

# Our Older People's Oral Health

*Key Findings of the 2012 New Zealand  
Older People's Oral Health Survey*

A Report for the Ministry of Health by CBG Health Research Limited



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## Authors

This report was written by Dr. Moira Smith, Professor W. Murray Thomson and Dr. Barry Gribben. Note: this report builds on the 2009 New Zealand Oral Health Survey. For consistency, the introductory text to sections which are common to both reports is similar or has been taken directly from the 2009 New Zealand Oral Health Survey report.

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Care and diligence have been taken to endeavour to make the information in this report accurate. CBG Health Research accepts no liability for the accuracy of the information, nor for its use or the reliance placed on it. If you suspect an error in any of the data contained in this report, please contact the authors.

## **Study Team**

### **Expert advisor**

Professor W. Murray Thomson, Professor of Dental Epidemiology and Public Health, Sir John Walsh Research Institute, School of Dentistry, University of Otago, Dunedin, New Zealand

### **Technical Advisory Group**

Professor W. Murray Thomson, Sir John Walsh Research Institute, School of Dentistry, University of Otago, Dunedin

Dr. Moira Smith – Department of Public Health, University of Otago, Wellington

Dr. Pauline Koopu – President of Te Ao Marama, NZ Māori Dental Association

Professor Ngaire Kerse – School of Population Health, University of Auckland.

Dr. Kathryn Peri – School of Nursing, University of Auckland

Dr. Barry Gribben – Clinical Director, CBG Health Research

Carol Boustead-Gibb – Managing Director, CBG Health Research

Neil Tee – Operations Manager, CBG Health Research

Anna Blackwell – Study Coordinator, CBG Health Research

### **Lead dental trainer**

Professor Kaye Roberts-Thomson, Australian Research Centre for Population Health, University of Adelaide

### **Training and calibration of examining dentists**

Dr. Robyn Haisman-Welsh

Dr. Moira Smith

### **Training facilities for dentists and recorders**

Oral Hygiene Clinic, Auckland University of Technology

### **Gold standard examiner**

Dr. Moira Smith

### **Dental examination software**

Adelaide Research and Innovation Pty Ltd, Adelaide University, Australia

### **IT programming, reporting and support**

Tom Robinson, Thomas Zhang and Emma Polson

### **Dental examination team**

Dr. Abeer Al Sammak, Dr. Jeff Annan, Dr. Marian Bassalious, Dr. Doris Bodker-Madsen, Dr. Harvey Brown, Dr. John Dalton, Dr. Gerry Davis, Dr. Cheryl Downey, Dr. Anna Ferguson, Dr. David Healey, Dr. David Kay, Dr. Roger Larkin, Dr. Chris Ledger, Dr. Jocelyn Logan, Dr. Howard Mace, Dr. Andrew Mackie, Dr. Chris Newbould, Dr. Sandie Pryor, Dr. Rebecca Schipper, Dr. Stephen Smith, Dr. Tania Stuart.

### **Dental recording and questionnaire administration field team**

Heni Tupe (National Field Manager); Tony Lewis (Residential Aged-Care Facilities Liaison); and surveyors/recorders: Sarah Baker, Dr. Kate Ball, Michelle Bird, Dr. Elizabeth Borst, Sonja Cartwright, Steffany Choy, Mary Clark, Angela Cribb, Diane Fleming, Barbara Horrell, Shona Jennings, Cristina Lourencao, Christina Macann, Judi Martin, Sue Millar, Alicia Saptoe, Lisa Schreivogel, Julie Summers, Sarah Tupe, Donna Wharewaka, Lexie Witana.

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# Executive Summary

Oral health refers not only to the absence of oral disease – primarily tooth decay and gum disease – but also to the contribution made to overall health and wellbeing, and quality of life. Good oral health benefits both individuals and society, yet oral diseases are among the most prevalent chronic diseases in New Zealand and represent a considerable public health burden. Given that the population of New Zealand is expected to increase, and is also becoming older (Statistics New Zealand 2014), and that New Zealanders are retaining more of their own teeth (Ministry of Health 2010a), the demand for oral health services is likely to increase and be substantial.

Older adults have been identified as a priority group in *Good Oral Health for All, for Life* (Ministry of Health 2006), the document which sets out New Zealand's oral health strategy. However, there is limited evidence in New Zealand (and internationally) to inform the development of strategies to address the specific oral health needs of this population group and, increasingly, their future oral health needs. Although the recent 2009 New Zealand Oral Health Survey (NZOHS) (Ministry of Health 2010a) has provided some insight on the oral health of the 'usually resident older New Zealanders living in private dwellings', little is known about the oral health of the most vulnerable older adults: people living in residential aged-care facilities, and older New Zealanders who live in their own home but who require assistance for their day-to-day living. Older adults living in residential aged-care facilities were not included in the 2009 NZOHS. While older New Zealanders living in their own homes were included in the 2009 NZOHS, those receiving home-based personal care assistance were not specifically sampled for the specific purpose of determining their oral health status.

The 2012 New Zealand Older People's Oral Health Survey (OPOHS) is part of the 'Study into Older People's Oral Health Issues' (SOPOLI); an umbrella project funded by the Ministry of Health, specifically designed to supplement the findings of the 2009 NZOHS. The SOPOLI also sought to identify publically-funded oral health services available to, and oral health services accessed by, the target populations.

The 2012 OPOHS is the first nationwide survey to collect information on the oral health status of New Zealand older adults living in residential aged-care facilities, and older New Zealanders who live in their own home but who require assistance for their day-to-day living. In addition to ascertaining the clinical and self-reported oral health status of vulnerable older adults, the 2012 OPOHS also reports on the oral health services accessed by them.

This report presents the key findings of the face-to-face interviews and dental examinations undertaken in the 2012 OPOHS. The fieldwork (including the pilot study) was carried out from April to December 2012. Overall, 2,218 New Zealanders aged 65 years and over participated in the face-to-face interview, and 1,882 completed an oral health examination. Using total response ethnicity, the sample included 226 Māori, 141 Pacific, 76 Asian and 1,813 European/Other older adults. Of the entire sample, 1,120 (50.5%) were living in residential aged-care facilities, and 1,098 (49.5%) were living in their own homes receiving home-based personal care assistance. In this report, the former are termed the 'residential care' or 'RC' sample, and the latter are the 'home-based', or 'HB' sample. The findings presented in this report relate to the overall sample;

that is, all older adults surveyed, according to their residential location. Research centred on whether the survey participants in the RC and HB samples had one or more natural teeth (dentate), or had complete tooth loss (edentulous). In total, a maximum of 102 questions, covering 22 topics, were asked during the interviews of participants in both residential locations. In-depth analysis of the target population has been undertaken and a summary of the findings can be found in Appendices A and B.

Overall, the report shows that, a substantial proportion of the vulnerable older adult population in New Zealand has retained at least one natural tooth. Although this is an encouraging finding, as the retention of natural teeth benefits people's overall health and wellbeing, the data also indicate that many dentate vulnerable older adults, experience a significant burden of oral disease and unmet treatment need. In addition, further disparities in oral health exist within this population group, particularly among Māori and Pacific older adults, older adults of lower socioeconomic status, and those living in residential aged-care facilities. These findings, along with the other findings from the SOPOHI project, will provide valuable information for the future development of oral health policies and programmes for older New Zealanders, thus progressing the strategic vision for oral health in New Zealand: *Good Oral Health for All, for Life*.

## Oral health status

In 2012, just over half of all older adults had lost all of their natural teeth (RC, 56.6%; HB, 52.2%). Of those who were edentulous (had complete tooth loss), 73.9% living in residential care and 86.9% living in their own homes, wore full upper and lower dentures to replace their missing teeth.

The proportion of older adults living in residential care who were dentate (had some natural teeth) was 43.4%; of those living in their own homes, 47.8% were dentate (that is, they had one or more of their own natural teeth). Just over a third (RC, 35.1%; HB, 37.3%) had a functional dentition (defined as 21 or more natural teeth), and on average, had 15 (RC, 15.6; HB, 15.1) teeth missing due to oral diseases.

There were concerning levels of untreated decay among dentate older adults:

- 61.3% living in residential care and 43.2% living in their own homes had untreated coronal decay on one or more teeth; the average number of teeth affected was 3.5 and 3.0, respectively
- 33.7% living in residential care and 32.7% living in their own homes had untreated root decay on one or more teeth; the average number of teeth affected was 0.8 and 0.7, respectively.

The overall lifetime experience of dental decay (the DMFT score) was 24.2 for dentate older adults in residential care (comprising 2.6 decayed, 15.6 missing and 6.0 filled teeth), and 23.9 for those living in their own homes (comprising 1.7 decayed, 15.1 missing and 7.1 filled teeth). It is to be noted that the D component of the DMFT comprises teeth with coronal decay or root decay or both. See Severity of dental decay experience (DMFT), Chapter 3, Part 2, for an in-depth explanation of the DMFT score.

The prevalence of periodontal disease (periodontal pocketing of greater than 4mm) among dentate older adults living in residential care was 11.2%, and 20.8% among those living in their own home. The prevalence of deep pocketing (6mm or more) was less than 3%.

A large proportion of dentate older adults had heavy plaque and calculus deposits on their teeth. On more than one-third of the tooth surface:

- of older adults living in residential care, 35.8% had heavy plaque on their teeth, and 20.8% had heavy calculus on their teeth
- of older adults living in their own home, 20.5% had heavy plaque on their teeth, and 13.8% had heavy calculus on their teeth.

For all older adults:

- 25.4% of those living in residential care and 31.4% living in their own homes had one or more oral mucosal conditions, including ulcerated lesions, oral candidiasis or denture stomatitis
- 52.7% of those living in residential care and 69.7% living in their own home reported having a dry mouth.

## **Protective behaviours**

Half of all dentate older adults (RC, 49%; HB, 51.5%) brushed their teeth twice a day with fluoride toothpaste (as currently recommended).

One third (33.3%) of dentate older adults living in residential care and one in five (18.9%) living in their own home reported having difficulty cleaning their teeth.

Of those who wore dentures, about half (RC, 47%; HB, 50.1%) reported that they cleaned their dentures twice a day, and about two-thirds (RC, 61%; HB, 56%) reported that they removed their dentures at night.

The majority of older adults usually visited a dental professional only when they had a problem, rather than for routine dental check-ups:

- A quarter (RC, 23.8%; HB, 27.8%) had visited a dental professional in the 12 months prior to the survey
- The last visit to a dental professional for 16.9% of older adults living in residential care, and for 26.9% of older adults living in their own homes, was for a check-up
- 12.9% of older adults living in residential care and 19.7% of those living in their own homes usually visited a dental professional for a check-up.

Cost hindered access to oral health services for some older adults: with 17.3% living in residential care and 32.1% living in their own home, reporting that they avoided dental care due to cost. Other key reasons given for not visiting (by those who had not visited a dental professional in the previous year) were difficulty in accessing services (RC, 13.6%; HB, 11.3%) and a perceived lack of problems (RC, 51.8%; HB, 59.7%).

Older adults who had seen a dental professional in the previous 12 months had better oral health over almost all of the clinical and self-reported indicators.

## **Unmet need**

There was strong evidence of unmet need among older adults, and this was apparent with both self-reported and actual measures (as determined by the examining dentist's clinical opinion based on the health of the participant, their ability to undergo treatment, the need for treatment, and each participant's wishes). Among dentate older adults:

- 42.2% living in residential care and 45.6% living in their own homes required one or more restorations
- 33.2% living in residential care and 21.9% living in their own homes required one or more teeth extracted.

Among all older adults:

- 24.9% living in residential care and 36% living in their own homes felt that they needed dental treatment
- Two in five (42.1%) living in residential care and one-third (31.6%) living in their own homes felt that they did not see a dental professional often enough
- 14.5% living in residential care and 21% living in their own home reported experiencing pain in the mouth, face or jaw in the four weeks prior to the survey.

Overall, older adults reported that they perceived their oral health adversely impacting on their quality of life:

- Only 29.4% living in residential care and 45.5% living in their own homes reported having 'very good' or 'excellent' oral health
- 18% living in residential care and 23.9% living in their own homes reported that they experienced impacts due to their oral health.

## **Disparities in oral health status and access to services**

Māori, Pacific people, and older adults of lower socioeconomic status (SES) are recognised as key priority groups in New Zealand's oral health strategy. This Study highlights the disparities in oral health (and access to services) experienced by older adults. Those living in aged residential-care facilities; older adults who are most dependent on others for their day-to-day care; the oldest older adults; and men, all having poorer oral health than older adults living in their own homes; the more independent older adults; younger older adults; and women. The oral health issues which particularly affected some or all of these groups included higher levels of untreated decay and missing teeth; greater requirement for dental treatment; lower prevalence of tooth replacement; higher levels of perceived unmet need; and self-reported poorer overall oral health. Furthermore, they were often less likely to have visited a dental professional in the previous year or to usually visit for check-ups, and they were more likely to report that cost is a major barrier to accessing services and receiving treatment.



## **Māori**

Older Māori had poorer oral health across the range of survey indicators. They experienced greater tooth loss, and were more likely to be edentulous. Furthermore, edentulous older Māori were less likely to replace their missing teeth with complete full dentures. Dentate older Māori were less likely to have a functional dentition and had fewer natural teeth present; they were also less likely to use fluoridated toothpaste when brushing their teeth.

Older Māori also had problems with accessing oral health services. They were more likely to feel that they did not see dental professionals often enough. Older Māori were less likely to have visited a dental professional in the previous year; half as likely to have visited at that time for a check-up; only one-fifth as likely as non-Māori to usually attend for a check-up; and half as likely to visit the same dental professional for dental care and advice. When they did make a dental visit, older Māori were less likely to visit a private dentist; see the same person; and to feel that they were listened to carefully by a dental professional. Cost was a significant barrier to seeking dental care for older Māori.

## **Pacific people**

The oral health status of Pacific older adults was generally better than that of non-Pacific older adults. They were less likely to be edentulous; had almost twice as many sound teeth present; and a lower mean DMFT score. However, for dentate Pacific older adults, the level of disease was greater than their non-Pacific counterparts. Although there was no significant difference in the prevalence of coronal or root decay between Pacific and non-Pacific people, there were differences in the severity, with Pacific older adults, on average, having almost twice as many teeth as non-Pacific older adults with untreated coronal or root decay. Furthermore, they were more likely to have periodontal pocketing and nine times more likely to have deep periodontal pocketing, in part due to the finding that they were twice as likely to have heavy calculus on their teeth. Consequently, Pacific older adults were twice as likely as their non-Pacific counterparts to require extractions, and on average, required over three times the number of teeth extracted as non-Pacific older adults.

Pacific older adults were only half as likely as non-Pacific older adults to have attended a dental professional in the previous year for a check-up, and they were less likely to usually attend for a check-up, or attend the same dental professional for care. They also had higher levels of unmet need. Cost was a major barrier to accessing care, with Pacific older adults being twice as likely to avoid going to a dental professional and three times as likely to avoid undertaking recommended routine treatment due to cost. When they did make a dental visit, Pacific older adults paid twice as much as non-Pacific people for transport services to access their care. The findings of the self-report and quality of life questions in the interview, which focus on self-perceptions of oral health, indicate that Pacific older adults perceive that their oral health is poorer than that of their non-Pacific counterparts.

## **People of lower socioeconomic status (SES)**

The survey findings provide evidence of SES disparities in oral health. Older adults of lower SES had a higher prevalence of total and partial tooth loss than those of higher SES. Access to oral health care services was poorer for lower-SES older adults, who were significantly less likely to have visited a dental professional in the year prior to the survey. For those who had, their visit was more likely to have been for a problem than a check-up; lower-SES older adults were also less likely to usually attend a dental professional for a check-up. Cost was a significant barrier to accessing dental care for older adults of lower SES.

## **Older adults in residential aged-care facilities**

The study findings indicate that, in contrast to older adults living in their own homes, older adults living in residential aged-care facilities experience poorer oral health, faring poorly in almost all study indicators. They were more likely to have untreated coronal decay and, on average, more teeth with coronal decay; more surfaces with untreated root decay; and more likely to require extractions and, on average, required more teeth to be extracted than older adults living in their own home. They were also less likely to wear complete dentures.

This population group was nearly twice as likely as those living in their own homes to have heavy plaque on their teeth, and one and a half times more likely to have heavy calculus on their teeth. Furthermore, they were less likely to brush their teeth twice a day and to use a fluoridated toothpaste when doing so. These findings possibly mirror other studies that show this population group to be twice as likely as their community-dwelling peers to report having physical difficulty in cleaning their teeth.

Overall, older adults living in residential care were less likely than older adults living in their own home to access oral health services, particularly privately-funded services, and were less likely to use transport services to access care. They were less likely to have attended a dental professional in the previous year; when they did, it was more likely to be for a problem rather than for a check-up. The continuity of care and regular attendance were also poorer for older adults in residential care. However, cost did not appear to be a significant barrier to accessing care. Fewer older adults in residential care reported oral-health-related quality of life (OHRQoL) impacts, which are impacts that can affect a person's wellbeing and enjoyment of life; and fewer older adults also reported experiencing orofacial pain and feeling that they needed any type of treatment. However, older adults living in residential care felt that they did not see a dental professional often enough, and perceived their oral health to be poorer than older people living in their own homes, with fewer reporting very good or excellent oral health.

## **The most dependent older adults**

The residential care sample of the Study was analysed to ascertain the oral health of those older adults who were most dependent on others for their day-to-day care. Primarily, the most dependent older adults' oral health issues were related to accessing services, unmet need, and OHRQoL. These most dependent older adults living in residential aged-care facilities were more likely to feel that they did not see a dental professional often enough, and when they did, they were less likely to feel that they had

been listened to carefully. They were also almost ten times as likely to go without recommended treatment due to cost than their more independent peers. This finding contrasts with the findings from the RC sample overall, which showed that cost was not a significant barrier to accessing care. This population group was also only half as likely to report having very good or excellent oral health, then the more independent older adults surveyed.

### **The oldest older adults**

As expected, older adults aged 85 years and over (in either sample) were more likely to be edentulous and wear complete dentures. If dentate, they were more likely to have retained fewer of their own natural teeth, were less likely to have a functional dentition, and more likely to replace their missing teeth with dentures. Dentate older adults aged 85 years and over had poorer oral health than dentate older adults aged 65–84 years, in several of the oral health indicators measured in this survey. They had fewer sound teeth, were more likely to have untreated root decay, and more teeth with root decay, a higher mean DMFT, and more teeth requiring extraction than younger older adults. The oldest older adults were significantly less likely to have visited a dental professional in the previous 12 months than younger older adults. Nonetheless, overall, people aged 85 years and over reported having low levels of unmet need and enjoyed greater levels of OHRQoL; they were also more likely than older adults aged 65–84 years to perceive their oral health to be very good or excellent.

### **Older men and women**

Older men were less likely to be edentulous than older women. However, the oral health of dentate older men was poorer than for older dentate women over a range of factors, particularly untreated coronal and root decay. Subsequently, they had greater actual treatment need and perceived unmet need. Older men also had poorer self-care and self-reported oral health.

### **Older adults who had made a dental visit in the previous year**

Notably, the older adults who had made a visit to a dental professional in the year prior to the survey, had better oral health than those who had not, faring better in almost all survey indicators. Despite this overall positive finding, this population group reported experiencing unmet need and poorer OHRQoL.

## **Conclusion**

This report presents the most up-to-date and comprehensive information on the oral health status of the most vulnerable older New Zealanders – the people living in residential aged-care facilities, and receiving home-based personal care assistance in their own homes. Overall, high rates of oral disease and unmet need exist in this population group and, generally, its members do not routinely engage in oral health care practices which would assist in reducing disease and maintaining oral health. Moreover, some substantial ethnic, SES, locational and dependency-related disparities in oral health and care are apparent.

These key findings from the 2012 Older People’s Oral Health Survey will provide valuable information for the further development of oral health policies and programmes specific to this population group, including New Zealand’s strategic vision for oral health: *Good Oral Health for All, for Life*.

# Chapter 1: Introduction and Background

## Introduction

Oral health refers not only to the absence of oral disease – primarily tooth decay and gum disease – but also to the contribution made to overall health and wellbeing, and quality of life. Good oral health benefits both individuals and society, yet oral diseases are among the most prevalent chronic diseases in New Zealand and represent a considerable public health burden. Given the population of New Zealand is expected to increase and become older (Statistics New Zealand 2014), and that New Zealanders are retaining more of their own teeth (Ministry of Health 2010a), the demand for oral health services is likely to increase and be substantial.

*Good Oral Health for All, for Life* (Ministry of Health 2006) is New Zealand’s strategic vision for high-quality oral health services that promote, improve, maintain and restore good oral health. The 2012 OPOHS is a proactive component of this strategic vision, addressing the needs of those at greatest risk of poor oral health. The vision also recognises that oral health is integral to general health and wellbeing throughout life. One population group which has been identified in the strategic vision as a priority is older adults, a group characterised by its heterogeneity, and which presents a wide range of dental needs and challenges.

This report presents key findings from the 2012 Older People’s Oral Health Survey (2012 OPOHS), the first nationwide survey to collect comprehensive information on levels of oral disease, perceptions of oral health and patterns of dental care of the most vulnerable older adults – people living in aged-care residential facilities or receiving home-based personal care assistance in their own homes. Although the recent 2009 New Zealand Oral Health Survey (Ministry of Health 2010a) provided insight into the oral health conditions of older New Zealanders, older adults living in residential aged-care facilities were not included.

Furthermore, while older adults living in permanent private dwellings were included in the 2009 New Zealand Oral Health Survey (2009 NZOHS), those receiving home-based personal care assistance were not specifically sampled in the 2009 NZOHS for the purpose of determining their oral health status. Thus, to complement the 2009 NZOHS, the 2012 OPOHS aimed to investigate the oral health issues of this specific population group. The Study provides an important source of evidence for New Zealand’s strategic vision for the oral health of the most vulnerable older adults.

Specifically, this report presents key clinical and self-reported findings on the oral health status, protective factors and service utilisation among the most vulnerable older adults. Results are presented by residential location, whether older adults were living in a residential care facility (RC), or were based in their own home (HB); sex; ethnic group; age group; socioeconomic status (SES); whether people visited a dental professional in the previous year; and for people living in residential aged-care facilities, level of dependency. All results have been weighted to represent the resident population living in aged-care residential facilities or the resident population living in their own homes and receiving home-based personal care assistance.

The layout of this report is intentionally similar to the layout of the report of the 2009 NZOHS, given the conduct and instruments used in this survey were similar to the 2009 NZOHS; it also facilitates the comparison of the results of the two surveys. Summary tables of key findings can be found in Appendix A; detailed comparisons by population group according to residential location can be found in Appendix B; and a comparison of indicators common to this survey and 2009 NZOHS can be found in Appendix C.

## Background

Oral health surveys are important, not only because they provide a snapshot of the dental status of the population at a particular point in time, but because sequential surveys allow monitoring of changes over time. New Zealand has now had three national oral health surveys, conducted in 1976 (Cutress et al 1979), 1988 (Hunter et al 1992), and 2009 (Ministry of Health 2010a). Each of these surveys have provided essential monitoring data on the oral health status of older New Zealanders, although the 1988 survey reported on the 65–74 age group only. The data from those surveys have confirmed a steady fall in the prevalence of edentulism (total tooth loss), and a concomitant rise in tooth retention among older New Zealanders (Thomson 2012).

The 2009 NZOHS revealed much about the oral health of older people in New Zealand, but specifically excluded from the sampling frame were those residing in residential aged-care facilities. Although many older people will continue to live independently in the community, almost half will move to living in residential aged-care facilities and may be functionally dependent on others for their personal and healthcare needs (including their day-to-day oral care) and activities of daily living (Broad et al 2015).

Table 1 shows the estimated 580,000 older people aged 65 years and over, living in the community or in residential care in 2011: 5.0% of this group (some 28,800 people) are residing in the approximately 1,000 residential aged-care facilities in New Zealand. Another 9.5% of the 65 years and over population group (approximately 55,000 individuals), are living in their own homes with government assistance for housework and/or personal care.

**Table 1 Estimated distribution of Older People (aged 65 and over) in New Zealand**

Living arrangements		Ethnicity			Total
		Māori	Pacific	European and Other	
	Independently	26,500	11,900	457,800	<b>496,200</b>
Living in the community	Accessing publicly-funded home-based support for housework and/or personal care assistance	1,700	800	52,500	<b>55,000</b>
	<b>Subtotal</b>	<b>28,200</b>	<b>12,700</b>	<b>510,300</b>	<b>551,200</b>

Living arrangements	Ethnicity			Total	
	Māori	Pacific	European and Other		
In rest homes	500	200	15,800	<b>16,500</b>	
With hospital level care	300	100	8,900	<b>9,300</b>	
Living in residential care	With specialist dementia care	100	minimal	2,300	<b>2,400</b>
	With specialist psycho-geriatric care	minimal	minimal	600	<b>600</b>
<b>Subtotal</b>	<b>900</b>	<b>300</b>	<b>27,600</b>	<b>28,800</b>	
<b>Total</b>	<b>29,100</b>	<b>13,000</b>	<b>537,900</b>	<b>580,000</b>	

Source: Ministry of Health 2012 OPOHS: Request for Proposal 2011

The main conditions of interest when considering oral diseases among older people are tooth loss, dental caries, periodontitis, dry mouth and oral precancer/cancer (Petersen and Yamamoto 2005). Complementing this disease-related focus is the notion of oral-health-related quality of life (OHRQoL). Considerable research effort has focused on OHRQoL in the last two decades, allowing identification of the conditions which have the greatest effects on older people's day-to-day lives and comfort. Dental caries (dental decay) remains the main problem, whether directly through the associated symptoms or indirectly through its contribution to incremental tooth loss.

