Open access • Journal Article • DOI:10.1111/ADJ.12761

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Published on: 25 Jun 2020 - Australian Dental Journal (John Wiley & Sons, Ltd)

Topics: Tooth loss, Dentures, Dental insurance and Dentition

Tooth loss, denture wearing and implants: Findings from the National Study of Adults Oral Health 2017-18

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Keywords: Adults, dental prostheses, oral epidemiology, surveillance, surveys

Acknowledgements

The National Study of Adult Oral Health (NSAOH) 2017–18 was funded by the Australian Government Department of Health, and National Health and Medical Research Council (Partnership Grant #1115649). Sponsorship was provided by the Australian Dental Association, Colgate Oral Care and BUPA. State/Territory health department and dental services were partners in the study. The research team would like to acknowledge the Australian Government Department of Human Services,

state and territory dental health services and the participants involved in the study. A full list of acknowledgements is provided in the main report for the study.

Abstract

Background.

We aimed to describe the prevalence of different tooth loss outcomes along with the use of dentures and implants among Australians aged 15+ years across socioeconomic and demographic groups. In addition, we performed time trend analyses of tooth loss.

Methods:

Data from the National Study of Adult Oral Health 2017-18 included sex, age, residential location, household income, Socio-Economic Indexes for Areas**,** possession of dental insurance and pattern of dental visiting. Outcomes were complete tooth loss, inadequate dentition, average number of missing teeth, denture wearing and implants. We compared our findings with data from previous surveys conducted in 1987-88 and 2004-06.

Results:

Tooth loss decreased from 14.4% in 1987–88 to 6.4% in 2004–06, and to 4.0% in 2017–18. The proportion of people with lack of functional dentition halved from 20.6% 1987-88 to 10.2% in 2017-18; the average number of teeth lost due for any reason slightly reduced from 2004-06 (6.1) to 2017-18 (5.7). Tooth loss increased with age and was higher among socioeconomically disadvantaged, uninsured and those with unfavourable pattern of dental visiting groups than in their counterparts.

Conclusions:

An overall improvement in tooth retention was identified over the last decades. However, socioeconomic inequalities persist.

Introduction

Oral diseases are a significant and neglected global public health problem and there is an urgent need to address this with *radical action*.[1, 2] Tooth loss is an indicator of damage, mostly due to dental caries and periodontal disease. It can however also be an indicator of cost and health system barriers to repair a damaged tooth and/or patient preference. Usually this will lead initially to partial tooth loss but over time may lead to total tooth loss (edentulism), having a significant impact on both oral health-related and general quality of life[3]. Furthermore, tooth loss has been associated with adverse health outcomes such as malnutrition, hypertension, and obesity.[4-6] The impact of both total and severe tooth loss is significant on general and oral health-related quality of life (OHRQoL)[3, 7-12]. The impacts are often wide-ranging affecting "… *the ability to speak, smile, smell, taste, touch, chew, swallow, …*".[13] A recent systematic review reported that people suffering from Alzheimer's disease had greater tooth loss and edentulism.[14] Another systematic review and meta-analysis showed that individuals of low income had greater odds of losing teeth.[15]

In both partial and total tooth loss function can be (partially) restored with removable or fixed prostheses, with or without tooth support or dental implants. All these restoration options, and especially the fixed prostheses with implants, are costly; and may require dental specialist care.

The estimated global prevalence of total tooth loss decreased from 4.3% in 1990 to 4.1% in 2015; however, the number of people with no teeth increased from 157 million to 276 million over this time period.[16] Over a similar period (1990-2010) severe tooth less (defined here as having fewer than 10 teeth) decreased from 4.4% to 2.4%.[17] Severe tooth loss was ranked in the 36th position among the most prevalent chronic diseases that affect life expectation. It affects 2% of the world population,[18] and its treatment directly costs, together with other dental diseases, about 4.6% of global health expenditure.[19]

The Australian National Oral Health Survey conducted in 1987-88 showed that 14.4% were edentulous.[20] Later in 2004-06 data from the National Survey of Adult Oral Health revealed a prevalence of edentulism of 6.4%, but this was almost 36% in those aged ≥75 years of age[21]. The percentage of people with fewer than 21 teeth was 11%, but this was 55% amongst those born before 1930. Both total and partial tooth loss was significantly related to socio-economic status, being higher in those with fewer years of schooling, among those eligible for public dental care and with no dental insurance. The more recent National Dental Telephone Interview Survey (NDTIS) conducted in 2013 reported that edentulism was overall slightly lower at 4.4% but was almost 20% in those aged 65+ years.[22] Overall, the average number of missing teeth

was 5, but amongst the 65+ year age group the average was almost 11. In the 65+ age group, those earning less than A$30,000 had on average 12 missing teeth compared to 5 in those earning A$140,000+.

The treatment options to restore function for tooth loss is wide-ranging. These can include removable full or partial prostheses, fixed prostheses with or without tooth-support or dental implants. These treatment options have differing impacts on quality of life.[23] A recent systematic review showed that implant supported-fixed dental prostheses (IFDP) had greater short-term improvement in OHRQoL compared to removable partial dentures (RTP) and tooth-supported fixed dental prostheses (TFDP).[23] IFDP and TFDP showed both short- and long-term improvements. In general, patients report positive effects for both fixed and removable prostheses.[24-26] Data from the NDTIS 2013 survey showed that 12% of Australian adults had a denture, and this was almost 42% amongst those aged 65+ years. In the 2004-2006 national adult survey only 60 implants were seen in the 5,505 examinations.[21] A comparison of dental services provided by dentists in Australia in 1983-84 and 2013-14 showed a higher rate of crowns and lower rate of dentures.[27]

The aim of this paper is to report the prevalence of total and partial tooth loss, denture wearing and presence of dental implants, number of missing teeth and these replaced by prostheses, from the National Study of Adult Oral Health 2017-18[28]. The oral outcomes were further compared for demographic and socioeconomic factors as well as for time trends since 1987-88.

