisation: Australia's fluoride generation had substantially less decay than its parents' generation, but most of the benefit accrued during childhood.

Unlike the predominant method of extractions used to treat decay in the first half of the twentieth century, most newly decayed teeth in the period between these two surveys were filled, not extracted. This pattern was observed in all four generations.

## Trends in dental visits and perceived treatment needs

Sixty-two per cent of dentate Australian adults per year made a dental visit in 2004–06, up from 53% in 1987–88.

- However, the rate of visits declined within the most recent generation, born 1967–83, as its members aged 17 years between the two surveys.

While the vast majority of adults saw a private dental practitioner, the percentage declined between the two surveys from 87% to 83%, with most of the decline observed in the 1970–90 generation.

In both surveys, nearly one half of Australia's adults reported having dental insurance.

- Dental insurance coverage decreased among 25–44-year-olds, while it increased among 55–74-year-olds.

In all age groups the percentage who reported a need for dentures decreased markedly. However, there were increases in perceived need for fillings among people aged 35 years or more and for extractions among all ages.

- There was a doubling in perceived need for extractions among people in the 1967–83 generation as they aged 17 years between surveys. The trend may have been fuelled by a requirement for removal of wisdom teeth or for orthodontic extractions.

When trends regarding oral disease, dental visits and perceived treatments were considered together, markedly different patterns were observed between generations.

- As they aged 17 years between surveys, members of the 1967–83 generation, developed as much decay in previously healthy teeth as their parents' generation during the same period. As well, their perceived need for fillings and extractions increased. However, during the same period the frequency of dental visits within the 1967–83 generation reduced significantly.
- As the three generations born before 1967 aged through the 17-year period between surveys, dental decay continued to develop in previously healthy teeth. However, their frequency of dental care did not change and their perceived need for treatment remained similar or reduced.

## Interpretation

Chapter 4 highlights the importance of historical events and lifetime experience in shaping the contrasting oral health standards of the four generations that feature in this survey. While Australians are unlikely to again endure the deprivations of the Great Depression or World War II, which contributed to the 'epidemic' of tooth extractions before the 1950s, an understanding of the past illuminates present challenges that remain today. History has shown, for example, that the fluoridation of municipal water systems substantially improved the oral health of children. A 'fluoride generation' of Australians has now reached adulthood, a majority of them exposed to fluoridated water and fluoride in toothpaste since childhood. This survey found that, as young adults, the 'fluoride generation' had about half the level of dental

decay as their parents' generation. Yet today, 31% of Australian adults remain without access to fluoridated public water.

Within the Australian adult population, oral diseases were pervasive. They caused a substantial amount of pain and other impacts on quality of life. This burden of disease persisted despite marked reductions among age groups in levels of tooth loss and lifetime experience of dental decay. The frequency of oral disease and related symptoms were inequitably distributed, being greater in groups that were already disadvantaged.

Yet during in-depth oral histories narrated by 15 survey participants, there was a general tendency of people to blame their oral health problems only on diet, genetics or fate, while overlooking the fact that failure to prevent and treat dental disease in a timely manner led to their problems worsening, and, in some cases, becoming irreparable. In general, they tended to blame themselves or their lifestyle choices for dental problems rather than recognising that their ability to obtain dental care was often constrained by their low income or lack of other resources.

The findings regarding oral disease have direct relevance to four elements of the Nation's Oral Health Plan (NACOH 2004):

- The finding of substantial benefits for oral health among the 'fluoride generation' of Australians born since 1970 provides support for the Plan's emphasis on fluorides as a method to promote oral health 'across the population'.
- While this survey found marked reductions in tooth loss among older adults, there were other adverse 'consequences of success' for them: people aged  $\geq 75$  years had prevalence rates of gum disease and root decay that were 2–3 times as great as the population at large. These findings provide strong endorsement for the Plan's action areas for older adults.
- The Plan has an additional action area for 'Low income and social disadvantage'. Virtually all aspects of oral disease measured in this study were more frequent and more severe among people who were eligible for public dental care and therefore were economically disadvantaged.
- Aboriginal and Torres Strait Islander people are the focus of an additional action area in the Plan. This survey found disproportionately elevated rates of tooth loss, untreated decay and tooth wear among Indigenous Australians. There was a similar pattern of poorer oral health for several other conditions, although limitations in sample size created uncertainty about the magnitude of the difference. The oral examination results were consistent with findings that Indigenous Australian adults also reported poorer self-rated oral health, more toothache and more difficulty with eating due to dental problems compared with non-Indigenous Australians.

The survey's results have additional implications for policies regarding oral health and dental care for Australia's adults.

- Despite the widespread distribution of oral diseases, only about half of Australia's adults made dental visits annually, usually for a check-up and at the same dentist. Those who did so overwhelmingly attended a private dentist, paid for their own dental care and were frequently supported in doing so by dental insurance. This dental attendance pattern was consistent with that recommended by the dental profession.
- For the other half of the adult population, the dental attendance pattern presented a striking contrast. Dental visiting was irregular and mostly associated with a dental problem, whether the visit was to a private dentist or the public dental services. For some, there was no effective contact with a dentist at all. This pattern of attendance was disproportionately more frequent in disadvantaged population groups: Indigenous Australians, people with less schooling, people living outside capital cities, people who were uninsured and people eligible for public dental care. Those are the very groups that experienced the highest levels of oral disease.

These two halves of the adult population present contrasting profiles of oral health in Australia. One group illustrates the degree of progress made in the way the dental system serves the population. In the other group, there was a conspicuous need for improvement in dental care and oral health.

Increases in dental attendance were observed across all adult age groups except for 25–34-year-olds. Yet, in the 17 years between surveys, both dental attendance and dental insurance became less frequent in the 1967–83 'fluoride generation'. As noted elsewhere, people in this 1967–83 generation developed dental decay in previously healthy teeth at a rate equal to their parents' and grandparents' generations. There is a risk that the oral health benefits acquired during childhood by Australia's 'fluoride generation' will be eroded during adulthood.

These results, in turn, have implications for the dental care system and the dental labour force.

- The percentage of adults who attended for dental care during the preceding year increased between 1987–88 and 2004–06, reflecting an increased demand for dental care in Australia's adult population.
- Because more than 80% of dental visits are made to dentists in private practice, this sector needs attention in any dental labour force policy response. Even among adults eligible for public dental care, 63% attended a private dental practice.
- If even a small proportion of adults with unfavourable patterns of dental attendance were to seek more frequent and comprehensive care, there would be a substantial increase in demand for dental care. Most of the additional care would be sought in private dental practices, creating a further challenge for health policies at a time when there are shortages in the dental labour force. Additional demand would represent a particular challenge to state and territory public dental services where scarcity of resources already acts as a barrier to timely and comprehensive care among those eligible for such services.