Reports from cohort studies of population-based samples of community-dwelling older people, have filled a large gap in knowledge of the natural history of dental caries in older people. The surprisingly consistent findings have shown that dental caries is active among older people, with a mean increment of about one surface per year (Griffin et al 2004; Thomson 2004), which is similar to that observed in younger adults (Broadbent et al 2008). While both coronal and root surface caries contributed to the observed increments among older people, there was a consistent pattern whereby coronal caries made the greater contribution to the overall increment. The situation is worse among those living in nursing homes: findings from two South Australian cohort studies show that the annual dental caries increment among older people residing in nursing homes is more than double that observed among their community-dwelling counterparts; among those with dementia, it is twice as high again (Chalmers et al 2005).

These data show that older adults in residential aged-care facilities are at even greater risk of developing complex oral health problems and are likely to have more oral disease and associated conditions (Smith 2010). Almost all require some level of periodontal support therapy (such as scaling); most have unmet caries treatment need (whether restorative or extraction), and some require prosthetic treatment (Carter et al 2004; Chalmers 2003; Thomson et al 1991; Thomson et al 1992). As people become functionally dependent, the risk of developing dental caries increases; moreover, many older adults have high levels of untreated disease and poor oral health on entry to facilities, or develop such needs soon after admission (Chalmers 2003). Little is known of

the oral health and needs of those who are being assisted, so they can remain in their own homes with State-funded support. It is likely that their oral health is better than that of long-term residents of nursing homes, but it is likely to be poorer than that of their more able counterparts living in their own homes without assistance.

New Zealand currently lacks a specific oral health policy for older people, primarily due to a paucity of evidence for this age group, in New Zealand or elsewhere, on which to inform policy. To supplement previous survey findings and provide specific national-level evidence on the oral health of older people living in residential aged-care facilities or in their homes receiving home-based personal care assistance, the Ministry of Health issued a request for proposals (RFP) in September 2011 to design, develop, coordinate and conduct a study on the oral health issues faced by this important population subgroup. This report presents the key findings of that study.

## **Overview of the survey**

The 2012 OPOHS, administered from April to December 2012, was a national representative survey of 2,218 New Zealanders aged 65 years and over, living in residential aged-care facilities or accessing publicly-funded home-based support for their care. These 2,218 older New Zealanders participated in an in-depth interview, and 1,882 also completed a dental examination. By ethnicity total response, the sample included 226 Māori older adults, with 189 participating in the dental exam, 141 Pacific older adults (122 participating in the dental exam) and 76 Asian older adults (64 participating in the exam). There were also 1,813 European/Other older adults who completed an interview, and 1,542 who participated in the oral exam. The achieved sample consisted of 1,120 older adults living in residential care, and 1,098 living in their own homes.

As with the 2009 NZOHS, the 2012 OPOHS was made up of two components: a computer-assisted face-to-face interview and an oral health examination. The questionnaire measured self-reported oral health status, risk and protective factors for oral health outcomes and the use of oral health care services, among older adults in both residential locations. Information on oral disease (including the health of oral tissues, condition of teeth and periodontal disease), was recorded during dental examinations of the teeth, gums and other tissues within the oral cavity, conducted by survey dentists. The interviews and dental examinations were conducted according to the protocols used in the 2009 NZOHS. Some alterations and additions to both the interview schedule and the dental examinations were made to allow for the unique requirements of, and specific information to be gathered from, the sample population.

The survey interviews were conducted by trained interviewers from CBG Health Research Ltd, while the dental examinations were conducted by qualified and registered dentists who were specially trained for the survey.

## **Audience**

This report will be of interest to oral health policy makers, dental professionals, oral health care providers, the New Zealand Dental Association, Te Ao Marama (the Māori Dental Association), the New Zealand Dental and Oral Health Therapists' Association, the New



Zealand Dental Hygienists' Association, District Health Boards (DHBs), universities, and those interested in improving oral health and reducing oral health inequalities. This report will be of particular interest to individuals, organisations and professional associations (particularly medical associations, and non-governmental and residential aged-care organisations) involved in the health and care of older adults.

The Ministry of Health is likely to use the 2012 OPOHS findings for a number of purposes, including:

- to monitor the oral health of vulnerable older New Zealanders
- to inform the development of the strategic vision: *Good Oral Health for All, for Life*, and to inform oral health policy and service delivery
- to set oral health targets, and
- to purchase service and health promotion programmes that aim to improve the oral health (and therefore reduce social inequalities in oral health) of this vulnerable population group.

The survey findings may be used by professional bodies to support programmes designed to raise public awareness about how to maintain the oral health and meet oral health needs of vulnerable older adults. DHBs may use the findings to enhance and support programmes and services (such as oral health education and promotion), for patient advice and education, and planning services. Universities may use the findings to understand the training needs of the future workforce. The survey data also provides considerable opportunities for researchers at universities, and other institutions, to conduct further research into the determinants of the oral health of older adults living in residential aged-care facilities, or who are living in their own home, but are dependent on others for their care.

## **Outline of this report**

This report presents key clinical and self-reported findings from the 2012 OPOHS.

- Chapter 2 summarises the methods used in the survey and data analysis.
- Chapter 3 presents findings of the oral health conditions.
- Chapter 4 examines protective behaviours (toothbrushing and denture cleaning).
- Chapter 5 describes the use of oral health services, and barriers to accessing these services.
- Chapter 6 presents perceptions and impacts of oral health status.
- Chapter 7 summarises and discusses the key findings from this report.

A glossary of key terms, and Appendices with summary data tables and other useful information, can be found at the end of the report.

## Chapter 2: Methods

### Overview of methodology

This section summarises the methodology employed to undertake the 2012 OPOHS. More details are available in the stand-alone Methodology Report (CBG Health Research 2015).

The 2012 OPOHS collects information about two different populations of older people:

- Older people living in residential aged-care facilities (residential care or “RC” population), and
- Older people living in the community and receiving home-based personal care assistance (home-based or “HB” population).

Table 1 in the previous Chapter presents the Ministry of Health estimates of the number of older people living in different residential locations. In order to randomly select potential participants from the two target populations, sampling frames were built from national claims databases. For the residential care population, the frame was built entirely from the national claims data. For the home-based population, the national claims database was incomplete as a number of District Health Boards (DHBs) did not submit claims to the national database. In these cases, lists of older people receiving home-based personal care were obtained directly from the DHB.

The two samples were managed independently. The key methodological challenge in both samples was having consideration for the high mortality rate. This required samples to be drawn throughout the study period. Residential aged-care facilities were selected with a weighting towards facilities with higher numbers of Māori and Pacific residents. Each month, lists of residents of each facility were obtained from national claims databases. Within each facility, potential participants were randomly selected; all Māori and Pacific residents were included in the sample.

In the home-based sample, each DHB was divided into geographical units with approximately equal numbers of people receiving home-based personal care. Samples of potential participants in each area were drawn from monthly downloads from claims databases.

Residential aged-care facilities were contacted to arrange times to complete the interviews and dental examinations. Where residential aged-care facility staff advised that clients were unable to give consent, they assisted with contacting proxies: people who were authorised to answer questions on the participant’s behalf. In the home-based sample, the providers of home-based personal care were consulted to confirm potential participant contact details and verify that they had not moved address or passed away. Appointments for interviews and dental examinations were made directly with the participant.

For both samples, signed consent was obtained before interviews and dental examinations commenced. Computer Assisted Personal Interviews were administered

face-to-face. Interviewers were trained to record exam findings into a purpose build application. Dental examinations were conducted by dentists trained in the specific exam methodology. The results were uploaded each day to a central database. Clinical examination findings which required urgent attention were reported to Professor Murray Thomson who was responsible for ensuring appropriate referrals were made. Participants were given summaries of exam findings.

This section describes the above processes in more detail and how the collected data was analysed.

## **Sampling frame and participant selection**

Separate samples were drawn from the two populations.

### **Residential care**

A two stage sampling process with oversampling of Māori and Pacific was employed for older people living in residential care.

#### *Stage 1*

An initial random sample of 120 sites was selected from all residential aged-care facilities with 10 or more residents receiving publicly-funded services. At the time of sampling there were 897 such facilities from a total of 1,021 facilities. The sample of residential aged-care facilities was drawn probability proportional to size, with a weighting factor of three given to Māori and Pacific residents. The selection was based on data from December 2011. An extension sample of a further 30 facilities was drawn in September 2012 due to original underestimates of mortality rates and residents moving to other facilities.

The date of surveying at each residential aged-care facility was set in advance to facilitate liaison. Up-to-date lists of all residents were accessed four weeks before a residential aged-care facility was due to be surveyed. It was important that the sampling frame was up-to-date to reduce the chance a resident had passed away when the residential aged-care facility was visited. The lists of residents were sourced from national claims databases.

Data from the national claims databases also classified residents into one of four levels of care – ‘nursing homes (or rest homes)’, ‘hospital care’, ‘specialist dementia care’ or ‘specialist psychogeriatric care’. As there were only small numbers in the latter category, the dementia care and psychogeriatric care categories were combined for the purposes of this study.

#### *Stage 2*

A random sample of 10 non-Māori, non-Pacific residents was drawn from this list, of which eight were selected to take part in the Study. If a person declined to participate the 9<sup>th</sup> and/or 10<sup>th</sup> selected residents were invited to take part.

All Māori and Pacific residents at each selected residential aged-care facility were added to the sample.

There were six cycles of monthly downloads – beginning in May 2012 and going through to October 2012 – for the main surveying period, which started in June 2012 and finished in December 2012.

### **Home-based**

A simple random sample was drawn from lists of all people receiving publicly-funded personal care services at home from any District Health Boards (DHBs). Individuals were identified primarily from the national claims database. However, where the DHBs did not submit claims to the national database, lists of older people receiving home-based personal care were obtained directly from the DHB. Māori and Pacific people were assigned an increased probability of selection (three times more likely to be selected). The samples were drawn four weeks before surveying began in each DHB.

To allow for the number of older people who would have passed away by the time they were scheduled to be surveyed, many DHBs were divided into one or more sub regions. A first download of all those receiving services in December 2011 was used to divide DHBs into sub regions with approximately equal populations of older people. The sub regions were based on lists of all meshblocks in a DHB; with up to six sub regions per DHB. The reason for this procedure was to give all people who receive services an equal chance of being selected without having to adjust selection probabilities due to people appearing on repeated monthly downloads for DHBs. The lists of meshblocks that we set up as sub regions are analogous to the residential care facilities (RCFs) in the RC design.

### **Socioeconomic status**

In most health surveys, a number of variables are collected that can be used to measure (or infer) socioeconomic status. The “NZDep” score of the meshblock in which the respondent resides is often used to present results in quintiles. The latest available NZDep scores were those derived from census data from the 2006 census.

The NZDep is problematic as a measure of socioeconomic status in the 2012 OPOHS because a participant’s current address may not correlate well with their actual socioeconomic status. For residents of residential care facilities, the address of the facility provides minimal information about the socioeconomic status of the responding resident.

To undertake analyses by socioeconomic status, the New Zealand Socioeconomic Index (NZSEI-06) score was used. The NZSEI is an occupation-based measure of individual socioeconomic status derived using Census data, as opposed to the NZDep index, which assigns deprivation scores to areas (meshblocks) also using Census data.

All respondents were asked questions about their occupation and education, and the occupation and education of their spouse, if applicable. The occupation and education information was used to assign each respondent a NZSEI score. Occupation information was captured in the interview as verbatim responses and later classified using the Australian and New Zealand Standard Classification of Occupations (ANZSCO) to three digits. Where occupation information was not available, the NZSEI score was imputed using the respondent’s age and education.

## Questionnaire

The interview component of the survey was carried out using a face-to-face computer-assisted personal interview (CAPI) tool. Interviewers typed responses directly into a laptop computer, and large print show cards with predetermined response categories were used to assist the participant where appropriate. Interviews were conducted in participants' place of residence, at a time to suit them.

The 2012 OPOHS questionnaire was based on the 2009 NZOHS adult questionnaire, but was modified to be relevant to the Study population. In consultation with the Ministry of Health and the Technical Advisory Group, a number of questions from the 2009 NZOHS were not included in the 2012 OPOHS because they were not considered relevant to older people; for example, questions on the use of mouth guards when playing sport. Additional questions, using validated questionnaires, where possible, were included to collect data on:

- Nutritional status
- Quality of Life
- Dementia
- Accessed services
- Previous address and occupation.

In total, there were 102 questions covering 22 topics. The content of the questionnaire is summarised in Table 2 and the full questionnaire is provided in Appendix D.

**Table 2 Summarised content of the 2012 OPOHS questionnaire**

Module	Topics
Self-reported oral health status	Self-reported number of natural teeth History of tooth loss Presence of dentures, bridges, implants Appearance of teeth Assessment of general oral health status Orofacial pain/symptoms Oral health-related quality of life Self-perceived need for dental care
Health Status/Quality of Life	EuroQol Nutritional Status, including self-reported height and weight Dementia assessment
Risk and protective behaviours	Preventive care (toothbrushing, cleaning between the teeth) Use of fluoridated toothpaste Use of mouthrinses Current smoking status
Accessed Services	Use of public/private services in last 12 months Cost of services, subsidy/out-of-pocket/insurance Access to services – transport/waiting

	<p>Dental visits in last 12 months, including reason for visit and reasons for not visiting</p> <p>Tooth extraction in last 12 months</p> <p>Last visit (reason, type of dental provider, dental services by type, choice of dental professional, time taken to get there)</p> <p>Perceived cost barriers</p> <p>Usual provider of dental care</p> <p>Regular dental check-ups</p> <p>Dental anxiety</p>
Attitudes to and knowledge and opinions about oral health	<p>Perceived importance of oral health (general wellbeing, government spend on oral health)</p> <p>Opinions about dental care for older adults</p>
Sociodemographic variables	<p>Age, ethnicity, previous independent-living address, personal income, previous occupation of themselves and their spouse</p>

### Interview duration

In the RC sample, interviews conducted with participants took an average of 23.0 minutes, with a median of 22.0 minutes, and a range of 5.3 to 80.0 minutes. Interviews conducted with a proxy took an average of 19.6 minutes, with a median of 18.0 minutes, and a range of 4.8 to 61.9 minutes.

In the HB sample, interviews conducted with participants took an average of 26.4 minutes, with a median of 23.9 minutes, and a range of 5.1 to 98.7 minutes. Interviews conducted with a proxy took an average of 26.1 minutes, with a median of 23.4 minutes, and a range of 8.4 to 72.2 minutes.

### Oral health examination

Survey participants who completed the face-to-face survey were invited to participate in an oral health examination. Where required, proxies were asked to consent to an oral health examination on behalf of the person they held guardianship over. All people surveyed were invited to participate regardless of dental status; that is, people with their own teeth, and those people who did not have any teeth – who did or did not wear dentures – were eligible for examination. This differed from the 2009 NZOHS, where only those with natural teeth were examined.

Dental examiners followed a standardised protocol to record information regarding the oral health status of the survey participant. Information on the presence of extra-oral abnormalities of the head, neck and limbs, intra-oral lesions, tooth loss and the presence of prostheses to replace missing teeth (either dentures, bridges and/or implants) were collected from all participants. People who had teeth missing were asked if they owned removable dentures, and if worn to the examination, their dentures were assessed for quality, fit and function. People with one or more teeth were further assessed for dental decay experience; oral debris and calculus; periodontal status (where not medically contraindicated) and tooth mobility; and experience of trauma. The level of difficulty of examination, and the physical location of the participant at the time of examination was

also recorded. Treatment need – appropriate to the participants' wishes, need for treatment and ability to undergo treatment – was assessed by each dental examiner for (i) prosthetic treatment requirement including replacement of teeth, repair and relining of dentures, and adjustment and cleaning of dentures; and (ii) restorative treatment for each tooth, including extraction.

Survey participants were examined in a seated position which was appropriate for (i) the participant's level of comfort, and physical and cognitive function, and (ii) the dentist's visibility and comfort. Illumination was provided by LED headlamps and an intra-oral mirror, both with their own battery-powered light source. A standard World Health Organization Community Periodontal Index probe (TRS 621) was used to assess periodontal health, and remove debris to improve the visibility of tooth and root surfaces. Sharp explorers typically used for dental examinations were not used, and x-rays were not taken. Dental loupes were not worn by the dental examiners.

The examination protocol used in the 2012 OPOHS (Appendix E) was based on the 2009 NZOHS, which used the protocol from the Australian National Survey of Adult Oral Health 2004–06. Other than the assessment of dentures, the main departure from the 2009 NZOHS was the index used to assess periodontal status. Since a full mouth periodontal assessment, as undertaken in the 2009 NZOHS, was considered burdensome for the participants and possibly the examining dentists, the World Health Organization Community Periodontal Index (CPI) and the Grace and Smales Mobility Index were used to assess periodontal status (Grace and Smales 1989).

## **Training and quality control**

The 2012 OPOHS interview team consisted of 19 interviewers from CBG, all of whom received specialised training on how to conduct the survey. The training comprised of self-directed learning, online assessment and a two-day face-to-face workshop. All interviewers received a copy of the 2012 OPOHS survey manual, and were trained on its use. Interviewers also completed general survey training, and online training modules focusing on public policy surveying techniques and interviewing older people. In addition, a one-on-one oral examination for each survey module was conducted, in order to test each interviewer's comprehension of the survey.

The interviewers were also instructed to familiarise themselves with all the information presented in the 2012 OPOHS pamphlet and dental examination information sheet (Appendix F). These documents were carefully designed to fully introduce the participants to the survey. Interviewers were instructed to explain the key points contained in the pamphlet and information sheet, as part of the 'informed consent' process.

The 2012 OPOHS dental examination team comprised a lead examiner and 22 dental examiners, including the gold standard examiner. All dental team members were fully qualified and registered with the Dental Council of New Zealand, holding current Annual Practising Certificates. All examining dentists also held Core Level 4 Resuscitation Certificates. Twelve dentists had been dental examiners for the 2009 NZOHS. The principal course presenter and trainer for the 2012 OPOHS was Professor Kaye Roberts-Thomson, Director of the Australian Research Centre for Population Oral Health (ARCPHO) at the University of Adelaide, and Director of the Dental Practice Education

Research Unit. Professor Roberts-Thomson has notable experience in training and calibrating examiners for oral health surveys and for designing data collection instruments, including her roles as the lead trainer for the Australian Survey of Adult Oral Health 2004–06, and for other national oral health surveys in Vietnam (1999), East Timor (2001), and Papua New Guinea (2008). She has also trained examiners for the New South Wales child survey (2007), Queensland child survey (2010) and for a number of research studies including a clinical trial in the management and prevention of caries in adults in residential care (2011). Professor Roberts-Thomson was also the lead trainer for (and conducted the calibration of) the dental examiners for the 2009 New Zealand Oral Health Survey.

All dental examiners undertook a one-and-a-half day training and calibration course led by the lead examiner. Three training sessions, comprising seven dentists each, were held during the period 16–20 April, 2012 at the Oral Hygiene Clinic at the Auckland University of Technology, Auckland. The training courses were timed to precede the start of the data collection phase, as well as coinciding with the availability of the lead examiner and with the training facility. One dentist, also a dental examiner on the 2009 NZOHS, could not attend the scheduled training session. This dentist was trained one-on-one by Drs. Haisman-Welsh and Smith, and calibrated by Dr. Smith, at the time of the pilot study.

Given the time lapse between the training sessions and the first data collection examinations, each dental examiner was mentored by the gold standard examiner on an individual basis at his/her first data collection session. The purpose of these sessions was to update the examiners on the minor changes to the protocol which had been implemented as a result of the pilot, confirm calibration and provide support for each dentist on the practical aspects of the examination procedures.

CBG interviewers were trained as dental recorders for the purposes of the 2012 OPOHS; 12 had been interviewers and recorders on the 2009 NZOHS. Dental recorders attended the training course, received instruction on oral epidemiology and the anatomy of the mouth, and were trained in, and provided with, a manual about the use of the computer system for collecting data. Dental recorders also attended the clinical and field training days, working in pairs with the dental examiners to record the information provided by the dental examiners during the training examinations.

## **Procedures prior to the examination**

On arrival at a residential aged-care facility, the dentist and the recorder reviewed the list of the day's examinations, to provide the dental examiner with information about the general health and cognitive and physical abilities of each participant, whether the participant would have a proxy present or require a carer from the residential aged-care facility, and assess the location of the examination and need for the portable dental chair. Often, the dental examination team met with the care manager or registered nurse to discuss any special requirements of the participants. Examinations were conducted in a location which most suited the participant, including their bed, wheelchair, recliner lounge-type chair, or portable chair. In some facilities, a room or work area within the facility was provided for the dental team, where the full examination kit could remain while examinations took place, and, if used, where the portable dental chair could be erected.



Prior to commencing the dental examination, the dental recorder checked that the examination consent form had been signed by the participant or their proxy and the examining dentist. The dentist confirmed that the participant (or their proxy) understood the purpose of the survey and the procedure, and if necessary provided further information and clarification. The dentist reviewed the participant's electronic consent form (Appendix E, Section 24) and completed medical history form (Appendix E, Section 25), which was signed by the dentist and the participant (or their proxy). Whenever possible, the dental recorder was always the CBG interviewer.

The medical history questionnaire asked about conditions that, if present, would preclude the participant from undergoing a periodontal assessment (Table 3). It also included questions regarding the participant's general medical condition so that the examining dentist could determine whether the person could be periodontally examined. The first question asked in the medical history questionnaire was a filter question to ascertain the dental status of the participant. For those participants with no natural teeth remaining, questions on their risk of endocarditis were skipped and only those relevant to their general medical health were asked, including current prescribed medications.

**Table 3 Medical conditions which precluded periodontal examinations**

- Participants who have been advised that they must always take antibiotics before routine dental care
- Joint replacement (hip or knee) during the last six months
- Rheumatic fever
- Congenital or acquired heart murmur
- Heart valve problems
- Congenital heart disease
- Bacterial endocarditis
- Congestive heart failure
- Bleeding disorders
- Immuno-suppressed or on immuno-suppression therapy

Procedures for participants who were examined in their own home were similar to those followed for residential aged-care facility participants. Prior to examination, each participant, and their home, was assessed to determine the optimum physical location for examination. Procedures for consent and medical history, and examination, were the same as for participants in residential aged-care facilities.

At the completion of the examination, participants (or proxies or facility staff where appropriate) were provided with a written report outlining the general findings of the dental examination (Appendix E, Section 23). The report included information regarding any oral conditions which were discovered, including tooth decay and gum disease, and general advice and recommendations about seeking treatment. If the dental examiner discovered a suspected malignancy, severe infection or acute dental pain which required immediate attention, the examining dentist referred that participant to Professor Murray Thomson, who then arranged further investigation with their domicile DHB. All participants who completed an oral health examination received a small gift of appreciation: a toothbrush, fluoride toothpaste, and denture cleaning tablets.

## Dental examiner reliability

The reliability of each dental examiner, relative to the gold standard examiner, was measured by calculating the intra-class correlation coefficient (ICC) and kappa statistics (inter-rater agreement). The ICC is a measure of how well the dental examiner's results match the gold standard examiner's results. Guidelines for interpreting the resulting kappa statistic propose that values of 0.8–1.0 represent 'almost perfect' agreement, 0.6–0.8 show 'substantial' agreement, 0.4–0.6 show 'moderate' agreement, and 0.2–0.4 show 'fair' agreement (Landis and Koch 1977). Overall there were high levels of agreement between the examiners and the gold standard examiner.

Replicate pairs of examinations were conducted with 107 survey participants in order to assess the reliability of the 21 original examiners. The number of replicate pairs of examinations ranged from three to seven per examiner. Every effort was taken to obtain at least four replicate dental examinations per examining dentist. Reliability data for most aspects of the examination were based on person-level summary indicators, such as the number of missing teeth.

The 2012 OPOHS Methodology Report (CBG Health Research 2015) includes more details on dental inter-examiner reliability, including a table presenting the differences in means between the examiner team collectively and the gold standard examiner.

## Response Rates

The main measure used to assess the overall quality of a survey is the final response rate. The response rate is a measure of how many people who were selected to take part in the survey actually participated. A high response rate means that the survey findings are more representative of the New Zealand population.

A total of 1,120 people living in residential care and 1,098 people receiving home-based personal care completed the 2012 OPOHS interview. This translates to an unweighted interview response rate of 70.0% in the RC sample and 80.4% in the HB sample. The interview response rate is expressed as the number of older adults who completed the interview, divided by the number of eligible older adults selected for the survey. The main reasons for the lower interview response rate in the RC sample were: (i) the difficulty in obtaining consent for the Study when the potential participant was unable to provide informed consent for him/herself; and (ii) the burden of the study procedures for often very frail older people (who were more likely to be living in a residential care facility than to be living in their own home).

A total of 987 people living in residential care and 895 people receiving home-based personal care took part in the follow-up dental examination. This translates to an unweighted exam response rate of 88.1% in the RC sample and 81.5% in the HB sample. The exam response rate is expressed as the number of older adults who took part in a dental examination, divided by the number of older adults who completed the interview.

Table 4 depicts the unweighted interview and exam response rates, and the interview decline and non-contact rates, for each population group within residential care and home-based settings.