Methods

Sample size calculation and selection

This is an analysis of the National Study of Adult Oral Health 2017-18. The study comprises an interview questionnaire undertaken online or via telephone interview and a dental examination. For methodological details, please see Chrisopoulos et al. (2020) and Do et al (2020) in this issue.

Independent Variables

For this present paper, we used the following variables, all self-reported: sex (males or females), age group (15-34, 35-54, 55-74, and 75+ years), region (Major city, regional, and remote), household income, Socio-Economic Indexes for Areas **(**SEIFA**),** dental insurance (insured and uninsured), and pattern of dental visiting. SEIFA ranks areas in Australia

according to relative socio-economic advantage and disadvantage. The index is based on information from the five-yearly national census.[29] The pattern of dental visiting is based on three indicators: usually visit a dentist at least once a year *(How often on average do you seek care from a dental professional?)*, usually visit the same dentist (*Is there a dentist you usually go to for dental care?)*, and usually visit dentist for check-up (*What is your reason for visiting a dental professional?*). Favourable attendance is visiting a dentist once or more per year, usually for a check-up and having a usual dental provider. Unfavourable attendance is visiting less than once every two years, usually for a problem or visiting once every two years, usually for a problem and without a usual dental provider. Any other combination was considered as an intermediate pattern of dental visiting.

Outcomes

Outcomes were obtained from the interview and dental examinations. Percentage of complete tooth loss was estimated from the following interview question: *Do you have any natural teeth?* Possible responses were Yes/No. Crowns and caps were considered as existing natural teeth while dental implants were not. Self-reported fewer than 21 natural teeth in those dentate estimated the prevalence of inadequate dentition. Percentage of people who wore dentures among dentate persons was estimated by the question *Do you have removable dentures or false teeth?* Possible responses were 'No dentures', 'upper only', lower only', both upper & lower' or 'don't know'. The prevalence of people with dental implants was calculated using the interview question: *Do you have any dental implants?*

The average number of missing teeth lost for any reasons, missing teeth replaced by prostheses per person in the dentate population and the mean number of implants per person were estimated by the dental examination.

For time trend analysis we used data from National Study of Adult Oral Health (NSAOH) 2017-2018, the National Survey of Adult Oral Health, 2004-06, and The National Survey of Adult Oral Health conducted in 1987-88.

Data Analysis

All data were weighted to ensure the representativeness of the target population as described by Ellershaw et al. (2020) in this issue. Mean, and proportions and respective 95% confidence intervals (CI) were estimated using SAS.

Results

Table 1 presents the proportions of Australian adults reporting complete tooth loss. Overall, the prevalence of complete tooth loss was 4.0% of the whole sample aged 15 years and over and 86% of them were wearing full dentures (data not shown). The prevalence of edentulism was higher in older age groups and ranged from 1.1% for 35–54 year–old to 20.5% for those aged 75 years and over. Females had a higher, but not statistically significant, proportion of tooth loss than males. There was a clear socioeconomic gradient in the prevalence of adults with tooth loss across income and SEIFA groups. The lower the household income and SEIFA, the higher the prevalence of total edentulism. The highest proportion of edentulism was found among those on the lowest income tertile (10.3%) while the lowest was found among those in the highest income tertile (0.5%). Uninsured and those with an unfavourable pattern of dental visiting has nearly 6 times higher prevalence of edentulism than those insured and with a favourable pattern of dental visiting. Australian adults living in regional areas had the highest prevalence of complete tooth loss (5.4%).

The overall prevalence of lack of functional dentition (fewer than 21 natural teeth) was slightly over 10% of the Australian adult population. There was no difference between sexes. The lack of functional dentition increased with age varying from only 0.7% among those aged 15-34 years to nearly half of those aged 75+ years. Participants living in regional and socioeconomically disadvantaged areas, those earning low income, uninsured and with an unfavourable pattern of dental visiting had a higher prevalence of lack of functional dentition than their better-off counterparts. The highest proportion of adults reporting fewer than 21 teeth was found among those in the lowest income group (23.7%) while the lowest prevalence was found among those reporting favourable patterns of dental visiting (6.2%) (Table 2). The proportion of people wearing dentures was slightly over 10% with no difference between sexes. Adults from the lowest household income group had almost 7 times higher proportion of wearing dentures compared to in the highest income group. Adults who were living in regional and socioeconomic disadvantaged areas reported greater use of dentures. Uninsured and those with an unfavourable pattern of dental visiting reported twice the proportions of wearing dentures than those insured and with a favourable pattern of dental visiting (Table 3).