**Table 4 Response rates for the 2012 OPOHS, by demographic group**

Population Subgroup		Setting							
		Residential Care				Home-Based			
		Interview response rate (%)	Interview decline Rate (%)	Interview non-contact rate (%)	Exam response rate (%)	Interview response rate (%)	Interview decline Rate (%)	Interview non-contact rate (%)	Exam response rate (%)
<i>All</i>		70.0	20.4	9.6	88.1	80.4	12.9	6.7	81.5
<i>Sex</i>	<i>Women</i>	68.9	21.5	9.5	88.6	79.8	13.5	6.7	78.9
	<i>Men</i>	72.6	17.8	9.6	87.2	81.7	11.6	6.7	86.8
<i>Age group</i>	<i>65–74</i>	73.9	18.3	7.7	86.8	87.6	8.1	4.3	80.0
	<i>75–84</i>	74.9	16.5	8.6	88.1	74.2	16.1	9.7	83.6
	<i>85+</i>	65.7	23.6	10.6	88.4	83.4	11.7	4.9	80.3
<i>Ethnic group</i>	<i>Māori</i>	73.6	14.7	11.7	88.4	80.4	11.0	8.6	80.2
	<i>Pacific</i>	69.7	23.6	6.8	90.3	70.5	15.8	13.7	82.6
	<i>Asian</i>	93.5	3.2	3.2	80.0	90.0	4.0	6.0	87.0
	<i>Other</i>	69.2	21.1	9.7	88.2	80.8	13.3	5.9	81.6

## Weighting

Survey ‘weights’ are used in analyses so that estimates of population totals, averages and proportions can be said to be representative of the total population that is being investigated. Survey weights can be thought of as the number of population members represented by each survey participant. Using weights in analyses ensures that no population group is under- or over-represented in estimates from the survey. All data presented in this report were weighted in order to be representative of the two populations – older people aged 65 years and over living in residential care or older people aged 65 years and over living in the community and receiving home-based personal care.

The procedure to calculate the survey weights for the 2012 OPOHS was different for each of the two target populations. The weight assigned to participants living in residential care facilities was calculated as the reciprocal of the product of two selection probabilities: The first probability was the probability that a residential care facility would be selected as a 2012 OPOHS study site. The second probability was the probability that a person would be selected in each facility. For the home-based sample, weights were the reciprocal of the probability of selection. The probability of selection was calculated from the single list of all recipients of home-based personal care. It is to be noted that weights were not calibrated to the demographic profile of the two populations of respondents. The weights were simple selection weights.

The Methodology Report (CBG Health Research 2015) presents more information on the weighting processes used, particularly with regard to the residential aged care sample.

## Design effects

The “design effect” (DEFF) is a measure of the net effect of a complex survey design. It is the ratio of the variance (a measure of precision) of an estimate achieved by a complex design, relative to the variance of the same estimate that would be achieved by using a simple random sample of the same size. The closer the design effect is to 1, the closer the design is to simple random sampling.

Design effects of between 2 and 4 are typical in population health studies; these mean that the variance is larger than would have been obtained using a simple random sample. Even though the design effect is greater than 1, it does not mean that a simple random sample should be used, because this design would be prohibitively expensive and inefficient. Design effects are presented for a range of variables, which range from 1.86 for the number of decayed coronal surfaces per person, to 1.00 for the number of teeth present per person, and the number of missing teeth due to pathology per person.

The Methodology Report includes a detailed table depicting the Study’s design effect (DEFF) measures, of the samples and the demographic profile of the sampling frames.

## Data processing

The 2012 OPOHS questionnaire was developed by CBG as a Microsoft Word document. This was then converted into a series of web pages using CBG’s survey software, based on modified output from the ‘The Survey System’ survey software package. The survey was administered as a series of web pages linked to a survey database unique to each tablet computer.

The completion date of the survey and survey timing data were recorded automatically in the survey database, as was the duration of the time spent answering each survey question.

Examination findings were recorded directly into a Microsoft Access database application supplied by Adelaide Research and Innovation, Adelaide University. This was a modified version of the application used for recording examination findings in the 2009 NZOHS.

At the end of each day, or more frequently in some cases, study data were encrypted and uploaded to the CBG datacentre. Uploaded data files were decrypted and checked as soon as they were received. All data processing, cleaning and subsequent analysis was undertaken in SAS 9.3.

Any information collected in the survey – interview and dental examination data – that could be used to identify individuals, has been treated as strictly confidential. Survey responses were stored in an encrypted format on each tablet. Data were transferred from each interviewer’s tablet personal computer to the CBG data centre by a secure Internet upload facility.

## Analysis and interpretation

Wherever possible, the methodology of the 2009 NZOHS has been followed in analysing the findings from the 2012 OPOHS. As in the 2009 NZOHS, many key findings are presented as prevalence estimates and means. Prevalence estimates provide estimates of the proportion of people with a defined outcome, within a defined population. Means are generally presented as the mean number per person; for example, the mean number of decayed teeth per person.

Prevalence and mean estimates are provided for the total population of older adults aged 65 years and over living in residential care, or in the community and receiving home-based personal care. These estimates are also provided for both RC and HB samples by age group, and for other population groups, including ethnic group, and SES quintiles. Additionally, for older people living in residential care, prevalence and mean estimates are provided for dependency status. These unadjusted prevalences and means, give an indication of the burden of oral health outcomes in these population groups and subgroups.

To help answer comparative questions such as, ‘Do men have a higher prevalence of untreated decay than women?’, two types of measures were presented in the 2012 OPOHS: rate ratios and rate differences (and the equivalent measures for means: ratios of means and differences of means). Rate ratios give a measure of relative difference in burden for the group of interest, while rate differences give a measure of the absolute difference in burden. These measures were adjusted for possible confounding factors.

Rate ratios and rate differences complement each other and give different perspectives on the difference between the two groups with respect to the outcome measure. For example, a 20% rate difference (men = 40%, women = 20%, difference = 40% – 20% = 20%) can be interpreted as placing a much higher burden on men than a 1% rate difference (men = 2%, women = 1%, difference = 1%), even though in both examples the risk is twice as high for men as it is for women (that is, the same rate ratio of 2.0).

A further consideration is the selection of possible confounding factors to adjust for in comparisons. Confounding can occur when two population groups have different distributions of other factors (such as age), which are themselves associated with the health outcome but are not on the causal pathway. Adjusting for potential confounding factors makes comparisons more accurate and meaningful, because the adjustment removes their effect.

Confounding factors include age and sex, which are important and fundamental determinants of health. Populations with different age structures (such as men and women, whose age structure differs because women have a longer life expectancy) may have differences in rates simply because of their age differences. Hence, when comparing population groups such as men and women, it is useful to remove (or adjust for) the effect of age, to be able to see if the differences between men and women go beyond what can be explained by age effects. Similarly, the Māori population is generally younger than the total New Zealand population, and therefore it is important to adjust for age when comparing Māori and non-Māori.

Both comparative measures in this report are based on adjusted prevalences (or means) for the group of interest and reference group. They are a form of direct adjustment, which is calculated in two steps:

1. A model is fitted to the data (a logistic model for indicator variables, and a log-linear regression model for count variables, such as the counts of teeth)
2. The parameters of the model are used to estimate a prevalence (or mean) for a population that matches the target population with respect to the other adjustment factors in the model (for example, age), except that everyone belongs to the group of interest (for example, everyone is male).

Once the adjusted prevalences (for the group of interest and the reference group) are estimated, the ratio or difference between them is calculated to provide the comparative measures. When these are presented in the report, the adjustment factors that have been used in the model are always listed.

The comparisons and adjustment factors used in this report are presented in Table 5.

**Table 5 Adjustment factors used in analyses**

Comparisons	Adjustment factors
Residential care and home-based	Age group, sex and ethnicity
Men and women	Age group
Māori and non-Māori	Age group and sex
Pacific peoples and non-Pacific peoples	Age group and sex
Asian and non-Asian	Age group and sex
Age 85+ and age <85	Sex and ethnicity
Lower SES and higher SES	Age group, sex and ethnicity
Dental visit in previous year and no dental visit in previous year	Age group, sex, ethnicity and SES
Highest dependency level and other	Age group, sex, ethnicity and SES

# How to interpret the tables in this report

## Unadjusted prevalence or means table

The following diagram shows how to interpret the tables of unadjusted results presented in this report.

**Table 6 Prevalence of complete tooth loss (edentulism) among all older adults, by population group (unadjusted prevalence)**

This number is the value for the prevalence (%) or mean for each population group.

The title provides information about what the table is about, the population of interest, and whether the data are unadjusted prevalences or unadjusted means.

This is the population group the results relate to.

These refer to total response ethnic groups. If a respondent reported being of both Māori and Pacific ethnicity, they have been included in both ethnic groups.

The notes provide essential information about the table, such as the data source, and other information that might affect its interpretation.

The 95% confidence interval (range between the -95% and the +95% CI values), is an indicator of the accuracy of a survey estimate. It gives the interval that would be expected to contain the true population value 95% of the time, if many samples were taken.

Population Subgroup	Setting					
	Residential Care			Home Based		
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All	56.6	52.8	60.4	52.2	47.4	57.0
Sex						
Women	60.3	56.0	64.6	56.8	52.2	61.4
Men	47.8	41.0	54.5	43.5	36.5	50.5
Age group						
65–74	43.0	29.7	56.2	53.2	45.3	61.0
75–84	55.2	49.8	60.6	45.6	40.5	50.8
85+	60.2	55.0	65.5	57.2	49.9	64.5
Ethnic group						
Māori	68.4	54.6	82.3	61.7	53.0	70.4
Pacific	35.8	24.4	47.3	38.1	29.8	46.3
Asian	23.8	8.4	39.2	34.9	17.9	52.0
Other	57.6	53.7	61.4	53.2	48.5	57.9
NZSEI						
1 (least deprived)	43.3	34.7	51.8	36.0	29.4	42.6
2	53.8	46.7	60.9	48.8	41.5	56.1
3	67.3	58.9	75.7	64.5	54.6	74.3
4	60.1	52.4	67.8	60.1	50.4	69.8
5 (most deprived)	63.3	55.7	70.9	58.1	47.0	69.1
Dependency status						
Nursing home	62.5	56.4	68.7	.	.	.
Psychogeriatric/Dementia	46.0	37.2	54.8	.	.	.
Hospital care	54.0	48.8	59.2	.	.	.

Source: 2012 Older People's Oral Health Survey  
 Note: Deprivation quintiles have been calculated using estimated NZSEI scores

## Comparisons table (adjusted ratio of rates or means)

The following diagram shows how to interpret the tables of comparisons presented in this report.

**Table 7 Complete tooth loss (edentulism) among all older adults by population group (adjusted rate ratio and rate difference)**

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Residential care	Home-based	Age group, Sex, Ethnicity	1.1	3.0
Men	Women	Age group	0.8*	-12.1*
Māori	Non-Māori	Age group, Sex	1.2*	13.4*
Pacific	Non-Pacific	Age group, Sex	0.7*	-14.6*
Asian	Non-Asian	Age group, Sex	0.6*	-22.3*
Age 85+	Age <85	Sex, Ethnicity	1.1*	6.6*
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.3*	14.2*
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.5*	-32.0*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.8*	-11.8*

Source: 2012 Older People's Oral Health Survey  
\* Indicates a statistically significant difference (p<0.05)

The title provides information about what the table is about and the population of interest.

This column tells us the population group of interest.

This column tells us the reference group for the comparison.

This column tells us what variables the results are adjusted for (such as age group).

In the ethnic comparisons, each ethnic group is compared with people who did **not** identify with that ethnic group.

For example, Pacific people are compared with non-Pacific people. The non-Pacific group includes all people who did not identify with Pacific ethnicity. While the majority of non-Pacific people are likely to be European, this group also includes people from other ethnic groups who did not identify as being Pacific (such as Māori and Asian people).

The notes provide additional information about the table, such as the data source, and other information that might affect its interpretation.

These numbers are the ratio of two prevalences (i.e. the rate ratios), rounded to one decimal place. A value greater than 1 indicates that the outcome is more likely in the group of interest than in the reference group. A value less than 1 indicates that the outcome is less likely in the group of interest than in the reference group.

An asterisk (\*) shows that the result is statistically significant (e.g. significantly greater than 1) (p-value < 0.05).

These numbers are the values for the rate difference (i.e. the difference in prevalence estimates between the group of interest and the reference group). A negative sign (-) indicates that the estimate for the group of interest is lower than that of the reference group.



## Chapter 3: Oral Health Conditions

### Key findings

- Just over half of older adults living in either residential location had lost all of their own natural teeth (that is, were edentulous) (RC, 56.6%; HB, 52.2%). This means 43.4% of people living in residential care and 47.8% living in their own homes are dentate, that is, had at least one of their own natural teeth present.
- Dentate older adults living in either residential location had approximately 15 teeth missing due to pathology (dental caries or periodontal disease) (RC, 15.6; HB, 15.1).
- One in three dentate older adults (RC, 35.1%; HB, 37.3%) had a functional dentition. This was defined as having 21 or more natural teeth, which is generally considered enough teeth to meet the functional, aesthetic and dietary needs of most people, without the need for dentures.
- Dentate older adults had on average, approximately 24 decayed, missing and filled teeth (a DMFT score of 24) (RC, 24.2; HB, 23.9). The D component of the DMFT comprises teeth with coronal decay or root decay or both. See Severity of dental decay experience (DMFT), Chapter 3, Part 2, for more information on the DMFT score.
- Two in three (61.3%) dentate older adults living in residential care and two in five (43.2%) living in their own homes had untreated coronal decay.
- One third of all dentate older adults, regardless of residential location, had untreated root decay (RC, 33.7%; HB, 32.7%).
- Two in five dentate older adults required one or more restorations (determined by dental examination based on the health of the participant, their ability to undergo treatment, the need for treatment as well as the participant's wishes) (RC, 42.2%; HB 45.6%).
- One in three (33.2%) dentate older people in residential care and one in five (21.9%) living in their own homes required one or more teeth extracted (determined by dental examination based on the health of the participant, their ability to undergo treatment, the need for treatment as well as the participant's wishes).
- Three in four (73.9%) older adults living in residential care, and nine in ten (86.9%) living in their own homes who were edentulous wore both full upper and lower dentures.
- One in three (35.8%) older adults living in residential care and one in five (20.5%) of those living in their own homes had heavy plaque on their teeth.
- One in five (20.8%) living in residential care and one in seven (13.8%) living in their own homes had heavy calculus on their teeth.
- One in ten (11.2%) dentate older adults living in residential care and one in five (20.8%) living in their own home had periodontal pocketing. The prevalence of deep periodontal pocketing was less than 3% (RC, 2.1%; HB, 3%).
- One in four (25.4%) older people in residential care and one in three (31.4%) living in their own homes had at least one oral mucosal condition. An extremely low proportion of the sample (0.8%) was referred for further investigation of a suspected malignant tumour.

- One in ten had ulcerated lesions (RC, 8.2%; HB, 11%), just over one in twenty had oral candidiasis (RC, 6.5%; HB, 5.5%), and 6% of denture wearers in residential care and 2.9% living in their own home had denture stomatitis.
- Half of older adults living in residential care (52.7%) and two-thirds living in their own home (69.7%) reported having a dry mouth.

## Introduction

The main oral conditions include dental caries, periodontal disease, tooth loss, cancers and other lesions of the lips and mucosa lining the mouth and throat, the oral manifestations of systemic conditions, and trauma to the mouth and teeth.

Most oral conditions are chronic, progressive, cumulative, and irreversible, yet they are situated where they can be easily examined. The accessibility of the mouth means that trained examiners can readily measure a person's experience of dental diseases to that point in time, meaning that objective clinical data can quite easily be collected from samples and translated into population-level estimates.

Accordingly, a number of objective clinical indices have been developed for measuring and describing the occurrence of oral conditions. Most have a long history of field use. A key example is the DMF index for dental caries, which measures the overall number of decayed (D), missing (M) or filled (F) teeth (or surfaces) (Klein et al 1938). Criteria for measuring and recording oral health conditions in population-based oral health surveys are relatively standard throughout the world, mostly because of the World Health Organization (WHO) and its Survey Methods publications (WHO 1967, 1997).

This chapter reports the prevalence and severity of selected oral conditions for New Zealand adults aged 65 years and over who are living in residential aged-care facilities (the RC sample) or receiving home-based personal care assistance (the HB sample). The oral conditions reported in this chapter were measured for (a) dentate older adults (that is, those who had one or more natural teeth), and (b) edentulous older adults (those who had no natural teeth remaining, whether or not they wore dentures to replace their natural teeth). This differs from the 2009 NZOHS, where only dentate older adults took part in clinical examinations. The prevalence of partial and full denture wearing among the study population is also reported here.

The chapter is presented in seven parts:

- Part 1: The retention of natural teeth
- Part 2: Condition of the natural teeth
- Part 3: Dental treatment need
- Part 4: Tooth replacement
- Part 5: Oral hygiene status
- Part 6: Condition of supporting structures
- Part 7: Oral mucosal conditions.

## Part 1: The retention of natural teeth

Almost all older adults have lost at least one of their natural teeth, and some have had all of their teeth removed. Tooth loss is a complex socio-dental phenomenon for which dental diseases such as dental caries and periodontitis are just one of the contributing factors (Burt and Eklund 2005). Dental caries is the most common reason for tooth loss, but there are other causes, such as periodontal disease, or trauma. In those undergoing orthodontic treatment, a small number of teeth may be removed as part of that care.

The retention of natural teeth is a desirable goal, because tooth loss has been shown to have psychosocial and functional consequences for people of any age, but particularly among older people (Locker 1997; Walls et al 2000). Retaining 21 or more natural teeth is considered a 'functional dentition', through which the functional, dietary and aesthetic needs of most people can be met with natural teeth alone (Steele et al 1998).

Epidemiological investigations of edentulism occurrence have shown variations by a number of characteristics and behaviours. Sociodemographic differences are apparent, with rates being higher among women, older people, and those of lower SES, or those who belong to ethnic minority groups. Particular behaviours are also associated with edentulism prevalence, with higher rates among smokers and those with a problem-oriented dental visiting pattern. After decades of New Zealand leading the world in edentulism rates (Sussex et al 2010), the retention of at least some natural teeth into older age is now common, and tooth retention among older New Zealanders continues to increase (Thomson 2012). However, overall progress towards the goal of more older people retaining natural teeth will be influenced by the existing burden of disease experience (both treated and untreated) among older adults.

This section presents the following indicators for describing tooth loss and the retention of natural teeth:

- loss of all natural teeth (edentulism)
- mean number of natural teeth
- having a functional dentition (21 or more natural teeth)
- one or more teeth missing due to pathology (i.e. dental decay or periodontal disease)
- mean number of teeth missing due to pathology.

### Prevalence of complete tooth loss (edentulism)

A simple and important population oral status indicator is the proportion of people who have no natural teeth ('edentulous' people). The prevalence of complete tooth loss (edentulism) remains a fundamental indicator of dental impairment in the population, and reflects past experience of dental disease, including a surgical approach to its treatment, along with past social norms in respect of tooth retention (Sussex et al 2010).

Evidence suggests that the loss of all natural teeth can have an impact on diet, nutrition and general wellbeing (Moynihan et al 1994; Nowjack-Raymer and Sheiham 2003; Steele

et al 1998). For example, even though most edentulous people wear dentures, they report poorer subjective health, on average, than people who have natural teeth (Slade and Spencer 1994).

### How was this measured?

In the 2012 OPOHS, data for complete tooth loss among all older adults were derived from data collected in the dental examination. This differs to the 2009 NZOHS where complete tooth loss was measured using self-reported data from the interview.

Just over half of all older adults (regardless of residential location) had lost all of their own natural teeth (that is, they were edentulous) (RC, 56.6%; HB, 52.2%). Table 6 presents the prevalence of complete tooth loss, by population group.

**Table 6 Prevalence of complete tooth loss (edentulism) among all older adults, by population group (unadjusted prevalence)**

<i>Population Subgroup</i>		<i>Setting</i>					
		<i>Residential care</i>			<i>Home-based</i>		
		<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>	<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>
<i>All</i>		56.6	52.8	60.4	52.2	47.4	57.0
<i>Sex</i>	<i>Women</i>	60.3	56.0	64.6	56.8	52.2	61.4
	<i>Men</i>	47.8	41.0	54.5	43.5	36.5	50.5
<i>Age group</i>	<i>65–74</i>	43.0	29.7	56.2	53.2	45.3	61.0
	<i>75–84</i>	55.2	49.8	60.6	45.6	40.5	50.8
	<i>85+</i>	60.2	55.0	65.5	57.2	49.9	64.5
<i>Ethnic group</i>	<i>Māori</i>	68.4	54.6	82.3	61.7	53.0	70.4
	<i>Pacific</i>	35.8	24.4	47.3	38.1	29.8	46.3
	<i>Asian</i>	23.8	8.4	39.2	34.9	17.9	52.0
	<i>Other</i>	57.6	53.7	61.4	53.2	48.5	57.9
<i>NZSEI</i>	<i>1 (least deprived)</i>	43.3	34.7	51.8	36.0	29.4	42.6
	<i>2</i>	53.8	46.7	60.9	48.8	41.5	56.1
	<i>3</i>	67.3	58.9	75.7	64.5	54.6	74.3
	<i>4</i>	60.1	52.4	67.8	60.1	50.4	69.8
	<i>5 (most deprived)</i>	63.3	55.7	70.9	58.1	47.0	69.1
<i>Dependency status</i>	<i>Nursing home</i>	62.5	56.4	68.7	.	.	.
	<i>Psychogeriatric/Dementia</i>	46.0	37.2	54.8	.	.	.
	<i>Hospital care</i>	54.0	48.8	59.2	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

## Comparisons by population group

Table 7 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 7 Complete tooth loss (edentulism) among all older adults, by population group (adjusted rate ratio and rate difference)**

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Residential care	Home-based	Age group, Sex, Ethnicity	1.1	3.0
Men	Women	Age group	0.8*	-12.1*
Māori	Non-Māori	Age group, Sex	1.2*	13.4*
Pacific	Non-Pacific	Age group, Sex	0.7*	-14.6*
Asian	Non-Asian	Age group, Sex	0.6*	-22.3*
Age 85+	Age <85	Sex, Ethnicity	1.1*	6.6*
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.3*	14.2*
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.5*	-32.0*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.8*	-11.8*

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Older men were significantly less likely than older women to have lost all of their own natural teeth.

Older Māori were 1.2 times as likely as older non-Māori to be edentulous. By contrast, Asian and Pacific older adults were significantly less likely than non-Asian and non-Pacific older adults, respectively, to have lost all their own natural teeth.

People aged over 85 years were significantly more likely than those aged 65–84 years to have lost all their own natural teeth.

Older adults of lower SES were 1.3 times as likely as older adults of higher SES to be edentulous.

Older people who had visited a dental professional in the previous year were half as likely to be edentulous as those who had not made a dental visit in the previous 12 months.

Complete tooth loss was significantly less likely in the most dependent older adults than in those who were more independent.

There was no significant difference for edentulism among all older adults by residential location.

The previous findings indicate that 43.4% of RC and 47.8% of HB older adults had at least one natural tooth present (were dentate). The data presented in the rest of this section refer to dentate older adults only.

### **Prevalence of having one or more teeth missing due to pathology**

The following indicator presents the prevalence of having one or more teeth missing due to pathology (that is, extracted or lost due to dental decay or periodontal disease) among all dentate older adults.

#### **How was this measured?**

In the 2012 OPOHS, data for determining the prevalence of having one or more teeth missing due to pathology among all dentate older adults were derived from data collected in the dental examination. Dental examiners in the 2012 OPOHS made the assumption that missing teeth had been extracted because of dental disease. This means that results may be slightly overestimated if some teeth were extracted for other reasons (such as orthodontics or trauma).

Virtually all dentate older adults in all subgroups had one or more teeth missing due to pathology (RC, 99.3%; HB, 99.4%). Given the very high prevalence of having one or more teeth missing due to pathology, further analyses are not presented here. Data may be found in the supplementary tables in Appendix A.

### **Mean number of teeth missing due to pathology**

The severity of tooth loss due to pathology is presented as the mean number of teeth missing due to pathology (that is, dental decay or periodontal disease) per dentate older adult.

#### **How was this measured?**

In the 2012 OPOHS, data for determining the mean number of teeth missing due to pathology per dentate older adult were derived from data collected in the dental examination. Dental examiners in the 2012 OPOHS made the assumption that missing teeth had been extracted for dental disease. This means that the number may be slightly overestimated if some teeth were extracted for other reasons (such as orthodontics or trauma).

The mean number of teeth missing due to pathology was 15.6 in dentate older adults living in residential care and 15.1 in dentate older adults living in their own homes.

Table 8 presents the mean number of natural teeth present among dentate older adults, by population group.