The proportion of adults reporting that they had dental implants was 5.6% overall ranging from 2.5% among the 15–34-year age group to 10.1% among the 55–74-year age group. Men

reported a slightly higher proportion (6.1%) of having dental implants than females (5.0%). There was no significant variation in the percentage reporting dental implants by residential location within age groups (data not shown). The overall mean number of dental implants per person was 0.1 with a higher average among people aged 55-74 (0.2), among insured (0.3), and those in the highest income group (1.4) (Table 5)

Table 6 presents the mean number of missing teeth replaced by fixed and removable prostheses per person. Overall, the mean number of teeth replaced by prostheses was 1.0; this increased with age reaching 4.8 teeth replaced by prostheses among those aged 75+. Females had a slightly higher average than men, 1.2 and 0.9 respectively. Those in the lowest income group, uninsured and with an unfavourable pattern of dental visiting had a higher average number of teeth replaced by prostheses than their counterparts.

Figure 1 displays the time trend of figures of tooth loss over time. The percentage of Australians aged 15 years and over with complete tooth loss decreased from 14.4% in 1987–88 to 6.4% in 2004–06, and to 4.0% in 2017–18. The proportion of those with lack of functional dentition halved from 20.6% 1987-88 to 10.2% in 2017-18; the average number of teeth lost due for any reason slightly reduced from 2004-06 (6.1) to 2017-18 (5.7).

Discussion

The findings of the present study reveal an overall improvement in tooth retention among the Australian adult population in the last three decades. Between 1987-88 and 2017-18 edentulism has fallen by 72% and the lack of functional dentition by nearly 50%. The average number of missing teeth for any reason slightly reduced in the last 13 years. However, almost 1 in 6 Australians are either edentulous or have a lack of a functional dentition. Despite these advances, socioeconomic inequalities on tooth loss persist or even is worsening; those at the top of the social ladder had more retained teeth and less total edentulism than those on the bottom. The most socioeconomically disadvantaged group is wearing more prostheses than those who were better-off. The edentulism ratio between insured and uninsured adults increased from 3.0 to 3.8, while the lack of a functional dentition raised from 1.8 to 2.8 between 2004-06 and 2017-18.

The overall improvement in retention of teeth is due, hypothetically, to some upstream and downstream factors. The nationwide use of water fluoridation and fluoridated toothpaste are considered as the two most important public health measures to prevent dental caries, the most

important cause of tooth loss.[30] The favourable pattern of dental visiting, including higher proportion for check-up has been mentioned as one factor to improve dental health either in high- or low-income countries.[31, 32] The proportion of adults who reported usually visiting a dental professional for check-up increased from 56.2% in 2004-2008 to 64.9% in 2017-18. These are the most plausible explanations for our findings given that the figures of financial barriers to dental care due to cost were almost identical in the two last national surveys.[21, 28]

This is a nationwide study which represents the entire Australian adult population, as discussed in the methodological paper published in this issue (Chrisopouloset al. 2020). NSAOH 2017-18 followed the same protocol used in NSAOH 2004-06, allowing comparisons over time. Oral epidemiological examinations covered different tooth loss and ways of tooth replacement outcomes, followed international standards and examiners had high clinical reliability measures. On the other hand, the study was not capable of capturing a full picture of Aboriginal and Torres Strait Islander Peoples oral health status, the most socioeconomically vulnerable group of the Australian society, given that this requires a different study design.

The dominance of private mode of delivery dental care in Australia may have an impact in the persistent socioeconomic inequalities on tooth loss, dental implants, and wearing prostheses. Almost one in four adults had an unfavourable pattern of dental visiting, and almost half of the studied population has no health insurance. There are ongoing problems with the affordability of dental care reported by Australians. A recent patient experience survey showed that 17.6% of people delayed seeing or did not see a dental professional due to cost compared to 7.7% for medical specialists and 3.4% for general medical practitioners.[33] Another problem is the longstanding geographic maldistribution of the dental profession relative to the population.[34] This is not a problem that is peculiar to dental care and Russell's proposal[35] for a "Dental Service Corps" has echoes of the recently de-funded Voluntary Dental Graduate Year Program, which provided one mechanism for temporary deployment of recent graduates to areas of need. Finally, the low level of public subsidy for dental care compared to general medical care reveals the low priority that the field has received. While around 80% of the cost of general practice medical care is funding by the government, only around 25% of dental care is.[34] This, despite the majority of both dental care and general medical care being provided in private practice.[36] For all of these reasons, it is necessary to address the ongoing separation of dental care from general health in health care.

Dental caries, the leading cause of tooth loss may be prevented by the appropriate use of fluoride. Australia has already one of the highest coverage rates of water fluoridation in the world, nearly 90% of the population.[37, 38] However, the extension of the coverage of water fluoridation to smaller Australian communities has been recommended given the substantial dental health inequalities for more remote and regional communities.[39] There is an opportunity to maximize the benefit of WF in the country by implementing this policy in small, remote, rural areas.[40]

We can conclude that an overall improvement in tooth retention was observed among Australian adult population in the last three decades. However, a clear socioeconomic gradient exists with those socioeconomically disadvantaged experiencing higher prevalence of edentulism, inadequate dentition, wearing denture than their better off.