**Table 8 Mean number of teeth per person missing due to pathology among all dentate older adults, by population group (unadjusted mean)**

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Mean	-95% CI	+95% CI	Mean	-95% CI	+95% CI	
All	15.6	14.7	16.5	15.1	14.3	16.0	
Sex	Women	15.3	14.2	16.4	15.3	14.4	16.2
	Men	16.2	14.8	17.6	14.9	14.0	15.9
Age group	65–74	11.8	9.9	13.7	12.6	10.9	14.3
	75–84	15.5	14.4	16.7	14.6	13.5	15.7
	85+	16.7	15.5	18.0	16.7	15.8	17.5
Ethnic group	Māori	19.9	16.9	22.9	18.9	17.4	20.4
	Pacific	13.3	9.4	17.2	11.5	8.7	14.3
	Asian	14.0	9.0	19.1	14.2	10.7	17.7
	Other	15.7	14.7	16.6	15.2	14.3	16.2
NZSEI	1 (least deprived)	14.8	13.0	16.6	13.3	12.1	14.5
	2	16.1	14.5	17.7	16.0	14.6	17.4
	3	14.1	11.1	17.0	16.3	13.4	19.2
	4	15.6	13.6	17.5	14.6	12.6	16.6
	5 (most deprived)	16.2	13.9	18.6	16.9	14.5	19.4
Dependency status	Nursing home	16.4	14.9	17.9	.	.	.
	Psychogeriatric/Dementia	15.3	13.0	17.6	.	.	.
	Hospital care	15.0	13.9	16.1	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population groups

Table 9 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 9 Number of natural teeth per person missing due to pathology among all dentate older adults, by population group (adjusted mean ratio and mean difference)**

Group of interest	Reference group	Adjustment variables	Mean ratio	Mean difference
Residential care	Home-based	Age group, Sex, Ethnicity	1.0	0.4
Men	Women	Age group	1.0	0.6
Māori	Non-Māori	Age group, Sex	1.3*	4.7*
Pacific	Non-Pacific	Age group, Sex	0.9	-2.0

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Mean ratio</i>	<i>Mean difference</i>
Asian	Non-Asian	Age group, Sex	0.9	-1.0
Age 85+	Age <85	Sex, Ethnicity	1.2*	2.4*
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.1*	1.3*
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.9*	2.3*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.0	-0.4

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

The mean number of teeth missing per person due to pathology was 1.3 times higher among dentate older Māori than dentate older non-Māori.

The mean number of teeth missing per person due to pathology was significantly higher among the oldest dentate people than those aged under 85 years, and dentate older adults of lower SES than of higher SES.

Dentate older adults who had visited a dental professional in the previous year, had a significantly lower mean number of teeth missing due to pathology per person, than those who had not visited a dental professional in the previous year.

There were no significant differences in the mean number of teeth missing among dentate older adults, due to pathology by residential location, sex, dependency level, or between Pacific and non-Pacific, or Asian and non-Asian older adults.

### **Mean number of natural teeth present**

The measure 'mean number of natural teeth' represents the number of natural teeth (on average) each person has, irrespective of the condition of the teeth. Adults can have a maximum of 32 natural teeth.

This measure provides a useful starting point for interpreting the burden of disease affecting those teeth which are present. For example, if older adults had, on average, 18 teeth and four of those teeth were decayed, they would have a greater relative burden of untreated decay than those who had 28 teeth, four of which were decayed.

#### **How was this measured?**

In the 2012 OPOHS, data on the mean number of natural teeth per dentate participant were derived from data collected in the dental examination.

The mean number of natural teeth present per person in dentate older adults living in residential care was 16.1, and 16.8 in dentate older adults living in their own homes. Table 10 presents the mean number of natural teeth present among dentate RC and HB older adults, by population group.



**Table 10 Mean number of natural teeth present per person among all dentate older adults, by population group (unadjusted mean)**

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Mean	-95% CI	+95% CI	Mean	-95% CI	+95% CI	
All	16.1	15.2	17.0	16.8	16.0	17.6	
Sex	Women	16.3	15.2	17.4	16.7	15.8	17.6
	Men	15.7	14.3	17.2	16.9	15.9	18.0
Age group	65–74	20.2	18.3	22.0	19.1	17.0	21.1
	75–84	16.1	15.0	17.3	17.4	16.3	18.5
	85+	14.9	13.7	16.2	15.3	14.5	16.2
Ethnic group	Māori	11.4	8.6	14.1	13.1	11.6	14.6
	Pacific	18.7	14.8	22.6	20.4	17.6	23.2
	Asian	15.6	11.3	19.9	17.7	14.1	21.4
	Other	16.2	15.2	17.1	16.7	15.8	17.7
NZSEI	1 (least deprived)	17.2	15.4	19.0	18.7	17.5	19.9
	2	15.6	14.0	17.2	16.0	14.6	17.4
	3	16.6	13.8	19.3	15.7	12.8	18.6
	4	16.0	14.2	17.9	17.2	15.4	18.9
	5 (most deprived)	15.8	13.4	18.1	15.0	12.6	17.5
Dependency status	Nursing home	15.4	14.0	16.8	.	.	.
	Psychogeriatric/Dementia	15.9	13.5	18.4	.	.	.
	Hospital care	16.8	15.8	17.9	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 11 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 11 Number of natural teeth present per person among all dentate older adults, by population group (adjusted mean ratio and mean difference)**

Group of interest	Reference group	Adjustment variables	Mean ratio	Mean difference
Residential care	Home-based	Age group, Sex, Ethnicity	1.0	-0.6
Men	Women	Age group	1.0	-0.5
Māori	Non-Māori	Age group, Sex	0.7*	4.5*
Pacific	Non-Pacific	Age group, Sex	1.1	1.8
Asian	Non-Asian	Age group, Sex	1.0	0.0

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Mean ratio</i>	<i>Mean difference</i>
Age 85+	Age <85	Sex, Ethnicity	0.9*	2.4*
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.9*	1.5*
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.2*	2.4*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.0	-0.3

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Dentate older Māori had a significantly lower mean number of natural teeth present per person than dentate older non-Māori.

Dentate older adults aged over 85 years had a significantly lower mean number of natural teeth present per person than dentate people in the younger age groups.

Dentate older adults in the lower-SES group had a significantly lower mean number of natural teeth present per person than those of higher SES.

Dentate older adults who had visited a dental professional in the previous year had a significantly higher mean number of teeth present per person, than those who had not visited a dental professional in the previous year.

There were no significant differences in the mean number of natural teeth present per person among all dentate older adults by residential location, sex, dependency, or between Pacific and non-Pacific, or Asian and non-Asian older adults.

### **Having a functional dentition (21 or more teeth)**

The retention of 21 or more natural teeth is generally used to define the minimum functional dentition. Where there are 21 or more natural teeth, the functional, dietary and aesthetic needs of most people are generally met with natural teeth alone, without the need for removable partial dentures (Steele et al 1998).

#### **How was this measured?**

In the 2012 OPOHS, data for determining the presence/absence of a functional dentition among all dentate older adults were derived from data collected in the dental examination.

One in three dentate older adults (RC, 35.1%; HB, 37.3%) had a functional dentition (that is, they had 21 or more teeth).

Table 12 presents the prevalence of having a functional dentition, by population group.

**Table 12 Prevalence of having a functional dentition among all dentate older adults, by population group (unadjusted prevalence)**

Population Subgroup	Setting					
	Residential Care			Home-Based		
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All	35.1	29.7	40.5	37.3	31.5	43.0
Sex						
Women	37.7	30.8	44.5	36.8	30.8	42.8
Men	30.3	21.9	38.8	37.9	30.5	45.3
Age group						
65–74	58.7	44.3	73.1	49.3	36.5	62.2
75–84	33.7	26.6	40.8	42.1	32.6	51.6
85+	29.6	22.2	37.1	27.6	22.0	33.2
Ethnic group						
Māori	15.2	0.0	32.8	10.2	2.1	18.4
Pacific	45.0	23.5	66.5	48.9	29.6	68.2
Asian	29.7	2.8	56.6	42.5	21.2	63.8
Other	35.5	29.8	41.2	37.5	30.2	44.9
NZSEI						
1 (least deprived)	44.1	33.1	55.0	49.3	40.4	58.2
2	29.3	20.0	38.6	26.1	17.3	34.8
3	42.8	25.3	60.3	37.6	20.3	54.9
4	32.0	20.2	43.8	39.6	28.4	50.9
5 (most deprived)	30.4	15.4	45.4	32.1	20.5	43.6
Dependency status						
Nursing home	32.7	23.6	41.8	.	.	.
Psychogeriatric/Dementia	37.8	23.6	51.9	.	.	.
Hospital care	36.1	29.9	42.2	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 13 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 13 Having a functional dentition among all dentate older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.9	-2.0
Men	Women	Age group	0.9	-5.0
Māori	Non-Māori	Age group, Sex	0.3*	-26.2*
Pacific	Non-Pacific	Age group, Sex	1.1	2.9

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Asian	Non-Asian	Age group, Sex	1.0	-1.0
Age 85+	Age <85	Sex, Ethnicity	0.7*	-14.1*
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.7*	-12.1*
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.2	6.7
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.1	2.7

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Dentate older Māori were 0.3 times as likely as dentate older non-Māori to have a functional dentition.

Dentate people aged over 85 years were 0.7 times as likely as those aged 65–84 years to have a functional dentition.

Dentate older adults in the lower-SES group were 0.7 times as likely as those in the higher-SES group to have a functional dentition.

There were no significant differences in having a functional dentition among dentate older adults by residential location, sex, previous dental visit, dependency level, or between Pacific and non-Pacific, and Asian and non-Asian older adults.

## **Part 2: Condition of the natural teeth**

The structure of natural teeth can be affected by several conditions, including dental caries, dental erosion and abrasion, and dental trauma. The main threat to the condition of natural teeth is dental caries.

Dental caries is a chronic condition which can affect any tooth surface. In the early stages, dental caries can be prevented (and even reversed) through altering the dental environment by reducing plaque and sugar exposure, and through the use of protective modifiers such as fluoride, and treatment options such as fluoride varnishes, fissure sealants and preventive restorations. These measures can reduce the need for fillings.

If dental caries progresses unchecked and the enamel surface breaks down to form a cavity, the damage to the tooth becomes irreversible; a cavity on the crown of the tooth or a softening of the root surface occurs (depending on the site of the lesion). The crown is the part of the tooth that, on a natural sound tooth, is covered in dental enamel, while the root is that part of the tooth not covered by enamel, which is usually below the level of the gum. To help retain the tooth once a cavity has formed, a filling or other restoration is needed to remove the diseased tooth tissue and restore the form and function of the tooth. If caries is left untreated, pain and infection may occur, and the tooth may ultimately be lost.

The risk factors (and indicators) for dental caries include socioeconomic deprivation, suboptimal fluoride exposure, non-European ethnicity, poor oral hygiene, prolonged infant bottle feeding, poor family dental health, enamel defects, eating disorders, irregular dental care, a diet high in sugar, a high-carbohydrate diet (in people with complex medical conditions), the wearing of orthodontic braces, and low salivary flow (New Zealand Guidelines Group 2009). Self-care, including twice-daily toothbrushing with fluoride toothpaste, can help to reduce the risk of caries.

In this section, the following indicators are presented for the crowns of teeth:

- sound teeth
- decayed teeth
- filled (restored) teeth
- severity of dental caries experience (DMFT).

The following indicators are also presented:

- decay on roots of teeth.

This section reports on dentate older adults only.

Caries experience data in this chapter are presented at tooth level (that is, the data represent DMFT rather than DMFS). Surface-level data are reported in supplementary tables in Appendix A.

### **Mean number of sound and untreated teeth**

In this indicator, *sound teeth* refer to teeth with no past or present evidence of coronal decay (that is, in the crown of the tooth), or any fillings placed to treat coronal decay.

#### **How was this measured?**

In the 2012 OPOHS, all teeth present were first divided into crowns and roots. The crown was subdivided into five coronal surfaces, and each was assessed for untreated decay, defined as a cavity that had broken the enamel or visibly undermined it, or for a filling placed to treat decay. The assessment was made for up to 160 coronal surfaces per person (including the incisal edges of the incisors and canines). Teeth assessed as having no past or present evidence of dental decay or any fillings placed to treat decay on any of the five coronal surfaces were classified as 'sound'.

Dentate older adults living in residential care had an average of 7.2 sound teeth per person. Dentate older adults living in their own homes had an average of 7.8 sound teeth per person. Table 14 presents the mean number of sound teeth present among dentate RC and HB older adults, by population group.

**Table 14 Mean number of sound teeth per person among all dentate older adults, by population group (unadjusted mean)**

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Mean	-95% CI	+95% CI	Mean	-95% CI	+95% CI	
All	7.2	6.6	7.9	7.8	7.0	8.6	
Sex	Women	7.4	6.7	8.1	7.3	6.4	8.2
	Men	6.9	5.8	8.1	8.5	7.5	9.4
Age group	65–74	9.3	7.6	11.0	10.5	8.4	12.7
	75–84	7.8	6.8	8.7	8.2	7.4	9.0
	85+	6.2	5.5	6.9	6.3	5.6	6.9
Ethnic group	Māori	7.2	4.8	9.5	8.5	7.2	9.8
	Pacific	12.7	8.6	16.9	15.8	13.3	18.3
	Asian	9.8	4.9	14.7	11.5	8.5	14.6
	Other	7.0	6.3	7.6	7.0	6.4	7.6
NZSEI	1 (least deprived)	7.0	5.8	8.1	7.9	7.2	8.5
	2	6.8	5.6	8.0	7.3	6.2	8.4
	3	8.7	6.6	10.8	7.0	4.4	9.5
	4	6.9	5.5	8.2	9.4	7.3	11.4
	5 (most deprived)	7.9	6.5	9.3	7.6	6.0	9.3
Dependency status	Nursing home	6.5	5.5	7.5	.	.	.
	Psychogeriatric/Dementia	7.5	6.1	8.8	.	.	.
	Hospital care	7.9	6.9	8.8	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 15 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 15 Number of sound teeth per person among all dentate older adults, by population group (adjusted mean ratio and mean difference)**

Group of interest	Reference group	Adjustment variables	Mean ratio	Mean difference
Residential care	Home-based	Age group, Sex, Ethnicity	1.0	-0.2
Men	Women	Age group	1.0	0.1
Māori	Non-Māori	Age group, Sex	1.0	0.0
Pacific	Non-Pacific	Age group, Sex	1.8*	5.8*
Asian	Non-Asian	Age group, Sex	1.4*	2.9*

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Mean ratio</i>	<i>Mean difference</i>
Age 85+	Age <85	Sex, Ethnicity	0.8*	1.8*
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.0	-0.1
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.0	-0.3
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.0	0.3

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Dentate Pacific older adults had almost twice as many sound teeth per person, on average, than dentate non-Pacific older adults, and dentate Asian older adults had 1.4 times more sound teeth per person than dentate non-Asian older adults.

Dentate people aged over 85 years had significantly fewer sound teeth per person than those who were aged 65–84 years.

There were no significant differences in the mean number of sound teeth per person among all dentate older adults by location of residence, sex, SES, previous dental visit or dependency level, or between Māori and non-Māori older adults.

### **Prevalence of untreated coronal decay**

The prevalence of untreated dental decay is a fundamental measure of oral health at population level, and an indicator of the long-term prospects for a natural functional dentition. This section presents the percentage of dentate older adults who had untreated decay on the crown of one or more teeth.

#### **How was this measured?**

In the 2012 OPOHS, all teeth present were first divided into crowns and roots. The crown is the part of the tooth which, on a natural sound tooth, is covered in dental enamel. The crown was subdivided into five coronal surfaces, and each was assessed for untreated decay, defined as a cavity that had broken the enamel or visibly undermined it. The assessment was made for up to 160 coronal surfaces per person.

The prevalence of untreated coronal decay in one or more teeth among dentate older adults living in residential care was 61.3%, and 43.2% for those living in their own homes. Table 16 presents the prevalence of untreated coronal decay, by population group.

**Table 16 Prevalence of untreated coronal decay on one or more teeth, among all dentate older adults, by population group (unadjusted prevalence)**

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI	
All	61.3	55.9	66.7	43.2	38.1	48.3	
Sex	Women	59.3	52.0	66.6	37.8	31.8	43.9
	Men	64.9	57.0	72.9	50.9	43.5	58.3
Age group	65–74	65.5	51.3	79.7	46.4	33.4	59.3
	75–84	62.3	54.2	70.3	40.9	33.8	48.0
	85+	59.3	50.9	67.7	44.4	38.0	50.8
Ethnic group	Māori	75.9	51.8	99.9	41.7	25.8	57.5
	Pacific	83.3	70.9	95.7	56.7	37.7	75.8
	Asian	78.6	57.6	99.6	60.0	46.6	73.3
	Other	59.5	53.8	65.2	41.2	35.4	47.1
NZSEI	1 (least deprived)	54.8	45.2	64.5	34.9	24.6	45.2
	2	56.3	46.8	65.9	40.9	32.7	49.1
	3	55.6	38.4	72.8	56.2	41.3	71.1
	4	66.7	54.6	78.7	44.8	31.6	58.1
	5 (most deprived)	63.9	48.9	78.9	52.2	37.4	67.0
Dependency status	Nursing home	53.4	44.7	62.0	.	.	.
	Psychogeriatric/Dementia	66.1	53.0	79.3	.	.	.
	Hospital care	66.4	59.8	73.1	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 17 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 17 Having untreated coronal decay on one or more teeth among all dentate older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	1.5*	19.4*
Men	Women	Age group	1.2*	8.1*
Māori	Non-Māori	Age group, Sex	1.0	0.3
Pacific	Non-Pacific	Age group, Sex	1.3*	13.9



<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Asian	Non-Asian	Age group, Sex	1.3*	15.1
Age 85+	Age <85	Sex, Ethnicity	1.0	2.0
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.1	3.4
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.7*	-19.0*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.1	5.9

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Dentate older people living in residential care were significantly more likely than dentate older people living in their own homes to have untreated coronal decay in one or more teeth.

Dentate older men were 1.2 times as likely as dentate older women to have untreated coronal decay in one or more teeth.

Dentate Pacific and Asian older adults were 1.3 times as likely as dentate non-Pacific and non-Asian older adults to have untreated coronal decay in one or more teeth.

Dentate older adults who had visited a dental professional in the previous 12 months were significantly less likely to have untreated coronal decay in one or more teeth than those who had made a dental visit in the previous year.

There were no significant differences in the prevalence of untreated coronal decay in one or more teeth among dentate older adults by age, SES or dependency level, or between Māori and non-Māori older adults.

### **Mean number of teeth with untreated coronal decay**

The average number of decayed teeth reflects the burden of untreated disease in adults with at least one natural tooth (dentate adults). In this section, the severity of untreated dental decay is reported as the mean number of teeth with untreated coronal decay among New Zealand dentate adults aged 65 years and over, living in residential care facilities or receiving support in their own homes for their care.

### How was this measured?

In the 2012 OPOHS, all teeth present were first divided into crowns and roots. The crown is the part of the tooth which, on a natural sound tooth, is covered in dental enamel. The crown was subdivided into five coronal surfaces, and each was assessed for untreated decay, defined as a cavity that had broken the enamel or visibly undermined it. The assessment was made for up to 160 coronal surfaces per person. Surface-level data are reported in Appendix A.

Dentate older adults living in residential care had, on average, 2.2 teeth with untreated coronal decay. For dentate older adults living in their own home the average number of teeth per person with untreated coronal decay was 1.3. Table 18 presents the mean number of teeth with untreated coronal decay per person among all dentate older adults, by population group.

**Table 18 Mean number of teeth with untreated coronal decay, among all dentate older adults, by population group (unadjusted mean)**

<i>Population Subgroup</i>		<i>Setting</i>					
		<i>Residential Care</i>			<i>Home-Based</i>		
		<i>Mean</i>	<i>-95% CI</i>	<i>+95% CI</i>	<i>Mean</i>	<i>-95% CI</i>	<i>+95% CI</i>
<i>All</i>		2.2	1.8	2.5	1.3	1.0	1.6
<i>Sex</i>	<i>Women</i>	2.0	1.6	2.3	1.2	0.9	1.5
	<i>Men</i>	2.5	1.9	3.1	1.5	1.1	1.8
<i>Age group</i>	<i>65–74</i>	1.8	1.0	2.6	1.8	1.1	2.5
	<i>75–84</i>	2.0	1.5	2.4	1.2	0.8	1.5
	<i>85+</i>	2.4	1.9	2.9	1.2	0.9	1.6
<i>Ethnic group</i>	<i>Māori</i>	2.2	1.2	3.1	1.4	0.3	2.4
	<i>Pacific</i>	4.4	2.1	6.7	2.3	0.5	4.2
	<i>Asian</i>	3.7	1.5	6.0	1.8	0.9	2.7
	<i>Other</i>	2.0	1.7	2.3	1.2	0.9	1.5
<i>NZSEI</i>	<i>1 (least deprived)</i>	2.0	1.4	2.7	0.8	0.5	1.1
	<i>2</i>	2.1	1.4	2.9	1.4	1.0	1.9
	<i>3</i>	2.2	1.0	3.4	1.4	0.8	2.0
	<i>4</i>	2.0	1.5	2.6	1.6	0.8	2.4
	<i>5 (most deprived)</i>	1.7	1.2	2.3	1.7	1.1	2.2
<i>Dependency status</i>	<i>Nursing home</i>	1.8	1.2	2.4	.	.	.
	<i>Psychogeriatric/Dementia</i>	2.1	1.3	2.8	.	.	.
	<i>Hospital care</i>	2.5	2.1	3.0	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

## Comparisons by population group

Table 19 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 19** Number of teeth with untreated coronal decay per person, among all dentate older adults, by population group (adjusted mean ratio and mean difference)

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Mean ratio</i>	<i>Mean difference</i>
Residential care	Home-based	Age group, Sex, Ethnicity	1.7*	0.9*
Men	Women	Age group	1.3	0.4
Māori	Non-Māori	Age group, Sex	1.0	-0.1
Pacific	Non-Pacific	Age group, Sex	1.9*	1.6*
Asian	Non-Asian	Age group, Sex	1.5	0.9
Age 85+	Age <85	Sex, Ethnicity	1.3	0.4
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.0	0.0
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.7*	0.6*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.0	-0.1

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

The mean number of teeth with untreated coronal decay was 1.7 times higher in dentate older adults living in residential care than in those living in their own home.

The mean number of teeth with untreated coronal decay was 1.9 times higher in dentate Pacific older adults than dentate non-Pacific older adults.

The average number of teeth with untreated coronal decay was significantly lower in dentate older people who had made a dental visit, than those who had not visited a dental professional in the previous 12 months.

There were no significant differences in the average number of teeth with coronal tooth decay among dentate older adults by sex, age, SES or dependency level, or between Māori and non-Māori, or Asian and non-Asian older adults.

### Mean number of teeth with untreated coronal decay in dentate older adults with untreated coronal decay

Dentate older adults living in residential care, who had untreated coronal decay, had 3.5 teeth with untreated coronal decay, on average. Those living in their own homes who had untreated coronal decay had 3.0 teeth with untreated coronal decay, on average.

Table 20 presents the mean number of teeth with untreated coronal decay per person among all dentate older adults, with untreated coronal decay, by population group.

**Table 20 Mean number of teeth with untreated coronal decay, among all dentate older adults with untreated coronal decay, by population group (unadjusted mean)**

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Mean	-95% CI	+95% CI	Mean	-95% CI	+95% CI	
All	3.5	3.1	4.0	3.0	2.6	3.4	
Sex	Women	3.3	2.8	3.8	3.1	2.5	3.7
	Men	3.9	3.1	4.7	2.9	2.4	3.4
Age group	65–74	2.8	1.8	3.8	3.9	3.1	4.7
	75–84	3.1	2.6	3.7	2.8	2.2	3.5
	85+	4.1	3.4	4.7	2.8	2.1	3.4
Ethnic group	Māori	2.9	2.0	3.8	3.3	1.7	4.8
	Pacific	5.3	2.8	7.8	4.1	1.8	6.5
	Asian	4.8	1.9	7.6	3.0	2.0	4.0
	Other	3.4	2.9	3.8	2.9	2.5	3.3
NZSEI	1 (least deprived)	3.7	2.7	4.7	2.2	1.6	2.9
	2	3.8	2.8	4.8	3.5	2.6	4.4
	3	3.9	2.0	5.8	2.4	1.5	3.3
	4	3.0	2.4	3.7	3.6	2.4	4.8
	5 (most deprived)	2.7	2.0	3.5	3.2	2.5	3.9
Dependency status	Nursing home	3.3	2.4	4.2	.	.	.
	Psychogeriatric/Dementia	3.1	2.3	3.9	.	.	.
	Hospital care	3.8	3.2	4.5	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 21 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 21 Number of teeth with untreated coronal decay per person, among all dentate older adults with untreated coronal decay, by population group (adjusted mean ratio and mean difference)**

Group of interest	Reference group	Adjustment variables	Mean ratio	Mean difference
Residential care	Home-based	Age group, Sex, Ethnicity	1.2	0.6
Men	Women	Age group	1.1	0.3
Māori	Non-Māori	Age group, Sex	0.9	-0.2
Pacific	Non-Pacific	Age group, Sex	1.5*	1.7*

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Mean ratio</i>	<i>Mean difference</i>
Asian	Non-Asian	Age group, Sex	1.2	0.6
Age 85+	Age <85	Sex, Ethnicity	1.2*	0.7
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.0	-0.1
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.0	0.1
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.9	-0.4

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

After adjustment, the mean number of teeth with untreated coronal decay was 1.5 times higher in dentate Pacific older adults with untreated coronal decay, than dentate non-Pacific older adults with untreated coronal decay.

The mean number of teeth with untreated coronal decay was 1.2 times higher in dentate older adults aged 85 years and older, with untreated coronal decay, than dentate older adults aged 65–84 years, with untreated coronal decay.

There were no significant differences in the average number of teeth with coronal tooth decay among all dentate older adults with untreated coronal decay by any other group of interest.

### **Prevalence of untreated root decay**

The root is that part of the tooth not covered by enamel and which is usually below the level of the gum. As people age, gum recession and periodontal pocketing can expose the root surface of one or more teeth. When the root surface becomes exposed to the oral environment, and potentially to factors that cause dental decay, the roots can become affected by decay. Because gum recession is usually associated with increasing age, decay of the root surfaces of teeth is more common in older people. As adults retain their teeth for longer, decay on root surfaces is likely to become more common in the future.

#### **How was this measured?**

In the 2012 OPOHS, teeth were divided into crowns and roots. The roots of all teeth present were subdivided into four surfaces, and each surface was assessed for untreated decay, defined as a lesion on the root surface that was soft to exploration using a periodontal probe.

One in three dentate older adults (regardless of residential locations) had untreated root decay in one or more teeth (RC, 33.7%; HB, 32.7%).

Table 22 presents the prevalence of untreated root decay among dentate older adults, by population group.

**Table 22 Prevalence of untreated root decay on one or more teeth, among all dentate older adults, by population group (unadjusted prevalence)**

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI	
All	33.7	28.5	38.8	32.7	27.8	37.7	
Sex	Women	30.1	23.8	36.4	27.9	22.7	33.0
	Men	40.2	31.2	49.2	39.8	31.1	48.4
Age group	65–74	34.1	17.7	50.6	25.9	13.3	38.6
	75–84	30.6	23.1	38.1	31.2	24.9	37.5
	85+	36.1	28.5	43.6	37.0	30.4	43.6
Ethnic group	Māori	46.5	21.7	71.4	18.5	7.3	29.6
	Pacific	48.4	36.7	60.1	36.4	17.7	55.0
	Asian	38.7	15.5	61.9	44.6	17.5	71.7
	Other	32.7	27.3	38.1	32.3	27.3	37.4
NZSEI	1 (least deprived)	34.9	25.8	44.0	27.9	18.4	37.4
	2	32.7	22.4	43.0	31.6	21.6	41.6
	3	39.5	23.8	55.1	40.6	26.3	54.8
	4	38.3	25.3	51.3	29.5	17.7	41.3
	5 (most deprived)	24.6	14.7	34.5	42.1	28.5	55.6
Dependency status	Nursing home	27.6	18.2	37.0	.	.	.
	Psychogeriatric/Dementia	38.5	27.0	49.9	.	.	.
	Hospital care	37.1	29.8	44.4	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 23 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 23 Having untreated root decay on one or more teeth, among all dentate older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	1.0	1.5
Men	Women	Age group	1.4*	11.6*
Māori	Non-Māori	Age group, Sex	0.9	-4.4
Pacific	Non-Pacific	Age group, Sex	1.3	11.1

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Asian	Non-Asian	Age group, Sex	1.2	7.8
Age 85+	Age <85	Sex, Ethnicity	1.3*	7.5*
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.1	3.2
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.0	-1.4
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.2	6.0

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Dentate older men were 1.4 times as likely as dentate older women to have untreated root decay on one or more teeth. Dentate people aged over 85 years were 1.3 times as likely as those aged 65–84 years to have untreated root decay on one or more teeth.

There were no significant differences in having untreated root decay on one or more teeth among all dentate older adults by residential location, ethnicity, SES, previous dental visit, or dependency level.

### Mean number of teeth with untreated root decay

#### How was this measured?

In the 2012 OPOHS, teeth were divided into crowns and roots. The roots of all teeth present were subdivided into four surfaces: each surface assessed for untreated decay, defined as a lesion on the root surface that was soft to exploration using a periodontal probe.

On average, dentate older adults in residential care had 0.8 teeth with untreated root decay, and dentate older adults living in their own homes had 0.7 teeth with untreated root decay. Table 24 presents the mean number of teeth with untreated root decay per person among dentate RC and HB older adults, by population group.

**Table 24 Mean number of teeth with untreated root decay, among all dentate older adults, by population group (unadjusted mean)**

<i>Population Subgroup</i>		<i>Setting</i>					
		<i>Residential Care</i>			<i>Home-Based</i>		
		<i>Mean</i>	<i>-95% CI</i>	<i>+95% CI</i>	<i>Mean</i>	<i>-95% CI</i>	<i>+95% CI</i>
<i>All</i>		0.8	0.6	1.0	0.7	0.5	0.9
<i>Sex</i>	<i>Women</i>	0.7	0.5	0.8	0.5	0.4	0.7
	<i>Men</i>	1.1	0.7	1.4	0.9	0.6	1.2
<i>Age group</i>	<i>65–74</i>	0.6	0.3	0.9	0.6	0.2	0.9
	<i>75–84</i>	0.7	0.5	1.0	0.7	0.5	0.9
	<i>85+</i>	0.9	0.6	1.2	0.8	0.5	1.1

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Mean	-95% CI	+95% CI	Mean	-95% CI	+95% CI
Ethnic group	Māori	0.9	0.3	1.4	0.5	0.1	0.8
	Pacific	1.4	0.9	1.9	1.0	0.4	1.6
	Asian	0.7	0.1	1.3	1.4	0.2	2.5
	Other	0.8	0.6	1.0	0.6	0.4	0.8
NZSEI	1 (least deprived)	0.8	0.6	1.1	0.5	0.3	0.8
	2	0.8	0.5	1.1	0.6	0.3	0.9
	3	0.8	0.3	1.2	0.7	0.4	1.0
	4	1.0	0.5	1.4	0.5	0.3	0.7
	5 (most deprived)	0.6	0.3	0.8	1.4	0.5	2.3
Dependency status	Nursing home	0.6	0.4	0.8	.	.	.
	Psychogeriatric/Dementia	0.8	0.5	1.2	.	.	.
	Hospital care	1.0	0.7	1.3	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 25 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 25 Number of teeth with untreated root decay per person, among all dentate older adults, by population group (adjusted mean ratio and mean difference)**

Group of interest	Reference group	Adjustment variables	Mean ratio	Mean difference
Residential care	Home-based	Age group, Sex, Ethnicity	1.2	0.1
Men	Women	Age group	1.7*	0.4*
Māori	Non-Māori	Age group, Sex	0.8	-0.1
Pacific	Non-Pacific	Age group, Sex	1.9*	0.6*
Asian	Non-Asian	Age group, Sex	1.4	0.3
Age 85+	Age <85	Sex, Ethnicity	1.4*	0.2*
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.1	0.1
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.9	-0.1
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.0	0.0

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)



The mean number of teeth with untreated root decay was 1.7 times higher in dentate older men than dentate older women.

Dentate Pacific older adults had almost twice the mean number of teeth with untreated root decay than dentate non-Pacific older adults.

The mean number of teeth with untreated root decay was 1.4 times higher in dentate people aged over 85 years than in dentate people aged 65–84 years.

There were no significant differences in the mean number of teeth with untreated root decay among dentate older adults by residential location, SES, previous dental visit or dependency level, or between Māori and non-Māori, or Asian and non-Asian older adults.

### Mean number of teeth with untreated root decay in dentate older adults with untreated root decay

Dentate older adults living in residential care, who had untreated root decay, had 2.4 teeth with untreated root decay, on average. Those living in their own homes who had untreated root decay, had 2.1 teeth with untreated root decay, on average. Table 26 presents the mean number of teeth with untreated root decay per person among all dentate older adults, with untreated root decay, by population group.

**Table 26** Mean number of teeth with untreated root decay, among all dentate older adults with untreated root decay, by population group (unadjusted mean)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Mean	-95% CI	+95% CI	Mean	-95% CI	+95% CI
<i>All</i>		2.4	2.0	2.7	2.1	1.7	2.5
<i>Sex</i>	<i>Women</i>	2.2	1.8	2.6	2.0	1.4	2.5
	<i>Men</i>	2.7	2.1	3.2	2.2	1.8	2.7
<i>Age group</i>	<i>65–74</i>	1.7	1.4	2.0	2.2	1.4	3.0
	<i>75–84</i>	2.4	1.9	2.9	2.1	1.6	2.6
	<i>85+</i>	2.5	2.0	3.1	2.0	1.5	2.6
<i>Ethnic group</i>	<i>Māori</i>	1.9	1.5	2.2	2.4	1.2	3.7
	<i>Pacific</i>	2.9	1.9	4.0	2.7	2.0	3.3
	<i>Asian</i>	1.8	0.9	2.8	3.0	0.0	6.1
	<i>Other</i>	2.4	2.0	2.8	1.9	1.5	2.4
<i>NZSEI</i>	<i>1 (least deprived)</i>	2.4	1.9	2.9	2.0	1.6	2.4
	<i>2</i>	2.4	1.7	3.1	1.9	1.2	2.7
	<i>3</i>	1.9	1.3	2.5	1.7	1.4	2.0
	<i>4</i>	2.5	1.7	3.4	1.6	1.1	2.0
	<i>5 (most deprived)</i>	2.2	1.5	3.0	3.2	1.5	5.0

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Mean	-95% CI	+95% CI	Mean	-95% CI	+95% CI	
Dependency status	Nursing home	2.2	1.8	2.6	.	.	.
	Psychogeriatric/Dementia	2.1	1.4	2.8	.	.	.
	Hospital care	2.6	2.0	3.2	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 27 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 27** Number of teeth with untreated root decay per person, among all dentate older adults with untreated root decay, by population group (adjusted mean ratio and mean difference)

Group of interest	Reference group	Adjustment variables	Mean ratio	Mean difference
Residential care	Home-based	Age group, Sex, Ethnicity	1.2	0.3
Men	Women	Age group	1.2	0.4
Māori	Non-Māori	Age group, Sex	1.0	-0.1
Pacific	Non-Pacific	Age group, Sex	1.4*	0.9*
Asian	Non-Asian	Age group, Sex	1.1	0.2
Age 85+	Age <85	Sex, Ethnicity	1.1	0.2
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.0	-0.1
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.9	-0.2
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.9	-0.2

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

After adjustment, the mean number of teeth with untreated root decay was 1.4 times higher in dentate Pacific older adults with untreated root decay than dentate non-Pacific older adults with untreated root decay.

There were no significant differences in the average number of teeth with untreated root decay among dentate older adults with untreated root decay by any other group of interest.

## Mean number of filled teeth (coronal) in dentate older adults

Once a cavity has formed in a tooth, a restoration is needed to restore the form, function and appearance of the tooth, if the tooth is ultimately to be retained and not extracted. The extent to which teeth have been restored represents the past experience of dental caries, as well as access to oral health care and more health-promoting dental visiting patterns.

In this report, the term ‘fillings’ refers to restorations placed in the treatment of decay, ranging from simple fillings to complex fillings and crowns (but not including fillings placed for cosmetic reasons).

### How was this measured?

In the 2012 OPOHS, all five coronal surfaces of each tooth were assessed for the presence of a filling or other restoration placed to treat decay. Fillings placed for cosmetic reasons were not included in this measure. The assessment was made for up to 160 tooth surfaces per person. Surface-level data are reported in Appendix A.

Dentate older adults living in residential care had a mean number of 6.0 filled teeth. Dentate older adults living in their own homes had, on average, 7.1 filled teeth. Table 28 presents the mean number of filled teeth among dentate RC and HB older adults, by population group.

**Table 28 Mean number of filled teeth (coronal), among all dentate older adults, by population group (unadjusted mean)**

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Mean	-95% CI	+95% CI	Mean	-95% CI	+95% CI
All		6.0	5.2	6.8	7.1	6.3	7.8
Sex	Women	6.3	5.2	7.4	7.7	6.8	8.6
	Men	5.5	4.5	6.4	6.1	5.1	7.1
Age group	65–74	8.5	6.4	10.6	6.2	4.4	8.0
	75–84	5.8	4.7	6.8	7.4	6.3	8.5
	85+	5.5	4.5	6.6	7.1	6.3	7.9
Ethnic group	Māori	1.2	0.6	1.8	3.0	1.7	4.3
	Pacific	0.7	0.1	1.2	1.4	0.8	2.0
	Asian	1.7	0.4	2.9	3.3	0.8	5.7
	Other	6.5	5.6	7.3	7.9	7.1	8.7

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Mean	-95% CI	+95% CI	Mean	-95% CI	+95% CI	
NZSEI	1 (least deprived)	7.5	6.3	8.8	9.5	8.4	10.7
	2	6.0	4.7	7.2	6.7	5.5	7.8
	3	5.1	3.1	7.1	6.6	5.1	8.1
	4	6.3	4.8	7.8	5.4	4.1	6.7
	5 (most deprived)	5.7	3.4	8.0	5.0	3.7	6.3
Dependency status	Nursing home	6.6	5.1	8.0	.	.	.
	Psychogeriatric/Dementia	5.8	3.5	8.1	.	.	.
	Hospital care	5.6	4.8	6.4	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 29 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 29** Number of filled teeth per person among all dentate older adults, by population group (adjusted mean ratio and mean difference)

Group of interest	Reference group	Adjustment variables	Mean ratio	Mean difference
Residential care	Home-based	Age group, Sex, Ethnicity	0.8*	1.4*
Men	Women	Age group	0.8*	1.2*
Māori	Non-Māori	Age group, Sex	0.4*	4.3*
Pacific	Non-Pacific	Age group, Sex	0.2*	5.7*
Asian	Non-Asian	Age group, Sex	0.4*	4.1*
Age 85+	Age <85	Sex, Ethnicity	0.8*	1.2*
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.8*	1.5*
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.6*	3.3*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.9	-0.4

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

On average, dentate older adults living in residential care had significantly fewer teeth filled per person than dentate older adults living in their own homes.

Dentate older men had significantly fewer teeth filled than dentate older women, per person, on average.

Dentate older Māori had, on average, less than half the number of filled teeth per person, as dentate older non-Māori. Dentate Pacific older adults had, on average, one-fifth of their teeth filled per person than dentate non-Pacific older adults. Asian older adults also had significantly lower mean numbers of filled teeth than non-Asian older adults.

The oldest dentate older adults (aged over 85 years) had significantly fewer teeth filled, on average, than younger dentate older adults (aged 65–84 years).

Dentate older adults in the lower-SES group had, on average, significantly fewer filled teeth per person than those in the higher-SES group.

On average, dentate older adults who had made a visit to a dental professional in the previous year had 1.6 times as many filled teeth per person as those who had not made a dental visit in the previous 12 months.

There was no significant difference in the mean number of teeth filled among dentate older adults by dependency level.

### **Severity of dental decay experience (DMFT)**

If dental decay progresses unchecked and the enamel surface breaks down to form a cavity, the damage to the tooth becomes irreversible. The treatment of irreversible dental decay leaves a permanent mark on the dentition, either through the presence of a filling or the loss of the affected tooth by extraction.

The number of decayed, missing or filled teeth (or surfaces of teeth) reflects a person's lifetime experience of dental decay. By convention, dental decay experience is quantified as the sum of three components: decayed (D), missing due to pathology (M) and filled (F) teeth (T). This measure is known as the DMFT index (World Health Organization 1997). The index is cumulative, which means that an individual's DMFT score cannot decrease over time. The disease can affect either the crown or the root of a tooth (if gum recession has occurred and exposed the root).

#### **How was this measured?**

For this section the DMFT index was calculated using data from previous sections: mean number of teeth with untreated coronal and root decay, mean number of teeth missing due to pathology, and mean number of filled teeth. Tables in Appendix A report the components of the index and the overall DMF score at the tooth level (DMFT) and surface level (DMFS).

It should be noted that it was assumed that all missing teeth were missing due to pathology (i.e. including teeth missing due to trauma or as a result of orthodontic treatment. This means that findings on teeth missing due to decay may be slightly overestimated. Unless otherwise indicated, the D component of the DMFT data presented in this report comprises teeth with coronal decay or root decay or both.

Overall, dentate older adults living in residential care had a mean number of 24.2 decayed, missing or filled teeth (a DMFT score of 24.2). The mean number of decayed,

missing or filled teeth for those dentate older adults living in their own homes was 23.9 (a DMFT score of 23.9). In the RC sample, the overall DMFT score was made up of the following components: a mean DT of 2.6; a mean MT of 15.6; and a mean FT of 6.0. In the HB sample, those were 1.7, 15.1 and 7.1 respectively.

Table 30 presents the mean DMFT among all dentate older adults, by population group.

**Table 30 Mean number of decayed, missing and filled teeth (DMFT) per person among all dentate older adults, by population group (unadjusted mean)**

<i>Population Subgroup</i>		<i>Setting</i>					
		<i>Residential Care</i>			<i>Home-Based</i>		
		<i>Mean</i>	<i>-95% CI</i>	<i>+95% CI</i>	<i>Mean</i>	<i>-95% CI</i>	<i>+95% CI</i>
<i>All</i>		24.2	23.5	25.0	23.9	23.1	24.6
<i>Sex</i>	<i>Women</i>	23.9	23.1	24.8	24.5	23.6	25.3
	<i>Men</i>	24.8	23.6	25.9	23.0	22.1	24.0
<i>Age group</i>	<i>65–74</i>	22.5	20.8	24.2	20.8	19.0	22.7
	<i>75–84</i>	23.6	22.6	24.7	23.5	22.7	24.3
	<i>85+</i>	25.2	24.4	26.0	25.4	24.8	26.0
<i>Ethnic group</i>	<i>Māori</i>	23.7	20.9	26.6	23.4	22.1	24.7
	<i>Pacific</i>	19.2	15.1	23.3	15.8	13.5	18.1
	<i>Asian</i>	19.8	13.2	26.3	20.1	17.1	23.2
	<i>Other</i>	24.6	23.9	25.3	24.7	24.1	25.2
<i>NZSEI</i>	<i>1 (least deprived)</i>	24.9	23.7	26.0	23.9	23.3	24.5
	<i>2</i>	24.7	23.3	26.0	24.4	23.3	25.5
	<i>3</i>	21.8	19.0	24.7	24.7	22.3	27.1
	<i>4</i>	24.5	22.7	26.2	21.9	19.8	23.9
	<i>5 (most deprived)</i>	24.0	22.6	25.4	24.3	22.6	25.9
<i>Dependency status</i>	<i>Nursing home</i>	25.1	23.9	26.2	.	.	.
	<i>Psychogeriatric/Dementia</i>	23.7	22.0	25.3	.	.	.
	<i>Hospital care</i>	23.7	22.7	24.7	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### **Comparisons by population group**

Table 31 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 31 Number of decayed, missing or filled teeth (DMFT score) per person, among all dentate older adults, by population group (adjusted mean ratio and mean difference)**

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Mean ratio</i>	<i>Mean difference</i>
Residential care	Home-based	Age group, Sex, Ethnicity	1.0	0.0
Men	Women	Age group	1.0	0.0
Māori	Non-Māori	Age group, Sex	1.0	0.0
Pacific	Non-Pacific	Age group, Sex	0.7*	6.6*
Asian	Non-Asian	Age group, Sex	0.8*	4.0*
Age 85+	Age <85	Sex, Ethnicity	1.1*	1.8*
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.0	-0.1
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.0	0.5
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.0	-0.8

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Dentate Pacific older adults and Asian older adults had significantly fewer decayed, missing and filled teeth per person on average, than dentate non-Pacific and non-Asian older adults.

The mean number of decayed missing and filled teeth was significantly higher for dentate older adults aged over 85 years than those dentate older adults aged 65–84.

There were no significant differences in the mean number of missing, filled and decayed teeth among dentate older adults, by location of residence, sex, SES, previous visit or dependency level, or between Māori and non-Māori older adults.

### Part 3: Dental treatment need

Estimates of treatment need may be useful in considering the challenges in oral health care delivery, and imputing population dental treatment need from surveys of dental status (for example, from using the Decayed component of the DMFT) is a logical use of such information (Spencer 1980). The resulting estimates may then be used in planning appropriate services, priority setting in allocating scarce health-care resources, and in the evaluation of services. Those estimates may be obtained by using an individual treatment plan approach – whereby each examined individual (sampling unit) has a treatment plan “worked up” at the time of the examination – or a condition-to-need approach, whereby standard algorithms are used to convert recorded conditions to specific treatment needs, with those then aggregated to form an overall estimate of treatment need (Schofield 1981).

While attractive at first glance, there are problems with attempting to estimate treatment needs from epidemiological surveys, because the process relies upon a number of assumptions. The first of these is that the criteria used by the calibrated survey examiners are identical to those used by dentists in day-to-day practice. The second is that everyone

in the population will demand dental services, and the third is that they will do it in the same way. For a subpopulation such as older people living in residential care, there is the added complication of the system within which they live and its current unpreparedness for a dentate clientele (Smith 2010).

Alongside this issue is the tension between the requirements of what would be the “ideal” treatment plan for an older adult who is healthy, fit and fully functioning, and the inevitable compromises which need to be made when an older adult is heavily dependent on support care, and for whom the risks of conventional dental treatment are simply too great. Thus, treatment need data are available in this report in two ways: (1) as the more or less “ideal” scenario of the condition-to-need approach (‘ideal’); and (2) as a pragmatic, reality-based estimate from the examining dentists, who would have taken each individual’s circumstances into account at the time of examination (‘actual’ need). While estimates of treatment need in surveys such as the 2012 OPOHS can be informative, their practical relevance remains unclear. Nevertheless, the data are presented here for completeness.

Data for the ‘actual’ treatment need (at tooth level) determined from the dental examination are presented here. The data for ‘ideal’ treatment need at both coronal and root level are reported in the summary tables in Appendix A.

This part reports on dentate older adults only.

### Actual treatment need for dentate older adults

#### How was this measured?

In the 2012 OPOHS, actual treatment need was determined at the time of the dental examination. Each examining dentist coded the treatment required based on their opinion given the health of the participant, their ability to undergo treatment, the need for treatment as well as the participant’s wishes. Data presented is for any restoration required (that is, regardless of the number of surfaces).

### Prevalence of requiring one or more restorations (actual)

The prevalence of requiring one or more restorations was 42.2% for dentate older adults living in residential care, and 45.6% for dentate older adults living in their own homes. Table 32 presents those data by population group.

**Table 32** Prevalence of requiring one or more restorations among all dentate older adults, by population group (unadjusted prevalence) (actual)

Population Subgroup	Setting					
	Residential Care			Home-Based		
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All	42.2	36.7	47.7	45.6	39.1	52.2



Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
Sex	Women	40.9	34.3	47.6	42.9	35.3	50.6
	Men	44.5	35.2	53.8	49.5	41.6	57.5
Age group	65–74	38.6	23.4	53.7	47.4	35.0	59.8
	75–84	40.5	32.0	49.0	47.2	37.4	57.1
	85+	44.6	36.7	52.6	43.3	34.1	52.5
Ethnic group	Māori	47.6	26.4	68.8	35.5	20.8	50.3
	Pacific	34.7	20.4	49.0	44.2	33.2	55.3
	Asian	54.0	24.7	83.4	51.3	21.0	81.6
	Other	41.7	36.1	47.3	45.8	37.8	53.7
NZSEI	1 (least deprived)	45.5	34.7	56.2	44.5	34.3	54.6
	2	46.6	35.3	57.8	46.0	35.0	57.0
	3	41.8	23.9	59.7	40.7	24.3	57.2
	4	44.0	32.3	55.6	48.6	37.0	60.2
	5 (most deprived)	35.8	23.1	48.5	45.6	32.5	58.6
Dependency status	Nursing home	39.8	30.8	48.8	.	.	.
	Psychogeriatric/Dementia	35.8	25.3	46.4	.	.	.
	Hospital care	47.5	38.2	56.7	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI score

### Comparisons by population group

Table 33 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 33 One or more restorations required among all dentate older adults, by population group (adjusted rate ratio and rate difference) (actual)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.9	-3.3
Men	Women	Age group	1.1	5.3
Māori	Non-Māori	Age group, Sex	0.9	-4.4
Pacific	Non-Pacific	Age group, Sex	0.9	-2.7
Asian	Non-Asian	Age group, Sex	1.2	8.4
Age 85+	Age <85	Sex, Ethnicity	1.0	0.9
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.0	1.4

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.9	-3.2
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.8	-7.7

Source: 2012 Older People's Oral Health Survey

There were no significant differences in the prevalence of requiring one or more restorations among all dentate older adults by any group of interest.

### Mean number of restorations required (actual) in dentate older adults

On average, dentate older adults (regardless of residential location) required one restoration per person.

Table 34 presents the prevalence of one or more restorations required among dentate older adults, by population group.