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Figure captions

Time trend of complete tooth loss, inadequate dentition and average number of teeth lost for any reasons. Data of 1987-1988; 2004-06; and 2017-18 surveys. Proportion (or mean) and 95% CI

Table 1. Proportion of people with complete tooth loss in the Australian adult population by age groups

	N	% (95CI)	Total	Age (years)			
				15-34	35-54	55-74	75+
					%(95CI)		
Total	**15731**		**4.0(3.6,4.4)**	**—**	**1.1(0.7,1.6)**	**8.1(7.0,9.3)**	**20.5(18.1,23.1)**
Sex							
Males	6781	49.2 (48.1–50.0)	3.4(2.9,3.9)	—	1.1(0.6,2.0)	6.5(5.2,8.1)	19.1(15.6,23.2)
Females	8950	50.8 (49.6–51.0)	4.7(4.1,5.3)	—	1.0(0.6,1.8)	9.6(8.0,11.5)	21.5(18.4,25.0)
Region				—			
Major City	9372	71.8 (68.6–74.0)	3.5(3.0,4.0)	—	1.0(0.6,1.7)	7.4(6.0,9.0)	18.8(15.9,22.0)
Regional	5572	26.4 (23.3–29.0)	5.4(4.7,6.3)	—	1.1(0.6,1.9)	9.5(8.1,11.2)	23.9(19.8,28.6)
Remote	787	1.8 (0.9–3.0)	4.8(3.0,7.5)	—	2.2(0.6,8.1)	9.5(5.6,15.6)	31.9(17.8,50.3)
Income Tertile				—			
Lowest(<$40,000)	4163	31.0 (29.7–32.0)	10.3(9.2,11.6)	—	2.9(1.5,5.7)	11.6(9.7,13.8)	25.0(21.9,28.3)
Middle ($40-<$100,000)	4358	35.8 (34.6–37.0)	2.0(1.5,2.7)	—	1.2(0.6,2.6)	5.3(3.8,7.3)	7.6(4.2,13.3)
Highest ($100,000+)	4023	33.2 (31.7–34.0)	0.5(0.3,0.8)	—	0.3(0.1,0.9)	1.9(1.1,3.2)	8.9(2.9,23.9)
Seifa Tertile				—			
Lowest	5076	33.5 (29.0–38.0)	5.8(5.1,6.6)	—	1.4(0.7,2.5)	11.2(9.3,13.3)	26.1(21.8,30.9)
Middle	4955	33.2 (28.5–38.0)	3.8(3.3,4.5)	—	1.1(0.6,2.1)	8.4(6.8,10.3)	18.1(14.4,22.5)
Highest	5700	33.2 (29.0–37.0)	2.4(1.9,3.1)	—	0.8(0.4,1.8)	4.2(2.6,6.5)	16.2(12.6,20.6)
Dental insurance				—			
Insured	8238	51.1 (49.5–52.0)	1.7(1.4,2.0)	—	0.5(0.3,1.1)	3.6(2.8,4.5)	9.2(7.0,11.9)
Uninsured	7206	48.9 (47.2–50.0)	6.5(5.8,7.2)	—	1.8(1.1,2.8)	12.7(10.9,14.8)	28.3(24.7,32.3)
Visiting Pattern				—			
Favourable	6626	44.9 (43.5–46.0)	—	—	—	—	—
Intermediate	4692	32.1 (30.9–33.0)	0.4(0.3,0.6)	—	0.0(0.0,0.1)	1.0(0.5,1.9)	3.1(1.7,5.7)
Unfavourable	3375	23.0 (21.8–24.0)	5.7(4.8,6.7)	—	0.5(0.2,1.2)	10.4(8.1,13.3)	29.1(23.8,35.0)

Notes: 1. Data in this table was taken from the Interview.

2. — zero or rounded to zero; 95CI: N: unweighted sample size; 95% Confidence Interval.

Table 2. Percentage of people with fewer than 21 teeth in the Australian dentate population

	N	%(95CI)	Total	Age (years)			
				15-34	35-54	55-74	75+
				%(95CI)			
Total	**14868**		**10.2(9.5,10.9)**	**0.7(0.4,1.2)**	**4.9(4.1,5.7)**	**22.2(20.5,23.9)**	**45.6(41.9,49.3)**
Sex							
Males	6447	49.6 (48.4–50.8)	10.1(9.2,11.1)	0.8(0.4,1.6)	4.8(3.7,6.1)	23.0(20.7,25.6)	46.0(40.5,51.5)
Females	8421	50.4 (49.2–51.6)	10.3(9.4,11.2)	0.6(0.3,1.3)	4.9(3.8,6.4)	21.3(19.1,23.6)	45.3(40.6,50.0)
Region							
Major City	8957	72.2 (69.0–75.2)	8.9(8.1,9.7)	0.6(0.3,1.1)	4.2(3.3,5.2)	20.3(18.2,22.5)	43.7(39.2,48.3)
Regional	5168	26.1 (23.0–29.4)	13.8(12.4,15.3)	1.1(0.4,3.0)	6.9(5.3,8.8)	26.0(23.2,29.0)	50.1(43.7,56.5)
Remote	743	1.7 (0.9–3.2)	10.2(7.3,14.2)	1.5(0.4,6.1)	5.0(2.5,9.7)	25.5(19.8,32.1)	44.3(22.6,68.3)
Income Tertile							
Lowest(<$40,000)	3623	28.9 (27.5–30.3)	23.7(21.7,25.8)	1.9(0.6,5.3)	12.0(8.5,16.6)	31.2(28.3,34.2)	49.9(45.1,54.6)
Middle ($40-<$100,000)	4251	36.6 (35.3–38.0)	7.7(6.7,8.9)	0.5(0.2,1.1)	5.0(3.6,6.7)	18.6(15.7,21.8)	36.5(28.0,45.9)
Highest ($100,000+)	3989	34.5 (33.0–36.0)	3.0(2.5,3.7)	0.7(0.3,1.5)	2.1(1.4,3.1)	10.2(7.7,13.3)	47.3(27.3,68.2)
Seifa Tertile							
Lowest	4663	32.9 (28.4–37.7)	13.5(12.2,15.0)	0.6(0.2,1.5)	7.6(6.0,9.5)	28.1(25.3,31.0)	53.3(46.5,60.0)
Middle	4682	33.3 (28.6–38.4)	10.7(9.6,11.9)	1.0(0.4,2.3)	5.3(4.1,7.0)	23.3(20.2,26.7)	46.6(40.6,52.7)
Highest	5523	33.8 (29.6–38.3)	6.4(5.7,7.2)	0.5(0.2,1.3)	1.8(1.2,2.6)	14.6(12.5,16.9)	36.2(30.6,42.2)
Dental insurance							
Insured	8009	52.4 (50.7–54.1)	6.7(6.0,7.4)	0.5(0.2,1.1)	2.0(1.4,2.8)	15.3(13.6,17.3)	33.3(28.9,37.9)
Uninsured	6591	47.6 (45.9–49.3)	14.4(13.3,15.5)	1.0(0.5,1.9)	8.6(7.1,10.4)	30.0(27.4,32.8)	57.0(51.6,62.2)
Visiting Pattern							
Favourable	6597	45.5 (44.1–47.0)	6.2(5.5,6.9)	6.2(5.5,6.9)	0.5(0.2,1.2)	2.0(1.3,3.1)	30.4(26.1,35.2)