**Table 34 Mean number of teeth requiring one or more restorations per person among all dentate older adults, by population group (unadjusted mean) (actual)**

<i>Population Subgroup</i>		<i>Setting</i>					
		<i>Residential Care</i>			<i>Home-Based</i>		
		<i>Mean</i>	<i>-95% CI</i>	<i>+95% CI</i>	<i>Mean</i>	<i>-95% CI</i>	<i>+95% CI</i>
<i>All</i>		1.0	0.8	1.3	1.1	0.9	1.3
<i>Sex</i>	<i>Women</i>	1.0	0.8	1.2	1.0	0.8	1.2
	<i>Men</i>	1.2	0.8	1.6	1.3	1.0	1.6
<i>Age group</i>	<i>65–74</i>	0.9	0.4	1.4	1.1	0.6	1.5
	<i>75–84</i>	1.1	0.8	1.4	1.2	0.9	1.5
	<i>85+</i>	1.0	0.7	1.3	1.0	0.7	1.4
<i>Ethnic group</i>	<i>Māori</i>	0.9	0.3	1.6	0.6	0.2	1.0
	<i>Pacific</i>	1.1	0.4	1.8	1.0	0.5	1.4
	<i>Asian</i>	1.7	0.4	3.1	1.1	0.4	1.7
	<i>Other</i>	1.0	0.8	1.2	1.1	0.9	1.4
<i>NZSEI</i>	<i>1 (least deprived)</i>	1.2	0.7	1.6	1.1	0.8	1.3
	<i>2</i>	1.3	0.8	1.7	1.0	0.7	1.2
	<i>3</i>	0.9	0.4	1.4	0.8	0.4	1.2
	<i>4</i>	1.0	0.6	1.4	1.2	0.7	1.8
	<i>5 (most deprived)</i>	0.9	0.5	1.3	1.6	0.8	2.4

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Mean	-95% CI	+95% CI	Mean	-95% CI	+95% CI	
Dependency status	Nursing home	1.0	0.6	1.4	.	.	.
	Psychogeriatric/Dementia	0.9	0.5	1.2	.	.	.
	Hospital care	1.2	0.8	1.6	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 35 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 35 Number of teeth requiring restoration per person among all dentate older adults, by population group (adjusted mean ratio and mean difference) (actual)**

Group of interest	Reference group	Adjustment variables	Mean ratio	Mean difference
Residential care	Home-based	Age group, Sex, Ethnicity	0.9	-0.1
Men	Women	Age group	1.3*	0.3
Māori	Non-Māori	Age group, Sex	0.7*	0.4*
Pacific	Non-Pacific	Age group, Sex	1.0	0.0
Asian	Non-Asian	Age group, Sex	1.2	0.2
Age 85+	Age <85	Sex, Ethnicity	0.9	-0.1
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.1	0.1
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.9	-0.1
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.8	-0.2

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

On average, dentate older men had 1.3 times as many teeth requiring restoration per person than dentate older women.

Dentate older Māori had, on average, significantly fewer teeth requiring restoration per person than dentate non-Māori.

There were no significant differences in the number of teeth requiring restoration per person among all dentate older adults by residential location, age, SES, previous dental visit or dependency level, or between Pacific and non-Pacific, or Asian and non-Asian older adults.

## Prevalence of one or more extractions required (actual) in dentate older adults

### How was this measured?

In the 2012 OPOHS, data focusing on the need for the extraction of one or more teeth was derived from the dental examination. Examining dentists recorded whether a tooth required extraction due to dental caries or periodontal disease at the time of examination, based on the health of the participant, their ability to undergo treatment, the need for treatment as well as the participant's wishes.

One in three (33.2%) dentate older adults in residential care and one in five (21.9%) living in their own homes required the extraction of one or more teeth. Table 36 presents the prevalence of one or more extractions required among dentate older adults, by population group.

**Table 36** Prevalence of one or more extractions required among all dentate older adults, by population group (unadjusted prevalence) (actual)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All		33.2	28.3	38.1	21.9	16.4	27.3
Sex	Women	31.0	25.0	37.0	17.9	12.4	23.5
	Men	37.1	29.4	44.8	27.5	20.6	34.3
Age group	65–74	31.6	18.4	44.7	27.2	14.8	39.7
	75–84	32.2	24.8	39.5	18.7	13.7	23.7
	85+	34.4	27.1	41.8	23.0	14.9	31.2
Ethnic group	Māori	31.7	15.8	47.7	41.0	20.7	61.3
	Pacific	66.2	53.1	79.3	46.2	21.2	71.2
	Asian	39.4	13.4	65.3	37.5	22.8	52.1
	Other	32.0	26.8	37.1	18.3	12.9	23.7
NZSEI	1 (least deprived)	31.5	23.8	39.3	14.1	7.1	21.1
	2	32.5	24.6	40.5	19.7	11.6	27.7
	3	27.7	12.8	42.6	36.1	15.7	56.4
	4	39.9	28.2	51.6	21.0	9.2	32.8
	5 (most deprived)	27.0	13.1	40.8	31.4	19.6	43.3
Dependency status	Nursing home	34.4	26.5	42.3	.	.	.
	Psychogeriatric/Dementia	32.3	20.1	44.6	.	.	.
	Hospital care	32.4	25.0	39.7	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

## Comparisons by population group

Table 37 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 37 One or more extractions required among all dentate older adults, by population group (adjusted rate ratio and rate difference) (actual)**

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Residential care	Home-based	Age group, Sex, Ethnicity	1.6*	12.8*
Men	Women	Age group	1.3*	7.3*
Māori	Non-Māori	Age group, Sex	1.4	10.7
Pacific	Non-Pacific	Age group, Sex	2.0*	28.2*
Asian	Non-Asian	Age group, Sex	1.4	9.9
Age 85+	Age <85	Sex, Ethnicity	1.2	5.7
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.1	2.8
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.7*	-10.5*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.0	-0.5

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Dentate older adults residing in a care facility were 1.6 times as likely as those living in their own homes to require one or more teeth extracted.

Dentate older men were 1.3 times as likely as dentate older women to require one or more teeth extracted.

Dentate Pacific older adults were twice as likely as dentate non-Pacific older adults to require one or more teeth extracted.

Those dentate older adults who visited a dental professional in the previous 12 months were 0.7 times as likely to require one or more teeth extracted than those who had not visited a dental professional in the previous year.

There were no significant differences in the prevalence of requiring one or more extractions among all dentate older adults by age, SES or dependency level, or between Asian and non-Asian older adults or Māori and non-Māori older adults.

### Mean number of extractions required (actual) in dentate older adults

Dentate residential care older adults required, on average, 1.1 teeth extracted per person. The mean number of teeth required by dentate older adults living in their own homes was

0.7 per person. Table 38 presents the mean number of extractions required among dentate older adults, by population group.

**Table 38 Mean number of extractions required per person among all dentate older adults, by population group (unadjusted mean) (actual)**

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Mean	-95% CI	+95% CI	Mean	-95% CI	+95% CI	
All	1.1	0.8	1.3	0.7	0.5	1.0	
Sex	Women	0.9	0.6	1.2	0.6	0.3	0.9
	Men	1.4	1.0	1.8	0.8	0.5	1.1
Age group	65–74	0.8	0.4	1.3	1.1	0.4	1.9
	75–84	0.9	0.6	1.2	0.6	0.3	0.9
	85+	1.3	0.9	1.7	0.7	0.4	1.0
Ethnic group	Māori	1.2	0.1	2.3	1.2	0.2	2.2
	Pacific	3.2	1.1	5.3	2.2	-0.1	4.5
	Asian	1.4	0.1	2.7	0.7	0.2	1.3
	Other	1.0	0.7	1.2	0.6	0.4	0.8
NZSEI	1 (least deprived)	1.0	0.7	1.4	0.2	0.1	0.4
	2	1.2	0.6	1.8	0.8	0.4	1.2
	3	0.8	0.2	1.4	1.0	0.2	1.8
	4	1.1	0.6	1.6	0.9	0.2	1.6
	5 (most deprived)	0.7	0.3	1.2	1.0	0.5	1.6
Dependency status	Nursing home	1.1	0.7	1.5	.	.	.
	Psychogeriatric/Dementia	0.8	0.4	1.3	.	.	.
	Hospital care	1.2	0.8	1.6	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 39 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 39 Number of extractions required, among all dentate older adults, by population group (adjusted mean ratio and mean difference) (actual)**

Group of interest	Reference group	Adjustment variables	Mean ratio	Mean difference
Residential care	Home-based	Age group, Sex, Ethnicity	1.6*	0.4*

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Mean ratio</i>	<i>Mean difference</i>
Men	Women	Age group	1.4*	0.3*
Māori	Non-Māori	Age group, Sex	1.4	0.3
Pacific	Non-Pacific	Age group, Sex	3.3*	2.0*
Asian	Non-Asian	Age group, Sex	1.1	0.1
Age 85+	Age <85	Sex, Ethnicity	1.5*	0.3*
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.2	0.1
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.8	-0.2
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.7	-0.3

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Dentate older adults in residential care required 1.6 times as many teeth extracted than dentate older adults living in their own home.

Dentate older men required 1.4 times as many teeth extracted than dentate older women.

Dentate Pacific older adults required 3.3 times as many teeth extracted than dentate non-Pacific older adults.

Dentate older adults aged 85 years and over required 1.5 times as many teeth extracted than dentate older adults aged 65–84 years.

There were no significant differences in the mean number of teeth requiring extraction among all dentate older adults by SES, previous dental visit or dependency level, or between Māori and non-Māori, or Asian and non-Asian older adults.

### **Prevalence of having conditions requiring referrals for urgent treatment for pain and infection**

The study protocol required examining dentists to immediately refer older adults for care if they were found to have any potentially life-threatening conditions, including a suspected malignant or pre-cancerous lesion, signs of systemic infection or a spreading local infection and other life-threatening conditions.

Seventeen older adults were referred to their domicile DHB for a consultation regarding a suspected malignant or pre-cancerous lesion, of which none required further investigation or treatment. There were no cases referred for acute pain or infection of any nature, or for any other reason.

## **Part 4: Tooth replacement**

The loss of teeth and their subsequent replacement with prosthetic substitutes have long been a feature of human existence. During the last century, New Zealand had the

unenviable reputation of leading the world in the prevalence of edentulism, but this is now rapidly changing. The decline in edentulism among older New Zealanders is encouraging, but continued tooth loss over time due to decay remains highly prevalent (Thomson 2012).

Most people with missing teeth opt to have their teeth replaced in some form. For edentulous individuals, full upper and lower dentures (complete dentures) were the most preferred replacement option. In some cases, one or both dentures (but usually the lower one) were implant-supported (Al-Zubeidi et al 2012), although the prevalence of implant-supported dentures remains very low at present. Other people may be edentulous in one arch (usually the upper) but not the other; such individuals will usually be wearing a full denture in the edentulous arch. Individuals with teeth missing from an arch may have had one or more of those teeth replaced with either a bridge, a partial denture or an implant-retained crown.

#### **How was this measured?**

In the 2012 OPOHS, data to determine the prevalence of wearing full dentures (upper or lower or both) or partial dentures (upper or lower or both) were derived from data collected in the dental examination. Older adults were recorded as wearing dentures only if they were wearing them at the time of the dental examination. If older adults indicated at the time of the clinical dental examination that they only wore their dentures occasionally, they were recorded as not wearing dentures. To determine the prevalence of full denture wearing in the study population, the prevalence of wearing only a full upper denture or only a full lower denture was measured among both dentate and edentulous older adults. The prevalence of wearing both full upper and full lower dentures (that is, complete dentures) among edentulous older adults is also reported here.

#### **Full denture wearing**

The pattern of full denture wearing in the population varies. People who wear either a full upper or a full lower denture may still have some of their own natural teeth present in the opposing arch; alternatively, if they are edentulous, they may wear only a full upper denture or only a full lower denture or they may wear both.

#### **How was this measured?**

To determine the prevalence of full denture wearing in the study population, the prevalence of wearing only a full upper denture or only a full lower denture was measured among both dentate and edentulous older adults. The prevalence of wearing both full upper and full lower dentures (that is, complete dentures) among edentulous older adults is also reported here. Older adults were recorded as wearing dentures only if they were wearing them at the time of the dental examination. People who indicated that they wore their dentures only occasionally were recorded as not wearing dentures.



## Prevalence of wearing full upper dentures among all dentate older adults

A quarter of all dentate older adults (regardless of residential location) wore a full upper denture (RC, 23.8%; HB, 24.6). Table 40 presents the prevalence of wearing a full upper denture among dentate older adults, by population group.

**Table 40** Prevalence of wearing a full upper denture among all dentate older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
<i>All</i>		23.8	19.1	28.4	24.6	19.9	29.2
<i>Sex</i>	<i>Women</i>	26.1	20.2	32.0	25.1	19.8	30.4
	<i>Men</i>	19.6	11.5	27.7	23.8	15.7	31.9
<i>Age group</i>	<i>65–74</i>	4.9	0.0	10.5	20.3	11.8	28.7
	<i>75–84</i>	23.4	16.3	30.4	19.9	13.6	26.2
	<i>85+</i>	29.4	22.7	36.0	31.1	25.0	37.1
<i>Ethnic group</i>	<i>Māori</i>	28.5	3.1	53.8	25.0	9.0	41.0
	<i>Pacific</i>	.	.	.	9.1	0.6	17.6
	<i>Asian</i>	10.6	0.0	24.3	12.1	0.0	25.3
	<i>Other</i>	25.0	20.2	29.8	26.4	21.2	31.6
<i>NZSEI</i>	<i>1 (least deprived)</i>	23.4	13.0	33.8	19.6	13.2	26.1
	<i>2</i>	26.7	17.1	36.4	25.5	17.7	33.3
	<i>3</i>	22.0	9.1	34.9	30.0	14.3	45.7
	<i>4</i>	26.0	15.8	36.1	26.5	17.2	35.8
	<i>5 (most deprived)</i>	17.8	5.7	29.9	29.3	13.4	45.2
<i>Dependency status</i>	<i>Nursing home</i>	32.4	24.7	40.0	.	.	.
	<i>Psychogeriatric/Dementia</i>	20.7	11.1	30.2	.	.	.
	<i>Hospital care</i>	17.2	10.8	23.5	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

## Comparisons by population group

Table 41 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 41 Wearing a full upper denture among all dentate older adults, by population group (adjusted rate ratio and rate difference)**

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Residential care	Home-based	Age group, Sex, Ethnicity	0.9	-2.1
Men	Women	Age group	0.9	-2.7
Māori	Non-Māori	Age group, Sex	1.2	5.2
Pacific	Non-Pacific	Age group, Sex	0.3*	-17.0*
Asian	Non-Asian	Age group, Sex	0.5	-12.0*
Age 85+	Age <85	Sex, Ethnicity	1.5*	9.3*
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.2	4.4
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.6*	-13.3*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.9	-3.5

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Dentate Pacific older adults were a third as likely as dentate non-Pacific older adults to wear a full upper denture.

Dentate people aged over 85 years were 1.5 times as likely as those aged 65–84 years who were dentate to wear a full upper denture.

Dentate older adults who had visited a dental professional in the previous year were just over half as likely as those who had not visited a dental professional in the previous year to wear a full denture.

There were no significant differences in the prevalence of wearing a full upper denture among all dentate older adults by residential location, sex, SES or dependency level, or between Māori and non-Māori, or Asian and non-Asian older adults.

### **Prevalence of wearing a full lower denture among all dentate older adults**

The proportion of dentate older adults who wore a full lower denture, was less than 1.6% (RC, 0.2%; HB, 1.6%). Given the low proportion of dentate older adults who wore only a full lower denture, further data are not presented here. Data may be found in the supplementary tables in Appendix A.

### **Prevalence of wearing only a full upper denture among edentulous older adults**

The prevalence of wearing only a full upper denture among edentulous older adults was 11.4% for people living in residential care and 9.2% for those people living in their own home. Table 42 presents the prevalence of wearing only a full upper denture among edentulous older adults, by population group.

**Table 42 Prevalence of wearing only a full upper denture among all edentulous older adults, by population group (unadjusted prevalence)**

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All		11.4	8.2	14.6	9.2	6.4	12.0
Sex	Women	9.8	6.4	13.2	7.7	4.7	10.6
	Men	16.0	8.5	23.5	13.1	7.0	19.2
Age group	65–74	10.3	0.0	22.7	14.2	7.5	21.0
	75–84	13.9	8.8	18.9	12.5	6.7	18.3
	85+	9.8	5.7	13.9	5.4	2.2	8.7
Ethnic group	Māori	14.2	4.3	24.0	23.6	10.4	36.8
	Pacific	13.7	0.0	31.6	.	.	.
	Asian	10.7	0.0	31.4	7.5	0.0	21.3
	Other	11.2	8.0	14.5	8.6	6.0	11.2
NZSEI	1 (least deprived)	15.2	7.2	23.3	10.1	1.7	18.5
	2	10.9	3.8	18.0	7.1	2.5	11.7
	3	8.1	2.0	14.1	7.0	0.6	13.3
	4	10.4	3.2	17.6	12.2	5.9	18.4
	5 (most deprived)	13.6	7.3	20.0	11.6	3.2	20.0
Dependency status	Nursing home	9.7	5.0	14.3	.	.	.
	Psychogeriatric/Dementia	20.2	8.8	31.6	.	.	.
	Hospital care	10.6	6.0	15.2	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 43 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 43 Wearing only a full upper denture among all edentulous older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	1.3	2.5
Men	Women	Age group	1.6*	5.0*
Māori	Non-Māori	Age group, Sex	1.7	6.9
Pacific	Non-Pacific	Age group, Sex	0.4	-6.8*

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Asian	Non-Asian	Age group, Sex	0.7	-2.7
Age 85+	Age <85	Sex, Ethnicity	0.7*	-4.4*
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.9	-1.1
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.0	0.5
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.8*	8.6

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Edentulous older men were 1.6 times as likely as edentulous older women to wear only a full upper denture.

Edentulous older adults aged over 85 years were 0.7 times as likely as younger edentulous older adults to wear only a full upper denture.

The most dependent edentulous older adults were almost twice as likely to wear only a full upper denture than their more independent peers.

There were no significant differences in the prevalence of wearing only a full upper denture among all edentulous older adults by residential location, ethnicity, SES, or previous dental visit.

### **Prevalence of wearing only a full lower denture among all edentulous older adults**

The proportion of edentulous older adults (regardless of residential location) living in either residential location who wore only a full lower denture, among all population groups, was 0.2%. Given the low proportion of dentate older adults who wore only a full lower denture, further data are not presented here. Data may be found in the supplementary tables in Appendix A.

### **Prevalence of wearing both upper and lower full dentures**

#### **How was this measured?**

In the 2012 OPOHS, data for determining the prevalence of wearing both full upper and lower dentures among edentulous older adults (that is, those who have no natural teeth remaining) was derived from data collected in the dental examination. Older adults were recorded as wearing dentures only if they were wearing them at the time of the dental examination. People who indicated that they wore their dentures only occasionally were recorded as not wearing dentures.

Three in four (73.9%) edentulous older adults living in residential care, and nine in ten (86.9%) older adults living in their own homes, wore both full upper and lower dentures.

Table 44 presents the prevalence of wearing full upper and lower dentures among all edentulous older adults, by population group.

**Table 44** Prevalence of wearing a full upper and lower denture among all edentulous older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All		73.9	69.5	78.2	86.9	83.7	90.2
Sex	Women	76.9	72.1	81.6	89.8	86.8	92.9
	Men	64.8	55.4	74.2	79.8	72.1	87.5
Age group	65–74	57.6	37.7	77.5	73.6	65.0	82.2
	75–84	69.1	61.7	76.4	82.7	75.6	89.8
	85+	79.4	74.3	84.4	94.1	90.5	97.7
Ethnic group	Māori	54.7	36.7	72.7	49.9	32.8	67.0
	Pacific	28.9	12.4	45.4	79.6	69.4	89.8
	Asian	54.1	13.2	95.1	84.9	57.3	100.0
	Other	75.3	71.0	79.5	89.8	87.0	92.6
NZSEI	1 (least deprived)	65.9	54.6	77.2	85.1	76.5	93.6
	2	79.4	70.8	88.1	89.8	84.5	95.1
	3	80.8	71.2	90.3	92.2	85.3	99.0
	4	82.2	73.2	91.3	82.5	75.1	90.0
	5 (most deprived)	59.8	51.1	68.6	82.3	73.5	91.2
Dependency status	Nursing home	83.5	78.5	88.5	.	.	.
	Psychogeriatric/Dementia	46.6	33.8	59.3	.	.	.
	Hospital care	70.3	63.4	77.2	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 45 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 45** Wearing a full upper and lower denture among all edentulous older adults, by population group (adjusted rate ratio and rate difference)

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.8*	-15.7*

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Men	Women	Age group	0.9*	-8.4*
Māori	Non-Māori	Age group, Sex	0.7*	-21.3*
Pacific	Non-Pacific	Age group, Sex	0.9	-10.4
Asian	Non-Asian	Age group, Sex	1.0	-1.8
Age 85+	Age <85	Sex, Ethnicity	1.1*	9.9*
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.1	5.0
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.1	5.1
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.6*	-29.1*

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Edentulous older adults living in residential care were significantly less likely than those living in their own homes to wear full upper and lower dentures.

Edentulous older men were significantly less likely than edentulous older women to wear full upper and lower dentures.

Older Māori who were edentulous were significantly less likely than older non-Māori who were edentulous to wear a full upper and lower denture.

Edentulous older adults aged over 85 years were significantly more likely than those aged 65–74 years to wear full upper and lower dentures.

The most dependent edentulous older adults were just over half as likely to wear full upper and lower dentures as the more independent edentulous older adults.

There were no significant differences in the prevalence of wearing full upper and lower dentures among all edentulous older adults by SES or previous dental visit, or between Pacific and non-Pacific, or Asian and non-Asian.

## Prevalence of partial upper dentures

### How was this measured?

In the 2012 OPOHS, data for determining the prevalence of wearing partial upper dentures or partial lower dentures or both among dentate older adults was derived from data collected in the dental examination. Older adults were recorded as wearing dentures only if they were wearing them at the time of the clinical dental examination. If older adults indicated they only wore their dentures occasionally, they were recorded as not wearing dentures.

The prevalence of wearing a partial upper denture among dentate older adults living in residential care was 13.0%. For dentate older adults living in their own homes, the prevalence of wearing a partial denture was 18.6%. Table 46 presents the prevalence of wearing a partial upper denture, by population group.

**Table 46** Prevalence of wearing a partial upper denture among all dentate older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All		13.0	9.4	16.6	18.6	14.3	22.8
Sex	Women	14.1	9.9	18.4	21.5	15.0	28.0
	Men	10.9	5.0	16.9	14.3	9.9	18.7
Age group	65–74	3.6	0.0	9.2	4.0	1.3	6.8
	75–84	12.9	7.5	18.3	18.0	12.0	24.0
	85+	15.7	10.4	21.1	24.8	18.2	31.4
Ethnic group	Māori	6.0	0.0	12.6	14.3	3.3	25.3
	Pacific	8.9	0.0	18.8	9.1	2.5	15.7
	Asian	6.1	0.0	18.1	14.4	0.0	32.0
	Other	13.6	9.9	17.4	19.6	14.6	24.6
NZSEI	1 (least deprived)	17.5	9.3	25.8	20.1	11.3	28.9
	2	14.8	7.9	21.7	23.7	14.9	32.5
	3	3.5	0.0	9.2	15.9	1.9	30.0
	4	15.8	5.8	25.7	10.0	2.5	17.5
	5 (most deprived)	9.6	2.1	17.1	16.5	6.1	27.0
Dependency status	Nursing home	15.3	9.5	21.1	.	.	.
	Psychogeriatric/Dementia	8.0	1.9	14.1	.	.	.
	Hospital care	13.2	7.8	18.7	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

## Comparisons by population group

Table 47 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 47 Wearing a partial upper denture among all dentate older adults, by population group (adjusted rate ratio and rate difference)**

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Residential care	Home-based	Age group, Sex, Ethnicity	0.7*	-6.6*
Men	Women	Age group	0.8	-3.8
Māori	Non-Māori	Age group, Sex	0.8	-2.7
Pacific	Non-Pacific	Age group, Sex	0.9	-2.1
Asian	Non-Asian	Age group, Sex	0.8	-3.4
Age 85+	Age <85	Sex, Ethnicity	1.5*	6.4*
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.9	-1.7
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.4	4.9
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.6	-6.0

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Dentate older adults living in residential care were 0.7 times as likely to wear a partial upper denture as their peers living in their own homes.

Dentate older people aged over 85 years were 1.5 times as likely to wear a partial upper denture as those aged 65–84 years.

There were no significant differences in the prevalence of wearing a partial upper denture among all dentate older adults by sex, ethnicity, SES, dental visit in the previous year, or dependency level.

## Prevalence of partial lower dentures

The prevalence of wearing a partial lower denture among dentate older adults living in residential care was 7.7%. For dentate older adults living in their own homes the prevalence of wearing a partial lower denture was 11.6%. Table 48 presents the prevalence of wearing a partial lower denture, by population group.



**Table 48 Prevalence of wearing a partial lower denture among all dentate older adults, by population group (unadjusted prevalence)**

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All		7.7	5.2	10.2	11.6	8.2	14.9
Sex	Women	6.6	3.5	9.7	10.3	6.0	14.5
	Men	9.6	4.6	14.6	13.5	9.4	17.6
Age group	65–74	5.5	0.0	11.9	5.0	1.4	8.6
	75–84	5.8	2.3	9.2	8.7	3.4	14.0
	85+	9.8	5.7	14.0	17.1	12.7	21.5
Ethnic group	Māori	16.2	0.0	39.6	16.2	1.0	31.4
	Pacific	7.0	0.0	16.4	5.6	0.0	11.6
	Asian	16.7	0.0	33.9	16.2	3.3	29.1
	Other	7.0	4.5	9.6	11.3	7.6	15.1
NZSEI	1 (least deprived)	11.3	5.0	17.6	13.9	5.0	22.8
	2	6.6	1.5	11.6	14.3	7.6	21.0
	3	5.9	0.0	12.3	12.6	2.0	23.2
	4	2.6	0.0	6.3	7.9	2.2	13.6
	5 (most deprived)	13.4	5.0	21.8	3.7	0.0	8.7
Dependency status	Nursing home	7.7	3.1	12.4	.	.	.
	Psychogeriatric/Dementia	8.1	2.2	14.1	.	.	.
	Hospital care	7.4	3.9	10.8	.	.	.