Intermediate	4635	32.4 (31.3–33.6)	10.7(9.6,12.0)	1.0(0.4,2.4)	4.9(3.4,6.9)	25.9(22.9,29.2)	51.8(44.7,58.8)
Unfavourable	3101	22.0 (20.9–23.3)	17.5(15.9,19.2)	0.7(0.2,2.3)	9.4(7.4,11.9)	34.2(30.5,38.0)	69.6(61.7,76.5)

Notes: 1. Data in this table was taken from the Interview.

2. — zero or rounded to zero; 95CI: N: unweighted sample size; 95% Confidence Interval.

Table 3. Percentage of people who wear denture(s) in the Australian dentate population

				Age (years)			
	N	**%(95CI)**	**Total**	**15-34**	**35-54**	**55-74**	**75+**
					%(95CI)		
Total	**14914**		**11.3(10.7,12.0)**	**1.1(0.7,1.7)**	**5.8(5.0,6.7)**	**24.5(22.8,26.3)**	**47.4(44.1,50.7)**
Sex							
Males	6456	49.5 (48.4–50.7)	10.8(9.8,11.8)	1.3(0.7,2.4)	6.1(4.9,7.6)	23.2(20.8,25.7)	45.8(40.9,50.8)
Females	8458	50.5 (49.3–51.6)	11.8(11.0,12.8)	0.9(0.5,1.5)	5.5(4.4,6.9)	25.8(23.4,28.4)	48.6(44.0,53.2)
Region							
Major City	8984	72.2 (69.0–75.2)	10.3(9.6,11.0)	1.0(0.6,1.6)	5.3(4.4,6.3)	23.2(21.0,25.5)	47.2(43.3,51.1)
Regional	5183	26.0 (22.9–29.4)	14.3(13.0,15.8)	1.4(0.5,4.1)	7.4(5.7,9.7)	27.3(24.4,30.4)	48.1(41.9,54.3)
Remote	747	1.7 (0.9–3.2)	9.0(7.0,11.3)	0.1(0.0,0.5)	3.1(1.1,8.6)	25.4(20.0,31.7)	40.8(23.4,60.9)
Income Tertile							
Lowest(<$40,000)	3641	29.0 (27.6–30.4)	23.8(21.9,25.8)	0.6(0.2,1.3)	10.0(7.2,13.7)	32.9(29.9,36.2)	50.4(46.2,54.7)
Middle ($40-<$100,000)	4253	36.6 (35.3–37.9)	8.6(7.6,9.8)	1.3(0.7,2.3)	5.7(4.3,7.6)	19.8(17.0,23.0)	36.7(29.2,44.8)
Highest ($100,000+)	3998	34.4 (32.9–36.0)	3.5(2.9,4.4)	0.3(0.1,1.2)	3.3(2.3,4.7)	10.9(8.4,14.0)	36.6(18.3,59.9)
Seifa Tertile							
Lowest	4684	32.9 (28.5–37.7)	13.6(12.3,14.9)	0.5(0.2,1.0)	7.0(5.5,9.0)	29.6(26.5,32.9)	50.5(44.6,56.5)

Middle	4694	33.3 (28.6–38.4)	12.2(11.2,13.4)	1.8(0.9,3.5)	6.6(5.2,8.3)	26.1(23.0,29.4)	48.9(43.5,54.3)
Highest	5536	33.8 (29.5–38.3)	8.2(7.4,9.1)	0.9(0.5,1.9)	3.8(2.8,5.1)	17.3(15.1,19.7)	42.3(36.9,47.9)
Dental insurance							
Insured	8034	52.4 (50.7–54.1)	8.5(7.8,9.2)	0.7(0.4,1.2)	3.7(2.8,4.8)	18.7(16.8,20.7)	38.0(33.4,42.8)
Uninsured	6611	47.6 (45.9–49.3)	14.6(13.6,15.7)	1.5(0.9,2.5)	8.1(6.6,9.8)	31.1(28.6,33.8)	55.9(51.0,60.7)
Visiting Pattern							
Favourable	6614	45.5 (44.1–47.0)	8.1(7.3,9.0)	0.5(0.2,1.1)	3.4(2.4,4.8)	16.9(15.0,19.1)	38.3(33.5,43.3)
Intermediate	4650	32.4 (31.3–33.6)	12.2(11.1,13.5)	1.4(0.7,2.7)	6.3(4.8,8.4)	29.6(26.6,32.9)	52.9(46.4,59.3)
Unfavourable	3114	22.0 (20.9–23.3)	16.1(14.6,17.8)	2.0(1.0,4.1)	7.9(6.0,10.2)	32.1(28.4,36.0)	60.3(52.0,68.1)

Notes: 1. Data in this table was taken from the Interview.