Source: 2012 Older People’s Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 49 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 49 Wearing a partial lower denture among all dentate older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.7	-3.8
Men	Women	Age group	1.5	4.1
Māori	Non-Māori	Age group, Sex	2.0	9.5
Pacific	Non-Pacific	Age group, Sex	0.9	-1.2

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Asian	Non-Asian	Age group, Sex	1.9	7.8
Age 85+	Age <85	Sex, Ethnicity	2.1*	7.2*
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.8	-2.2
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.0	0.4
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.1	0.5

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Dentate older adults aged over 85 years were just over twice as likely to wear a partial lower denture as those aged 65–84.

There were no significant differences in the prevalence of wearing a partial lower denture among all dentate older adults by any other group of interest.

### Prevalence of bridges

#### How was this measured?

In the 2012 OPOHS, data for determining the proportion of older adults who had a bridge to replace missing teeth were derived from data collected in the dental examination.

The proportion of dentate older adults (regardless of residential location) who had a bridge to replace a missing tooth or teeth was less than 5.1% (RC, 3.1%; HB, 5.1%). Given the low prevalence of having a bridge to replace a missing tooth or teeth, further data are not presented here. Data may be found in the supplementary tables in Appendix A.

### Prevalence of implants

#### How was this measured?

In the 2012 OPOHS, data for determining the proportion of older adults who had an implant to replace missing teeth were derived from data collected in the dental examination.

Fewer than 1% of older adults (regardless of residential location) were recorded as having an implant (RC, 0.3%; HB, 0.5%). Given the low prevalence of having an implant, further data are not presented here. Data may be found in the supplementary tables in Appendix A.

## Part 5: Oral hygiene status

Good oral hygiene is fundamental to the prevention of oral disease, whether people are dentate or edentulous. Regular brushing and flossing of teeth removes plaque, the sticky soft layer (a bacterial biofilm) that forms on teeth every day. If left to build up, plaque can cause tooth decay and periodontal disease. Bacteria in plaque react with (metabolise) sugar consumed in the daily diet to produce an acid that dissolves the minerals in teeth, and over time this can cause cavities (holes). Bacteria in plaque also produce substances that can cause destructive inflammation in the periodontal tissues surrounding the teeth. Removing plaque assists in preventing dental decay and gum disease. Plaque can also build up on dentures, and if not removed regularly may cause fungal infections of the mouth. Poor oral hygiene and oral health are also risk factors for the occurrence of aspiration pneumonia, a lung infection caused by the inhalation of oral debris.

Older adults in residential care are particularly at risk of aspiration pneumonia due to their age, lack of mobility and prevalence of chronic health conditions (Mylotte et al 2003). Measuring the build-up of plaque on the teeth or dentures indicates how well teeth or dentures are cleaned. It is also a predictor of a person's risk of developing oral disease. In the 2012 OPOHS, oral hygiene status was assessed on six index teeth using modifications of the Simplified Oral Hygiene Index (Greene and Vermillion 1964), which uses a four-category ordinal scale (where 0 = no debris detectable; 1 = soft debris covering no more than the cervical one-third of the tooth surface (the one-third of the tooth surface closest to the gum) or extrinsic stains without other debris regardless of surface area covered; 2 = soft debris covering more than one-third but no more than two-thirds of the exposed tooth surface; and 3 = soft debris covering more than two-thirds of the exposed tooth surface).

The prevalence of heavy plaque was reported as the proportion of examined dentate individuals with a score of 2 or 3 on at least one tooth surface. Calculus was determined and represented in much the same way, with supragingival calculus (calculus above gum level) scoring a '1', and individual flecks of subgingival calculus (calculus below gum level) scoring a '2', and a continuous heavy band of subgingival calculus around the tooth's cervical portion scoring '3'.

### How was this measured?

In the 2012 OPOHS, data for the need for oral hygiene status was derived from the dental examination. Examining dentists recorded the amount of plaque and calculus present on teeth. Older adults who had plaque or calculus covering more than one-third of the tooth surface were considered to have heavy plaque or calculus deposits on their teeth.

### Prevalence of having heavy plaque on teeth

One in three dentate older adults living in residential care and one in five dentate older adults living in their own homes had heavy plaque on their teeth (RC, 35.8%; HB, 20.5%). Table 50 presents the prevalence of having heavy plaque on the teeth among dentate older adults, by population group.

**Table 50 Prevalence of having heavy plaque on the teeth among all dentate older adults, by population group (unadjusted prevalence)**

Population Subgroup	Setting					
	Residential Care			Home-Based		
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All	35.8	30.1	41.5	20.5	12.1	28.9
Sex						
Women	32.1	24.8	39.4	16.9	9.1	24.7
Men	42.6	33.6	51.6	25.8	15.4	36.2
Age group						
65–74	40.5	25.7	55.2	24.4	13.3	35.5
75–84	33.6	26.3	40.9	19.7	10.8	28.7
85+	36.3	28.0	44.7	19.9	9.6	30.1
Ethnic group						
Māori	43.2	23.5	62.8	18.5	8.6	28.3
Pacific	38.9	20.4	57.5	32.7	8.8	56.6
Asian	39.2	13.8	64.6	27.9	8.4	47.4
Other	35.4	29.6	41.2	19.4	10.4	28.4
NZSEI						
1 (least deprived)	36.3	26.6	46.1	16.3	7.0	25.5
2	25.3	15.5	35.1	21.6	13.5	29.7
3	39.3	23.5	55.1	19.6	3.5	35.6
4	42.9	30.5	55.4	24.7	9.6	39.8
5 (most deprived)	37.9	23.5	52.3	21.7	4.3	39.0
Dependency status						
Nursing home	28.9	20.2	37.5	.	.	.
Psychogeriatric/Dementia	45.6	32.2	59.0	.	.	.
Hospital care	37.8	30.3	45.2	.	.	.

Source: 2012 Older People’s Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 51 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 51 Having heavy plaque on the teeth among all dentate older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	1.8*	16.1*
Men	Women	Age group	1.3*	8.8*
Māori	Non-Māori	Age group, Sex	0.9	-1.9
Pacific	Non-Pacific	Age group, Sex	1.2	5.9

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Asian	Non-Asian	Age group, Sex	1.1	2.7
Age 85+	Age <85	Sex, Ethnicity	1.1	2.2
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.0	0.6
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.8	-6.3
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.4	12.0

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Dentate older people living in residential care were almost twice as likely as those living in their own homes to have heavy plaque on their teeth.

Dentate older men were 1.3 times as likely as older women to have heavy plaque on their teeth.

There were no significant differences in the prevalence of heavy plaque on the teeth among all dentate older adults by age, ethnicity, SES, dental visit in the previous year, or dependency level.

### Prevalence of having heavy calculus on teeth

One in five dentate older adults living in residential care and one in seven dentate older adults living in their own homes had heavy calculus on their teeth (RC, 20.8%; HB, 13.8%). Table 52 presents the prevalence of having heavy calculus on the teeth among dentate older adults, by population group.

**Table 52** Prevalence of having heavy calculus on the teeth among all dentate older adults, by population group (unadjusted prevalence)

<i>Population Subgroup</i>		<i>Setting</i>					
		<i>Residential Care</i>			<i>Home-Based</i>		
		<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>	<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>
<i>All</i>		20.8	15.8	25.7	13.8	9.4	18.1
<i>Sex</i>	<i>Women</i>	20.3	13.9	26.8	12.7	7.3	18.1
	<i>Men</i>	21.6	14.8	28.3	15.3	9.3	21.3
<i>Age group</i>	<i>65–74</i>	30.9	17.2	44.6	18.7	8.3	29.2
	<i>75–84</i>	20.2	13.7	26.6	12.7	7.6	17.9
	<i>85+</i>	18.5	11.9	25.0	12.9	7.6	18.2

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
Ethnic group	Māori	25.4	10.1	40.8	13.0	2.1	23.8
	Pacific	35.5	17.1	53.9	34.4	10.3	58.6
	Asian	13.4	0.0	28.5	23.6	9.0	38.3
	Other	20.6	15.4	25.9	11.8	7.2	16.5
NZSEI	1 (least deprived)	15.9	8.7	23.1	14.1	5.5	22.7
	2	14.3	7.4	21.3	13.0	7.3	18.8
	3	25.2	9.4	41.0	13.1	2.8	23.4
	4	30.5	18.2	42.8	13.6	5.8	21.4
	5 (most deprived)	24.7	12.4	36.9	13.5	4.5	22.6
Dependency status	Nursing home	20.2	11.2	29.2	.	.	.
	Psychogeriatric/Dementia	26.8	16.1	37.5	.	.	.
	Hospital care	18.5	12.2	24.8	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 53 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 53 Having heavy calculus on the teeth among all dentate older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	1.6*	7.8*
Men	Women	Age group	1.1	0.9
Māori	Non-Māori	Age group, Sex	0.9	-0.9
Pacific	Non-Pacific	Age group, Sex	1.9*	14.7*
Asian	Non-Asian	Age group, Sex	1.0	0.7
Age 85+	Age <85	Sex, Ethnicity	0.9	-1.6
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.1	1.5
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.6*	-9.2*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.4	7.1

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Dentate older adults living in residential care were 1.6 times as likely as dentate older adults living in their homes to have heavy calculus on their teeth.

Dentate Pacific older adults were almost twice as likely as dentate non-Pacific older adults to have heavy calculus covering their teeth.

Dentate older adults who had visited a dental professional in the previous year were just over half as likely as those who had not had a dental visit to have heavy calculus on their teeth.

There were no significant differences in the prevalence of having heavy calculus on the teeth among all dentate older adults by sex, age, SES or dependency level, or between Māori and non-Māori, or Asian and non-Asian older adults.

### Prevalence of having staining or calculus on dentures

#### How was this measured?

In the 2012 OPOHS, data on denture hygiene status among older adults who wore either full or partial dentures were collected from the dental examination. Examining dentists recorded the amount of staining or calculus present on partial and full dentures. Those older adults who had staining or calculus covering more than one-third of the denture surface were considered to have staining or calculus on their denture.

The prevalence of having staining or calculus on dentures was 21.1% for older adults living in residential care and 17.7% for older adults living in their own homes. Table 54 presents the prevalence of having staining or calculus on dentures among dentate older adults, by population group.

**Table 54** Prevalence of having staining or calculus on dentures among all older adults with full or partial dentures, by population group (unadjusted prevalence)

<i>Population Subgroup</i>		<i>Setting</i>					
		<i>Residential Care</i>			<i>Home-Based</i>		
		<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>	<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>
<i>All</i>		21.1	15.2	26.9	17.7	11.3	24.1
<i>Sex</i>	<i>Women</i>	21.7	14.4	29.0	15.9	10.1	21.7
	<i>Men</i>	19.6	8.9	30.3	20.6	11.5	29.7
<i>Age group</i>	<i>65–74</i>	.	.	.	21.3	8.6	34.0
	<i>75–84</i>	18.3	9.8	26.7	20.4	12.5	28.4
	<i>85+</i>	24.9	16.7	33.0	14.6	6.1	23.1

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
Ethnic group	Māori	8.3	0.0	20.0	21.2	1.7	40.7
	Pacific	.	.	.	53.0	22.5	83.5
	Asian	16.6	0.0	48.6	30.2	0.3	60.0
	Other	21.6	15.5	27.7	16.2	9.8	22.7
NZSEI	1 (least deprived)	17.0	5.3	28.8	13.1	5.0	21.3
	2	19.2	6.9	31.6	15.9	7.6	24.2
	3	23.1	3.2	43.1	32.4	1.7	63.0
	4	26.7	11.3	42.2	10.3	1.4	19.2
	5 (most deprived)	9.8	0.0	20.4	25.5	14.9	36.2
Dependency status	Nursing home	21.1	12.5	29.8	.	.	.
	Psychogeriatric/Dementia	25.8	8.1	43.4	.	.	.
	Hospital care	18.5	9.7	27.4	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 55 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 55 Having staining or calculus on dentures among all older adults with full or partial dentures, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	1.2	3.3
Men	Women	Age group	1.1	1.3
Māori	Non-Māori	Age group, Sex	0.9	-1.5
Pacific	Non-Pacific	Age group, Sex	2.1	20.8
Asian	Non-Asian	Age group, Sex	1.3	5.3
Age 85+	Age <85	Sex, Ethnicity	1.1	2.1
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.1	1.1
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.7	-5.9
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.3	6.1

Source: 2012 Older People's Oral Health Survey



There were no significant differences for the prevalence of staining on dentures among all older adults with dentures for any group of interest.

## **Part 6: Condition of supporting structures**

The teeth sit in bony sockets within each jaw and are connected to the jaw bone by a periodontal ligament, which, in turn, is protected by the gums (gingiva). Two common types of periodontal disease occur: gingivitis and chronic periodontitis. The underlying cause of both gingivitis and chronic periodontitis is bacteria in dental plaque (the sticky film that accumulates on teeth). The more plaque accumulates (typically due to infrequent or ineffective oral hygiene), the greater the risk of both conditions. However, aspects of general health (such as smoking and diabetes) also increase the risk and severity of chronic periodontitis.

Gingivitis (inflammation of the gums) occurs in response to the bacteria in the dental plaque that accumulates around the necks of the teeth, near the gum line. It is a painless condition, characterised by redness, swelling or bleeding of the gums. Chronic periodontitis is also caused by bacteria and occurs when inflammation of the gums involves the supporting tissues, leading to progressive loss of the ligament and bone that support the teeth (in its severe forms, the teeth may become loose and even be lost). The loss of supporting bone can result in the formation of 'pockets' between the gum and the tooth. The depth of the pocket, measured in millimetres using a periodontal probe, is an indication of the severity of the destructive process.

In the 2012 OPOHS, to reduce participant burden, the Community Periodontal Index (CPI) (Ainamo et al 1982), was chosen to assess periodontal disease rather than measuring pocket depths on each tooth (as in the 2009 NZOHS). This was a major consideration, given the frailty and vulnerability of the study population, as well as the challenges presented by the examination conditions. In the 2012 OPOHS, the older adults who were examined, were assessed for periodontal disease, providing that they had no medical conditions that precluded measurements being made. Overall, 65.9% of older adults living in residential care and 72.8% of older adults living in their own homes were medically eligible for a periodontal assessment.

This report presents data on the progressive loss of supporting structures of the teeth, as represented by two measures:

- Prevalence of any periodontal pocketing (CPI score 3 and 4)
- Prevalence of deep pocketing (CPI score 4).

### How was this measured?

In the 2012 OPOHS, older adults were assessed for periodontal disease using the Community Periodontal Index (CPI) (Ainamo et al 1982). Three indicators of periodontal diseases are recorded in the CPI: gingival bleeding, calculus and periodontal pocketing (with two ordinal categories of severity). A special probe is used with a 0.5mm ball-tip, a black band between 3.5mm and 5.5mm, and lines at 8.5mm and 11.5mm. The mouth is divided into sextants. Index teeth in each sextant are probed and the worst score for each index tooth is coded according to the following hierarchy: healthy (scoring 0); bleeding (1); calculus (2); 4–5mm pocket (3); and 6+mm pocket (4). Dentate older adults were assessed for periodontal pocketing providing that they had no medical conditions that precluded measurements being made of the gums. A CPI score of 3 or 4 indicates periodontal pocketing; a CPI score of 4 indicates deep periodontal pocketing.

### Prevalence of any periodontal pocketing (CPI score of 3 or 4)

The prevalence of periodontal pocketing in dentate older adults living in residential care was 11.2%, and 20.8% for those living in their own homes. Table 56 presents the prevalence of periodontal pocketing, by population group.

**Table 56** Prevalence of any periodontal pocketing (CPI score 3 or 4), among all dentate older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
<i>All</i>		11.2	7.9	14.5	20.8	15.7	25.8
<i>Sex</i>	<i>Women</i>	11.8	7.5	16.2	18.0	12.7	23.2
	<i>Men</i>	10.0	5.1	14.8	24.8	18.2	31.4
<i>Age group</i>	<i>65–74</i>	14.1	4.1	24.1	31.0	19.9	42.1
	<i>75–84</i>	10.5	5.2	15.9	22.8	15.9	29.8
	<i>85+</i>	10.9	6.0	15.7	14.7	7.4	21.9
<i>Ethnic group</i>	<i>Māori</i>	13.1	0.0	30.1	20.4	2.0	38.9
	<i>Pacific</i>	12.7	1.8	23.6	48.2	33.2	63.1
	<i>Asian</i>	11.9	0.0	28.2	18.4	5.0	31.9
	<i>Other</i>	11.0	7.5	14.6	19.3	13.5	25.2
<i>NZSEI</i>	<i>1 (least deprived)</i>	10.1	4.5	15.8	15.4	11.1	19.8
	<i>2</i>	13.5	6.4	20.6	20.5	12.0	28.9
	<i>3</i>	7.8	0.0	16.5	23.3	10.6	36.0
	<i>4</i>	14.7	6.3	23.2	18.8	10.8	26.8
	<i>5 (most deprived)</i>	5.7	0.5	11.0	29.8	22.1	37.6

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI	
Dependency status	Nursing home	13.6	7.7	19.6	.	.	.
	Psychogeriatric/Dementia	10.0	2.8	17.1	.	.	.
	Hospital care	9.4	4.7	14.1	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 57 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 57 Any periodontal pocketing (CPI score 3 or 4) among all dentate older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.6*	-8.8*
Men	Women	Age group	1.1	2.2
Māori	Non-Māori	Age group, Sex	1.0	0.7
Pacific	Non-Pacific	Age group, Sex	2.1*	16.2*
Asian	Non-Asian	Age group, Sex	0.9	-1.6
Age 85+	Age <85	Sex, Ethnicity	0.7	-4.6
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.2	2.6
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.8*	9.4*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.9	-1.6

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Dentate older people living in residential care were just over half as likely to have periodontal pocketing as those living in their own home, and dentate Pacific older adults were just over twice as likely as dentate non-Pacific older adults to have periodontal pocketing.

Dentate older adults who visited a dental professional in the previous 12 months were 1.8 times as likely to have periodontal pocketing as those who had not made a visit in the previous year.

There were no significant differences in the prevalence of periodontal pocketing among all dentate older adults by sex, age, SES, or dependency level, or between Māori and non-Māori, or Asian and non-Asian older adults.

## Prevalence of deep periodontal pocketing (CPI score 4)

Fewer than 3% of dentate older adults (regardless of residential location) had deep periodontal pocketing (RC, 2.1%; HB, 3.0%). Table 58 presents the prevalence of periodontal pocketing, by population group.

**Table 58** Prevalence of deep periodontal pocketing (CPI score 4), among all dentate older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
<i>All</i>		2.1	0.6	3.5	3.0	1.3	4.7
<i>Sex</i>	<i>Women</i>	2.3	0.3	4.2	2.9	0.8	5.1
	<i>Men</i>	1.6	0.0	3.6	3.2	0.9	5.4
<i>Age group</i>	<i>65–74</i>	0.8	0.0	2.0	5.5	0.9	10.1
	<i>75–84</i>	1.5	0.0	3.4	3.2	1.1	5.3
	<i>85+</i>	2.9	0.3	5.5	1.9	0.0	4.1
<i>Ethnic group</i>	<i>Māori</i>	.	.	.	2.0	0.0	5.7
	<i>Pacific</i>	7.2	0.0	15.7	21.6	8.9	34.4
	<i>Asian</i>	.	.	.	5.2	0.0	15.7
	<i>Other</i>	2.1	0.5	3.6	1.8	0.3	3.3
<i>NZSEI</i>	<i>1 (least deprived)</i>	2.7	0.0	5.9	0.3	0.0	0.9
	<i>2</i>	.	.	.	3.2	0.1	6.4
	<i>3</i>	.	.	.	3.0	0.0	6.7
	<i>4</i>	6.9	0.3	13.4	5.7	0.0	11.8
	<i>5 (most deprived)</i>	0.3	0.0	0.7	5.8	0.0	12.4
<i>Dependency status</i>	<i>Nursing home</i>	3.9	0.6	7.2	.	.	.
	<i>Psychogeriatric/Dementia</i>	1.6	0.0	4.0	.	.	.
	<i>Hospital care</i>	0.5	0.0	1.4	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

## Comparisons by population group

Table 59 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 59 Deep periodontal pocketing (CPI score 4) among all dentate older adults, by population group (adjusted rate ratio and rate difference)**

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Residential care	Home-based	Age group, Sex, Ethnicity	0.8	-0.7
Men	Women	Age group	0.9	-0.2
Māori	Non-Māori	Age group, Sex	0.5	-1.2
Pacific	Non-Pacific	Age group, Sex	9.1*	16.0*
Asian	Non-Asian	Age group, Sex	1.1	0.3
Age 85+	Age <85	Sex, Ethnicity	1.3	0.6
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.9	1.4
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	2.1	1.9
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.9	-0.4

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Dentate Pacific older adults were nine times as likely to have deep periodontal pocketing as dentate non-Pacific older adults.

There were no significant differences for the prevalence of deep pocketing among all dentate older adults by any other group of interest.

## Part 7: Oral mucosal conditions

The soft tissues of the lips and mouth can be affected by a variety of lesions, ranging from the most innocent tissue aberrations to malignant tumours (oral cancer). A number of oral mucosal conditions can also be the first sign of particular systemic diseases.

In recent years, the health professions and public have been made more aware of the importance of oral mucosal pathology, largely due to the visibility given to the health effects of smoking, smokeless (or chewing) tobacco use, herpes simplex virus infections (cold sores), and human immunodeficiency virus (HIV/AIDS) infections, together with the health status of distinct populations such as older people (Kleinman et al 1991).

'Oral cancer' is a term used to describe cancers of the lip, tongue, salivary glands, mouth and all parts of the pharynx. Overall, oral cancer was the 12th most common cancer in New Zealand in 2007. New Zealand statistics showed that, in 2007, 222 men and 135 women were diagnosed with oral cancer, and 81 men and 42 women died as a result (Ministry of Health 2010b).

Tobacco use, particularly when combined with alcohol consumption, is the major risk factor for developing oral cancer, together with other factors including poor diet and vitamin deficiency, viral infections and genetic disposition (Beaglehole et al 2009). Smoking is associated with about 75% of oral cancer cases, and worldwide the

combination of tobacco use, heavy alcohol use and poor diet is responsible for 90% of all oral cancers (Beaglehole et al 2009; Burt and Eklund 2005). The risk for oral cancer is 15 times higher when the two main risk factors of tobacco use and alcohol are combined (Beaglehole et al 2009).

Two decades ago, a New Zealand study of an institutionalised older population showed that one-third had mucosal lesions, many of which were associated with denture wearing. The most common lesions observed were angular cheilitis (18%), traumatic ulcers (14%), atrophic glossitis (12%) and leukoplakia (8%). No malignant lesions were found (Thomson et al 1992).

With the exception of denture stomatitis, this section presents the prevalence of mucosal conditions among all older adults. The findings for denture stomatitis only relate to older adults who were wearing a denture or dentures, either partial or full, at the time of the dental examination.

### Prevalence of oral mucosal conditions

#### How was this measured?

In the 2012 OPOHS, dental examiners examined the lips and intra-oral mucosa of each participant (dentate and edentulous) for any of the following: suspected malignant tumours (oral cancer), ulcerated lesions (aphthous, herpetic, traumatic), any other oral mucosal lesions (including tongue piercings and lip piercings), or none of the above (i.e. healthy oral mucosa). If the dental examiner discovered a suspected malignancy, the participant was referred for further investigation to the relevant District Health Board.

One in four (25.4%) older adults living in residential care and one in three (31.4%) older adults living in their own homes had one or more oral mucosal conditions. Table 60 presents the prevalence of one or more oral mucosal conditions, by population group.

**Table 60** Prevalence of any oral mucosal condition among all older adults, by population group (unadjusted prevalence)

<i>Population Subgroup</i>		<i>Setting</i>					
		<i>Residential Care</i>			<i>Home-Based</i>		
		<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>	<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>
<i>All</i>		25.4	21.3	29.5	31.4	21.4	41.5
<i>Sex</i>	<i>Women</i>	25.0	20.4	29.6	31.5	20.5	42.5
	<i>Men</i>	26.4	20.9	31.9	31.3	21.8	40.8
<i>Age group</i>	<i>65–74</i>	20.3	8.8	31.8	38.6	24.5	52.7
	<i>75–84</i>	22.6	17.6	27.6	27.8	17.4	38.1
	<i>85+</i>	28.5	23.3	33.8	31.9	21.8	42.0

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
Ethnic group	Māori	22.9	9.8	35.9	32.9	21.3	44.6
	Pacific	12.9	3.9	21.9	20.6	0.0	41.5
	Asian	18.1	4.9	31.3	25.2	12.1	38.3
	Other	25.9	21.7	30.2	32.2	21.7	42.7
NZSEI	1 (least deprived)	25.8	18.6	33.1	29.6	11.1	48.0
	2	27.8	22.2	33.4	35.5	24.4	46.6
	3	14.7	8.0	21.5	20.8	14.1	27.5
	4	33.9	25.0	42.8	34.4	23.9	45.0
	5 (most deprived)	24.9	17.1	32.7	34.1	21.6	46.5
Dependency status	Nursing home	29.0	22.9	35.1	.	.	.
	Psychogeriatric/Dementia	26.1	17.1	35.1	.	.	.
	Hospital care	21.1	15.0	27.2	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 61 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 61 Having one or more oral mucosal conditions among all older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.8*	-6.3*
Men	Women	Age group	1.0	1.3
Māori	Non-Māori	Age group, Sex	1.1	1.5
Pacific	Non-Pacific	Age group, Sex	0.6	-10.8*
Asian	Non-Asian	Age group, Sex	0.8	-5.7
Age 85+	Age <85	Sex, Ethnicity	1.1	3.4
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.1	3.1
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.8*	-5.5*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.0	1.2

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Older adults living in residential care and older adults who had visited a dental professional in the previous 12 months were significantly less likely than those living in their own home and those who had not made a visit, to have an oral mucosal condition.