2. — zero or rounded to zero; 95CI: N: unweighted sample size; 95% Confidence Interval.

Table 4. Mean number of missing teeth for any reasons per person in the Australian dentate population

				Age (years)			
	N	**%(95CI)**	**Total**	**15-34**	**35-54**	**55-74**	**75+**
					Mean (95CI)		
Total	**5022**		**5.7(5.5,6.0)**	**3.2(3.0,3.4)**	**4.8(4.5,5.0)**	**8.8(8.2,9.4)**	**13.2(12.2,14.2)**
Sex							
Males	2249	49.6 (46.9–52.2)	5.4(5.1,5.8)	2.8(2.5,3.1)	4.5(4.1,5.0)	8.6(8.0,9.3)	13.6(12.5,14.6)
Females	2773	50.4 (47.8–53.1)	6.0(5.7,6.4)	3.6(3.4,3.8)	5.0(4.6,5.3)	9.0(8.0,10.0)	12.9(11.3,14.6)
Region							
Major City	2969	72.7 (69.1–76.0)	5.4(5.1,5.7)	3.1(2.9,3.3)	4.6(4.3,4.9)	8.4(7.6,9.2)	13.3(12.0,14.6)
Regional	1814	25.7 (22.4–29.4)	6.6(6.2,7.0)	3.6(3.3,4.0)	5.1(4.6,5.6)	9.6(8.8,10.4)	13.0(11.6,14.5)

Remote	239	1.6 (0.9–3.0)	5.8(4.5,7.1)	3.5(2.6,4.5)	6.0(3.9,8.1)	8.2(6.8,9.6)	12.7(7.7,17.8)
Income Tertile							
Lowest(<$40,000)	1409	32.1 (29.6–34.8)	8.0(7.5,8.6)	3.6(3.3,4.0)	5.6(4.9,6.4)	9.9(9.0,10.8)	13.5(12.4,14.7)
Middle ($40-<$100,000)	1289	32.0 (29.6–34.5)	5.4(5.0,5.8)	3.0(2.7,3.4)	4.8(4.2,5.5)	8.2(7.3,9.1)	11.4(10.2,12.7)
Highest ($100,000+)	1531	35.9 (33.3–38.5)	4.4(4.0,4.7)	3.3(3.1,3.6)	4.4(4.0,4.8)	6.7(5.3,8.1)	10.8(6.9,14.7)
Seifa Tertile							
Lowest	1596	33.3 (28.3–38.7)	6.1(5.6,6.6)	3.0(2.7,3.4)	5.2(4.6,5.8)	9.6(8.7,10.4)	13.2(11.9,14.5)
Middle	1561	33.3 (28.0–39.2)	6.1(5.7,6.5)	3.4(3.2,3.7)	4.9(4.6,5.3)	9.6(8.5,10.8)	13.6(12.4,14.8)
Highest	1865	33.3 (28.6–38.5)	5.0(4.6,5.4)	3.2(2.9,3.5)	4.1(3.6,4.7)	7.1(6.2,8.0)	12.9(10.3,15.4)
Dental insurance							
Insured	2548	45.3 (42.5–48.1)	5.3(5.0,5.6)	3.6(3.3,3.8)	4.3(3.9,4.7)	7.6(7.0,8.3)	10.8(9.8,11.8)
Uninsured	2385	54.7 (51.9–57.5)	6.2(5.8,6.6)	3.0(2.7,3.2)	5.2(4.8,5.7)	9.8(9.0,10.7)	15.0(13.4,16.5)
Visiting Pattern							
Favourable	2054	39.4 (36.8–42.1)	5.4(5.0,5.7)	3.5(3.2,3.8)	4.5(3.9,5.0)	7.1(6.5,7.8)	11.0(9.8,12.2)
Intermediate	1664	35.5 (33.1–38.1)	5.8(5.3,6.3)	3.1(2.7,3.4)	4.9(4.5,5.2)	10.3(9.0,11.6)	13.4(11.9,14.9)
Unfavourable	1113	25.1 (22.7–27.5)	6.4(5.9,7.0)	3.2(2.9,3.5)	4.8(4.3,5.3)	10.2(9.1,11.4)	18.2(15.6,20.9)

Notes: 1. Data in this table was taken from the Examination.

2. — zero or rounded to zero; 95CI: N: unweighted sample size; 95% Confidence Interval.

Table 5. Mean number of dental implants per person in the Australian dentate population

				Age (years)			
	N	**%(95CI)**	**Total**	**15-34**	**35-54**	**55-74**	**75+**
				Mean (95CI)			

Total	**14772**		**0.1(0.1,0.1)**	**0.1(0.0,0.1)**	**0.1(0.1,0.1)**	**0.2(0.2,0.2)**	**0.2(0.1,0.2)**
Sex							
Males	6395	49.5 (48.3–50.6)	0.1(0.1,0.2)	0.1(0.0,0.1)	0.1(0.1,0.2)	0.2(0.2,0.2)	0.2(0.1,0.3)
Females	8377	50.5 (49.4–51.7)	0.1(0.1,0.1)	0.0(0.0,0.0)	0.1(0.0,0.1)	0.2(0.2,0.3)	0.2(0.1,0.2)
Region							
Major City	8894	72.1 (68.9–75.2)	0.1(0.1,0.2)	0.1(0.0,0.1)	0.1(0.1,0.2)	0.2(0.2,0.3)	0.2(0.1,0.3)
Regional	5139	26.1 (23.0–29.5)	0.1(0.1,0.1)	0.1(0.0,0.1)	0.1(0.0,0.1)	0.2(0.1,0.2)	0.1(0.0,0.1)
Remote	739	1.7 (0.9–3.3)	0.1(0.0,0.2)	0.0(0.0,0.0)	0.1(0.0,0.2)	0.2(0.1,0.4)	0.0(0.0,0.0)
Income Tertile							
Lowest(<$40,000)	3601	28.9 (27.5–30.3)	0.1(0.1,0.2)	0.1(0.0,0.1)	0.1(0.0,0.3)	0.1(0.1,0.2)	0.1(0.1,0.1)
Middle ($40-<$100,000)	4218	36.6 (35.3–37.9)	0.1(0.1,0.1)	0.0(0.0,0.1)	0.1(0.1,0.2)	0.2(0.1,0.3)	0.4(0.2,0.6)
Highest ($100,000+)	3971	34.5 (33.0–36.1)	0.1(0.1,0.1)	0.1(0.0,0.1)	0.1(0.1,0.1)	0.3(0.2,0.4)	1.4(0.0,2.8)
Seifa Tertile							
Lowest	4639	32.9 (28.5–37.7)	0.1(0.1,0.1)	0.0(0.0,0.0)	0.1(0.1,0.2)	0.1(0.1,0.2)	0.1(0.0,0.2)
Middle	4653	33.3 (28.6–38.4)	0.1(0.1,0.2)	0.1(0.0,0.1)	0.1(0.1,0.2)	0.2(0.2,0.3)	0.2(0.1,0.3)
Highest	5480	33.7 (29.5–38.3)	0.1(0.1,0.2)	0.1(0.0,0.1)	0.1(0.1,0.1)	0.3(0.2,0.4)	0.2(0.2,0.3)
Dental insurance							
Insured	7966	52.6 (50.9–54.2)	0.1(0.1,0.2)	0.1(0.0,0.1)	0.1(0.1,0.1)	0.3(0.2,0.3)	0.3(0.2,0.4)
Uninsured	6546	47.4 (45.8–49.1)	0.1(0.1,0.1)	0.0(0.0,0.1)	0.1(0.1,0.2)	0.2(0.1,0.2)	0.1(0.0,0.1)
Visiting Pattern							
Favourable	6564	45.7 (44.2–47.1)	0.1(0.1,0.1)	0.0(0.0,0.0)	0.1(0.1,0.1)	0.3(0.2,0.3)	0.2(0.1,0.3)
Intermediate	4595	32.3 (31.1–33.5)	0.2(0.1,0.2)	0.1(0.0,0.1)	0.2(0.1,0.3)	0.2(0.2,0.3)	0.3(0.1,0.5)
Unfavourable	3083	22.1 (20.9–23.3)	0.1(0.0,0.1)	0.1(0.0,0.2)	0.1(0.0,0.1)	0.1(0.0,0.1)	0.1(0.0,0.1)

Notes: 1. Data in this table was taken from the Interview.

2. — zero or rounded to zero; 95CI: N: unweighted sample size; 95% Confidence Interval.

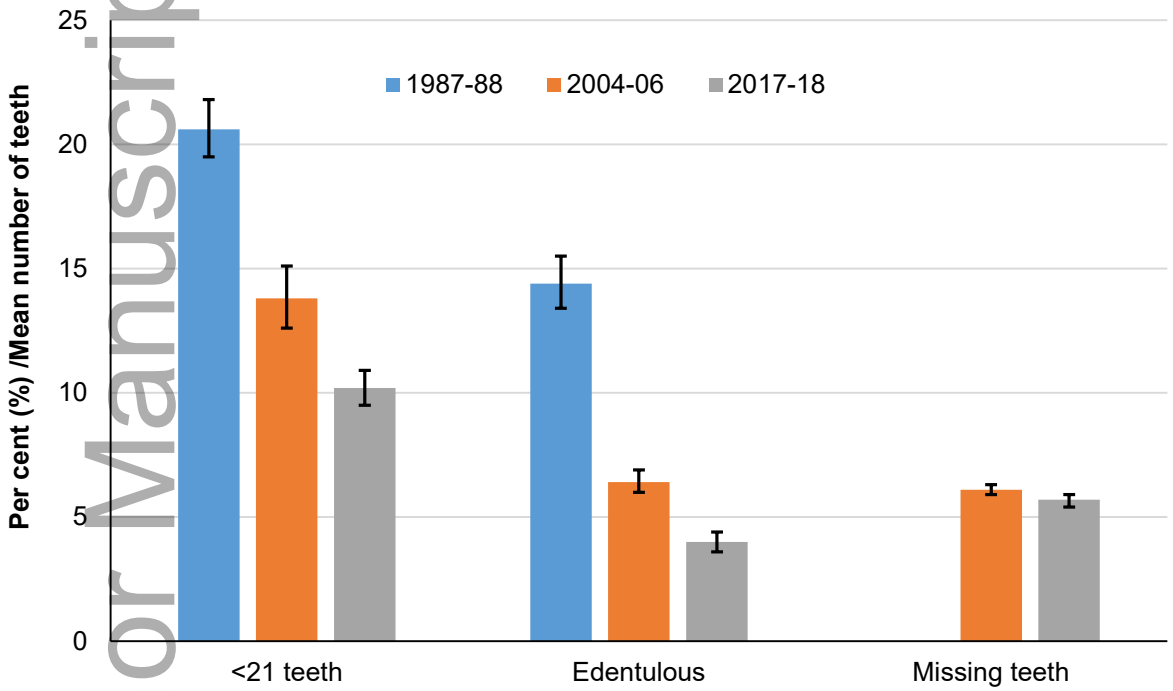
Table 6. Mean number of missing teeth replaced by prostheses per person in the Australian dentate population

	N	%(95CI)	Total	Age (years)			
				15-34	35-54	55-74	75+
				Mean (95CI)			
Total	**5022**		**1.0(0.9,1.2)**	**0.1(0.0,0.2)**	**0.3(0.2,0.5)**	**2.2(1.9,2.6)**	**4.8(3.6,6.0)**
Sex							
Males	2249	49.6 (46.9–52.2)	0.9(0.7,1.0)	0.1(0.0,0.1)	0.3(0.1,0.6)	2.0(1.5,2.4)	4.3(3.1,5.5)
Females	2773	50.4 (47.8–53.1)	1.2(0.9,1.4)	0.2(0.0,0.3)	0.4(0.2,0.5)	2.5(1.9,3.1)	5.2(3.3,7.0)
Region							
Major City	2969	72.7 (69.1–76.0)	0.9(0.7,1.1)	0.1(0.0,0.2)	0.3(0.1,0.5)	2.0(1.5,2.5)	4.9(3.3,6.5)
Regional	1814	25.7 (22.4–29.4)	1.4(1.1,1.6)	0.1(0.0,0.3)	0.5(0.2,0.7)	2.7(2.0,3.5)	4.6(3.1,6.0)
Remote	239	1.6 (0.9–3.0)	0.8(0.5,1.0)	0.0(0.0,0.0)	0.2(-0.1,0.4)	2.1(0.9,3.4)	5.0(0.7,9.4)
Income Tertile							
Lowest(<$40,000)	1409	32.1 (29.6–34.8)	2.0(1.6,2.4)	0.3(0.0,0.6)	0.5(0.2,0.9)	2.7(2.0,3.4)	5.1(4.0,6.1)
Middle ($40-<$100,000)	1289	32.0 (29.6–34.5)	0.9(0.6,1.2)	0.1(0.0,0.2)	0.6(0.1,1.0)	2.1(1.4,2.8)	2.6(1.2,4.1)
Highest ($100,000+)	1531	35.9 (33.3–38.5)	0.2(0.1,0.4)	0.0(0.0,0.1)	0.2(0.0,0.4)	0.9(0.4,1.4)	1.7(0.2,3.2)
Seifa Tertile							
Lowest	1596	33.3 (28.3–38.7)	1.1(0.9,1.4)	0.1(0.0,0.2)	0.5(0.1,0.9)	2.5(1.9,3.2)	4.2(2.8,5.7)
Middle	1561	33.3 (28.0–39.2)	1.2(0.9,1.4)	0.2(0.0,0.4)	0.2(0.1,0.4)	2.7(1.9,3.6)	5.7(4.3,7.0)
Highest	1865	33.3 (28.6–38.5)	0.7(0.5,1.0)	0.1(0.0,0.2)	0.3(0.1,0.5)	1.4(0.9,1.9)	4.5(1.4,7.6)
Dental insurance							
Insured	2548	45.3 (42.5–48.1)	0.8(0.6,0.9)	0.1(0.0,0.1)	0.2(0.1,0.4)	1.8(1.2,2.4)	3.1(2.1,4.1)
Uninsured	2385	54.7 (51.9–57.5)	1.3(1.0,1.5)	0.2(0.0,0.3)	0.5(0.2,0.7)	2.6(2.1,3.2)	6.1(4.1,8.0)
Visiting Pattern							
Favourable	2054	39.4 (36.8–42.1)	0.8(0.6,1.0)	0.1(0.0,0.3)	0.4(0.1,0.8)	1.5(1.1,2.0)	3.3(2.2,4.4)
Intermediate	1664	35.5 (33.1–38.1)	1.1(0.8,1.3)	0.2(0.0,0.3)	0.2(0.1,0.4)	3.3(2.3,4.3)	4.3(2.9,5.7)
Unfavourable	1113	25.1 (22.7–27.5)	1.3(0.9,1.7)	0.1(0.0,0.2)	0.4(0.1,0.6)	2.5(1.8,3.2)	9.4(5.7,13.1)

Notes: 1. Data in this table was taken from the Examination.

2. — zero or rounded to zero; 95CI: N: unweighted sample size; 95% Confidence Interval.

Time trend of complete tooth loss, inadequate dentition and average number of teeth lost for any reasons. Data of 1987-1988; 2004-06; and 2017-18 surveys. Proportion (or mean) and 95% CI



	<21 teeth	Edentulous	Missing teeth
1987-88	20.6	14.4	
2004-06	13.8	6.4	6.1
2017-18	10.2	4	5.7