There were no significant differences in the prevalence of one or more oral mucosal conditions among all older adults by sex, ethnicity, age, SES or dependency level.

### Prevalence of oral ulcers

The prevalence of oral ulceration was 8.2% for older adults living in residential care and 11% for those older adults residing in their own homes. Table 62 presents the prevalence of oral ulceration by population group.

**Table 62** Prevalence of oral ulceration among all older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
<i>All</i>		8.2	5.9	10.4	11.0	7.7	14.3
<i>Sex</i>	<i>Women</i>	7.5	4.8	10.3	10.7	7.3	14.0
	<i>Men</i>	9.6	6.0	13.2	11.7	7.1	16.2
<i>Age group</i>	<i>65–74</i>	4.4	0.2	8.6	13.7	7.3	20.1
	<i>75–84</i>	7.3	4.2	10.4	9.8	6.5	13.0
	<i>85+</i>	9.5	6.2	12.8	11.1	7.3	14.9
<i>Ethnic group</i>	<i>Māori</i>	6.5	0.1	12.9	13.0	6.1	19.9
	<i>Pacific</i>	3.3	0.0	6.8	3.5	0.0	7.8
	<i>Asian</i>	3.5	0.0	10.5	16.5	7.5	25.6
	<i>Other</i>	8.4	6.0	10.9	10.9	7.3	14.5
<i>NZSEI</i>	<i>1 (least deprived)</i>	4.2	1.2	7.2	9.5	2.5	16.5
	<i>2</i>	12.5	7.9	17.1	13.5	8.0	18.9
	<i>3</i>	4.4	0.8	8.0	8.2	4.3	12.1
	<i>4</i>	12.4	7.0	17.8	12.0	6.7	17.4
	<i>5 (most deprived)</i>	6.3	1.8	10.9	10.8	5.7	15.8
<i>Dependency status</i>	<i>Nursing home</i>	9.1	5.5	12.7	.	.	.
	<i>Psychogeriatric/Dementia</i>	10.3	4.1	16.6	.	.	.
	<i>Hospital care</i>	6.2	3.7	8.8	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores



## Comparisons by population group

Table 63 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 63 Having oral ulcers among all older adults, by population group (adjusted rate ratio and rate difference)**

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Residential care	Home-based	Age group, Sex, Ethnicity	0.7*	-2.9*
Men	Women	Age group	1.2	1.9
Māori	Non-Māori	Age group, Sex	1.1	1.4
Pacific	Non-Pacific	Age group, Sex	0.4*	-6.2*
Asian	Non-Asian	Age group, Sex	1.2	1.8
Age 85+	Age <85	Sex, Ethnicity	1.2	1.6
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.6*	3.9*
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.1	1.1
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.4	2.9

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Older adults living in residential care were about three-quarters as likely as those living in their own home to have oral ulceration.

Pacific older adults were 0.4 times as likely as non-Pacific older adults to have oral ulceration. Lower-SES older adults were 1.6 times more likely as higher-SES older adults to have oral ulceration.

There were no significant differences in the prevalence of oral ulceration among all older adults by sex, age, previous dental visit or dependency level, or between Māori and non-Māori, or Asian and non-Asian older adults.

### Prevalence of diagnosed or suspected oral cancers and other malignancies

Seventeen older adults were referred to their domicile DHB for a consultation regarding a suspected malignant or pre-cancerous lesion of which none required further investigation or treatment.

### Prevalence of oral thrush/candidiasis

Oral thrush or candidiasis is a fungal infection of the mouth. It frequently occurs in people whose immune system is compromised, who have a dry mouth, do not remove or clean

their dentures regularly, or take medications such as antibiotics (Rossie and Guggenheimer 1997).

The prevalence of oral candidiasis in older adults living in residential care was 6.5%. For older adults residing in their own homes the prevalence of oral candidiasis was 5.5%. Table 64 presents the prevalence of oral candidiasis, by population group.

**Table 64** Prevalence of oral candidiasis among all older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
<i>All</i>		6.5	4.7	8.4	5.5	3.8	7.2
<i>Sex</i>	<i>Women</i>	6.4	4.3	8.4	6.0	3.8	8.3
	<i>Men</i>	6.9	3.8	10.1	4.4	0.9	7.9
<i>Age group</i>	<i>65–74</i>	3.6	0.2	7.1	7.4	2.9	11.9
	<i>75–84</i>	6.8	3.9	9.7	4.6	1.4	7.9
	<i>85+</i>	6.9	4.3	9.6	5.5	3.7	7.2
<i>Ethnic group</i>	<i>Māori</i>	10.2	0.5	19.9	3.4	0.0	6.8
	<i>Pacific</i>	3.9	0.0	8.7	.	.	.
	<i>Asian</i>	7.5	0.0	17.1	2.6	0.0	8.0
	<i>Other</i>	6.5	4.6	8.4	6.0	4.2	7.8
<i>NZSEI</i>	<i>1 (least deprived)</i>	7.9	3.7	12.2	4.8	2.2	7.3
	<i>2</i>	6.7	3.1	10.4	7.4	4.0	10.7
	<i>3</i>	2.6	0.0	5.5	0.7	0.0	2.2
	<i>4</i>	8.7	4.2	13.1	7.4	4.0	10.8
	<i>5 (most deprived)</i>	6.3	2.0	10.5	6.4	2.5	10.4
<i>Dependency status</i>	<i>Nursing home</i>	7.0	3.9	10.1	.	.	.
	<i>Psychogeriatric/Dementia</i>	4.3	1.0	7.6	.	.	.
	<i>Hospital care</i>	6.9	3.9	9.9	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### **Comparisons by population group**

Table 65 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 65 Having oral candidiasis among all older adults, by population group (adjusted rate ratio and rate difference)**

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Residential care	Home-based	Age group, Sex, Ethnicity	1.2	0.9
Men	Women	Age group	0.9	-0.5
Māori	Non-Māori	Age group, Sex	1.0	0.2
Pacific	Non-Pacific	Age group, Sex	0.2*	-4.8*
Asian	Non-Asian	Age group, Sex	0.8	-1.3
Age 85+	Age <85	Sex, Ethnicity	1.0	0.3
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.0	0.2
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.7	-2.2
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.6	-2.7

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Pacific older adults were a fifth as likely as non-Pacific older adults to have oral candidiasis.

There were no significant differences in the prevalence of oral candidiasis among all older adults by any other group of interest.

### Prevalence of denture stomatitis

Denture stomatitis is a fungal infection of the soft tissues underneath a denture. It appears as an area of inflammation and is generally associated with not removing a denture regularly, especially overnight.

The prevalence of denture stomatitis was measured in older adults who wore either a full or partial denture. The prevalence of denture stomatitis for those living in residential care was 6.0% and 2.9% for those living in their own home. Table 66 presents the prevalence of denture stomatitis, by population group.

**Table 66 Prevalence of denture stomatitis among all older adults with full or partial dentures, by population group (unadjusted prevalence)**

<i>Population Subgroup</i>		<i>Setting</i>					
		<i>Residential Care</i>			<i>Home-Based</i>		
		<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>	<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>
<i>All</i>		6.0	2.0	10.0	2.9	0.7	5.1
<i>Sex</i>	<i>Women</i>	7.6	2.0	13.1	2.5	0.0	5.2
	<i>Men</i>	2.7	0.0	7.1	3.6	0.0	8.0

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
Age group	65–74	.	.	.	7.5	0.0	16.2
	75–84	6.0	0.8	11.1	4.0	0.2	7.8
	85+	6.5	1.6	11.5	1.0	0.0	2.9
Ethnic group	Māori	23.2	0.0	55.0	2.6	0.0	7.7
	Pacific	.	.	.	.	.	.
	Asian	.	.	.	.	.	.
	Other	5.7	1.8	9.7	3.1	0.6	5.6
NZSEI	1 (least deprived)	2.9	0.0	8.4	.	.	.
	2	7.4	0.0	14.7	3.1	0.0	7.0
	3	1.1	0.0	3.5	7.2	0.0	15.4
	4	11.6	0.0	25.5	3.0	0.0	9.0
	5 (most deprived)	2.4	0.0	7.2	1.0	0.0	3.1
Dependency status	Nursing home	6.7	0.0	13.7	.	.	.
	Psychogeriatric/Dementia	8.2	0.0	18.8	.	.	.
	Hospital care	4.0	0.0	8.1	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 67 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 67 Having denture stomatitis among all older adults with full or partial dentures, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	1.7	3.2
Men	Women	Age group	0.6	-2.2
Māori	Non-Māori	Age group, Sex	1.9	3.7
Pacific	Non-Pacific	Age group, Sex	.	.
Asian	Non-Asian	Age group, Sex	.	.
Age 85+	Age <85	Sex, Ethnicity	0.8	-1.1
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.3	1.6

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.1	0.7
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.4	3.2

Source: 2012 Older People's Oral Health Survey

There were no significant differences in the prevalence of denture stomatitis among all older adults with full or partial dentures by any group of interest.

### **Prevalence of angular cheilitis**

Angular cheilitis is a fungal infection which occurs at the corners of the mouth. This condition can be associated with poorly fitting dentures (particularly where a person over closes their mouth as a result of the ridges that the dentures sit on, having resorbed), dentures not being cleaned properly, or the individual being immune-compromised or nutrient-deficient.

The prevalence of angular cheilitis was less than 2% in all older adults (regardless of residential location) (RC, 1.8%; HB, 1.2%). Given the low prevalence of this condition, further data are not presented here, but in the supplementary tables in Appendix A.

### **Prevalence of dry mouth**

Reduced saliva flow has numerous implications for oral health, including greater risk of tooth decay, difficulty and discomfort in eating or in wearing dentures (particularly full dentures), trauma to (and infection of) the soft tissues, general mouth soreness and impaired quality of life. Dry mouth may be the result of the side-effects of the numerous medications which many older adults are prescribed, or it may be a side-effect of previous cancer treatments or medical comorbidities (Thomson 2015).

#### **How was this measured?**

In the 2012 OPOHS, the prevalence of dry mouth was determined by using self-reported data. Older adults were asked in the interview "How often does your mouth feel dry?" Those older adults who answered 'always' and 'frequently' were considered to suffer from chronic dry mouth.

Half of the older adults living in residential care (52.7%), and two-thirds living in their own home (69.7%), reported having a dry mouth. Table 68 presents the prevalence of dry mouth by population group.

**Table 68 Prevalence of dry mouth among all older adults, by population group (unadjusted prevalence)**

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI	
All	52.7	48.4	56.9	69.7	66.0	73.3	
Sex	Women	52.0	47.4	56.6	71.3	67.6	74.9
	Men	54.2	47.3	61.1	66.5	60.4	72.5
Age group	65–74	56.1	44.4	67.7	66.3	60.8	71.9
	75–84	52.6	46.3	58.8	70.9	64.1	77.6
	85+	52.1	47.0	57.1	70.0	65.7	74.2
Ethnic group	Māori	40.5	27.9	53.1	63.2	56.1	70.3
	Pacific	53.8	41.7	65.9	64.7	52.7	76.7
	Asian	41.9	22.0	61.8	50.7	40.8	60.6
	Other	53.3	49.0	57.6	71.3	67.2	75.4
NZSEI	1 (least deprived)	55.3	47.6	63.0	63.8	54.2	73.4
	2	52.0	44.8	59.3	71.4	65.3	77.4
	3	61.5	51.7	71.4	70.4	63.5	77.2
	4	53.6	44.4	62.9	74.1	67.2	80.9
	5 (most deprived)	54.6	46.2	63.1	69.5	61.8	77.3
Dependency status	Nursing home	58.8	53.4	64.3	.	.	.
	Psychogeriatric/Dementia	33.2	22.2	44.2	.	.	.
	Hospital care	54.1	47.5	60.6	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 69 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 69 Having a dry mouth among all older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.7*	-17.6*
Men	Women	Age group	1.0	-0.8
Māori	Non-Māori	Age group, Sex	0.9	-6.6

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Pacific	Non-Pacific	Age group, Sex	1.0	-0.2
Asian	Non-Asian	Age group, Sex	0.8*	-14.5*
Age 85+	Age <85	Sex, Ethnicity	1.0	-2.2
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.2*	9.4*
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.1*	8.1*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.6*	-23.4*

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Older adults living in residential care were 0.7 times as likely to report having a dry mouth as those living in their own homes.

Asian older adults were significantly less likely to report having a dry mouth than non-Asian older adults. Older people in the lower-SES group were 1.2 times as likely as those in the higher-SES group to report having a dry mouth.

Older adults who made a dental visit in the previous 12 months were significantly more likely than those who had not visited a dental professional in the previous year to report having a dry mouth. The most dependent older adults were just over half as likely to report having a dry mouth as those who were less dependent.

There were no significant differences in the prevalence of having a dry mouth among all older adults by sex, age, or between Māori and non-Māori, or Pacific and non-Pacific older adults.

## Summary of oral mucosal conditions

Table 70 summarises the prevalence of the oral mucosal conditions in all older adults.

**Table 70** Prevalence of oral mucosal conditions among adults (unadjusted prevalence)

Oral mucosal condition	Prevalence (95% CI)	
	RC	HB
Any oral mucosal condition	25.4 (21.3–29.5)	31.4 (21.4–41.4)
Oral ulceration	8.1 (5.9–10.4)	11.0 (7.7–14.3)
Oral candidiasis	6.5 (4.7–8.4)	5.5 (3.8–7.2)
Denture stomatitis*	6.9 (4.1–9.7)	6.4 (2.7–10.1)
Angular cheilitis	1.8 (0.7–2.9)	1.2 (0.4–2.0)
Dry mouth	52.7 (48.4–56.9)	69.7 (66.0–73.3)

Source: 2012 Older People's Oral Health Survey

\*Denture wearers only

## Chapter 4: Protective Factors

### Key findings

- 49% of dentate older adults living in residential care and 51.5% of those living in their own homes brushed their teeth at least twice a day with fluoride toothpaste of 1000 ppm or greater.
- One third (33%) of dentate older adults living in residential care and one in five (18.9%) living in their own home reported having difficulty cleaning their teeth.
- Half of all older people in both residential locations who wore dentures cleaned their dentures at least twice daily (RC, 47%; HB, 50.1%).
- Almost two-thirds of older adults who wore a partial or full denture removed their denture at night (RC, 61%; HB, 56%).

### Introduction

This chapter examines several important protective factors associated with good oral health, such as toothbrushing, denture hygiene, and denture removal at night. Toothbrushing is a factor shown to protect populations from dental caries and periodontal disease, yet the physical difficulties many older adults experience when brushing their teeth, can prevent adequate brushing. The use of clinically prescribed mouthrinse and toothpastes (fluoridated and non-fluoridated) is also examined. International research shows that the use of fluoridated toothpaste has reduced levels of dental decay in the developed world (Beaglehole et al 2009; Burt and Pai 2001). Protective factors such as the use of oral health care services, are presented in the next chapter.

Toothbrushing removes dental plaque, which is the sticky soft layer (a bacterial biofilm) that forms on teeth every day. If left to build up, plaque can cause tooth decay and periodontal disease. Bacteria in plaque react with (metabolise) sugar consumed in the daily diet to produce an acid that dissolves the minerals in teeth, and over time this can cause cavities (holes). Bacteria in plaque also produce substances that cause inflammation in the periodontal tissues surrounding the teeth.

The Ministry of Health recommends that people brush their teeth twice a day with fluoride toothpaste of 1000 ppm or greater and spit out toothpaste rather than rinsing after brushing (New Zealand Guidelines Group 2009). By not rinsing toothpaste from the mouth after brushing, fluoride remains in contact with the teeth for longer and can more effectively prevent dental caries.

Most fluoridated toothpastes on sale in New Zealand contain 1000 ppm of fluoride. Based on the consensus from many years of research on the effectiveness of different strength toothpastes, it is recommended that people use 1000 ppm fluoride toothpaste (New Zealand Guidelines Group 2009).



Fluoride acts both systemically and topically to prevent dental caries in three ways:

- the presence of fluoride within saliva enhances the repair of early enamel caries (through remineralising enamel)
- fluoride becomes incorporated into the structure of enamel and renders it more resistant to acid attack
- fluoride interferes with the metabolic pathways of caries-causing bacteria, thus reducing acid production (and therefore reducing the potential for enamel demineralisation) (Daly et al 2002).

To preserve the health of the supporting and surrounding oral hard and soft tissues, the Ministry of Health and the New Zealand Dental Association recommend that all denture wearers remove and rinse their dentures after each meal to clean off any food debris, and to clean their dentures twice daily to remove plaque build-up and debris accumulation (New Zealand Dental Association 2010).

## **Toothbrushing**

The Ministry of Health recommends that adults brush their teeth twice a day, and that they use fluoride toothpaste with a strength of 1000 ppm fluoride or greater (New Zealand Guidelines Group 2009).

### **Frequency of toothbrushing**

#### **What were the survey questions?**

In the 2012 OPOHS, older adults who had one or more natural teeth were asked how often they brushed their teeth. They were also asked how often they used toothpaste when brushing their teeth, and which type of toothpaste they usually used: 1000 ppm fluoride toothpaste; 400–500 ppm fluoride toothpaste; or non-fluoridated toothpaste. The frequency of brushing was measured among all dentate older adults.

### **Brushing teeth at least once daily with or without fluoride toothpaste**

Of all dentate older adults, 82.3% living in residential care reported brushing their teeth at least once a day with or without fluoride toothpaste, and 90.2% living in their own homes reported brushing at least once a day with or without fluoride toothpaste. Table 71 presents the prevalence of brushing teeth at least once a day with or without fluoride toothpaste among dentate older adults, by population group.

**Table 71 Prevalence of brushing teeth at least once a day with or without fluoride toothpaste among all dentate older adults, by population group (unadjusted prevalence)**

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI	
All	82.3	78.1	86.6	90.2	87.1	93.4	
Sex	Women	86.5	82.1	90.9	95.3	92.7	97.9
	Men	74.8	67.7	82.0	83.0	77.0	89.0
Age group	65–74	87.9	79.8	96.0	85.0	77.3	92.7
	75–84	82.4	76.2	88.6	92.6	89.0	96.2
	85+	80.7	74.0	87.4	89.8	85.2	94.4
Ethnic group	Māori	79.2	59.4	99.0	63.2	46.0	80.4
	Pacific	81.7	64.2	99.2	90.4	82.9	98.0
	Asian	74.7	48.5	100.0	98.3	94.7	100.0
	Other	82.8	78.4	87.1	90.9	87.1	94.7
NZSEI	1 (least deprived)	80.4	73.1	87.7	93.2	87.2	99.1
	2	86.6	78.5	94.7	92.4	86.0	98.7
	3	85.7	75.2	96.1	87.9	80.2	95.5
	4	84.2	75.9	92.5	86.6	78.4	94.9
	5 (most deprived)	85.2	74.6	95.8	86.3	78.9	93.7
Dependency status	Nursing home	88.6	83.2	93.9	.	.	.
	Psychogeriatric/Dementia	74.8	62.8	86.7	.	.	.
	Hospital care	79.9	73.0	86.8	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 72 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 72 Brushing teeth at least once a day with or without fluoride toothpaste among all dentate older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.9*	-8.8*
Men	Women	Age group	0.9*	-11.9*
Māori	Non-Māori	Age group, Sex	0.8*	-18.0*
Pacific	Non-Pacific	Age group, Sex	1.0	0.4

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Asian	Non-Asian	Age group, Sex	1.0	3.5
Age 85+	Age <85	Sex, Ethnicity	1.0	-4.2
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.0	3.3
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.1*	6.1*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.9	-9.4

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Dentate older adults living in residential care were significantly less likely than those living in their own home to brush at least once a day with or without fluoride toothpaste.

Dentate older men were significantly less likely than dentate older women to brush at least once a day with or without fluoride toothpaste.

Older Māori were significantly less likely to brush at least once a day with or without fluoride toothpaste than older non-Māori.

Older adults who had visited a dental professional in the previous 12 months were significantly more likely to brush at least once a day with or without fluoride toothpaste than those older adults who did not make a visit.

There were no significant differences in the prevalence of brushing teeth at least once a day with or without fluoride toothpaste among all dentate older adults by age, SES or dependency level, or between Pacific and non-Pacific or Asian and non-Asian older adults.

### Brushing teeth at least once daily with fluoride toothpaste

The prevalence of brushing teeth at least once a day with fluoride toothpaste was 70.1% for dentate older adults in residential care, and 76.1% for those living in their own homes. Table 73 presents the prevalence of brushing teeth at least once a day with fluoride toothpaste among dentate older adults, by population group.

**Table 73** Prevalence of brushing teeth at least once a day with fluoride toothpaste among all dentate older adults, by population group (unadjusted prevalence)

<i>Population Subgroup</i>	<i>Setting</i>					
	<i>Residential Care</i>			<i>Home-Based</i>		
	<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>	<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>
<i>All</i>	70.1	62.8	77.4	76.1	70.3	81.8
<i>Sex</i>						
<i>Women</i>	75.4	68.4	82.4	81.3	74.2	88.5
<i>Men</i>	60.6	50.2	71.1	68.5	62.7	74.3

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
Age group	65–74	78.6	67.6	89.6	72.5	63.0	82.0
	75–84	68.9	60.0	77.9	75.4	68.6	82.3
	85+	68.7	59.5	78.0	78.1	72.1	84.1
Ethnic group	Māori	64.6	39.9	89.3	59.0	41.0	77.1
	Pacific	73.3	54.4	92.1	67.6	60.7	74.5
	Asian	74.7	48.5	100.0	76.7	58.5	94.9
	Other	69.9	62.3	77.6	77.3	70.9	83.7
NZSEI	1 (least deprived)	71.0	59.8	82.2	74.4	66.4	82.4
	2	76.9	66.6	87.2	80.6	71.5	89.6
	3	75.7	61.6	89.9	78.0	65.2	90.7
	4	70.2	58.4	82.0	75.0	63.2	86.7
	5 (most deprived)	70.3	56.7	83.9	74.8	65.1	84.6
Dependency status	Nursing home	74.7	63.4	86.0	.	.	.
	Psychogeriatric/Dementia	59.2	44.5	74.0	.	.	.
	Hospital care	70.8	62.2	79.4	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 74 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 74 Brushing teeth at least once a day with fluoride toothpaste among all dentate older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.9*	-6.9*
Men	Women	Age group	0.8*	-13.7*
Māori	Non-Māori	Age group, Sex	0.8	-11.5
Pacific	Non-Pacific	Age group, Sex	0.9	-5.3
Asian	Non-Asian	Age group, Sex	1.1	5.4
Age 85+	Age <85	Sex, Ethnicity	1.0	-1.9
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.1*	7.3*

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.0	2.2
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.8	-13.4*

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Dentate older adults living in residential care were significantly less likely than those living in their own homes to brush their teeth at least once a day with fluoride toothpaste.

Dentate older men were significantly less likely than dentate older women to brush their teeth at least once a day with fluoride toothpaste.

Dentate older adults of lower SES were significantly more likely to brush their teeth at least once a day with fluoride toothpaste than those of higher SES.

There were no significant differences in the prevalence of brushing teeth at least once a day with fluoride toothpaste among all dentate older adults by ethnicity, age, previous dental visit or dependency level.

### Brushing teeth at least twice daily with or without fluoride toothpaste

The prevalence of brushing at least twice a day with or without fluoride toothpaste was 55.0% in older adults who lived in residential care and 60.2% in older adults who were living in their own homes. Table 75 presents the prevalence of brushing teeth at least twice a day with or without fluoride toothpaste among dentate older adults, by population group.

**Table 75** Prevalence of brushing teeth at least twice a day with or without fluoride toothpaste among all dentate older adults, by population group (unadjusted prevalence)

<i>Population Subgroup</i>		<i>Setting</i>					
		<i>Residential Care</i>			<i>Home-Based</i>		
		<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>	<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>
<i>All</i>		55.0	48.2	61.8	60.2	56.1	64.3
<i>Sex</i>	<i>Women</i>	60.1	52.5	67.6	68.6	62.9	74.3
	<i>Men</i>	45.8	36.6	55.1	48.1	42.6	53.6
<i>Age group</i>	<i>65–74</i>	58.6	43.6	73.6	62.0	52.2	71.7
	<i>75–84</i>	55.7	46.5	64.9	56.7	50.1	63.3
	<i>85+</i>	53.3	44.9	61.8	63.1	56.6	69.7

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
Ethnic group	Māori	58.5	35.5	81.4	31.3	14.0	48.6
	Pacific	36.4	21.0	51.8	48.9	34.4	63.4
	Asian	63.5	35.5	91.6	75.6	60.2	90.9
	Other	55.0	48.0	62.0	61.1	56.7	65.5
NZSEI	1 (least deprived)	60.1	48.7	71.6	68.0	58.3	77.6
	2	60.2	48.9	71.5	58.3	51.3	65.4
	3	49.0	31.1	67.0	54.2	39.7	68.7
	4	51.0	37.6	64.3	65.4	54.7	76.0
	5 (most deprived)	56.7	40.3	73.0	50.7	30.9	70.4
Dependency status	Nursing home	61.9	52.5	71.2	.	.	.
	Psychogeriatric/Dementia	52.9	37.2	68.5	.	.	.
	Hospital care	49.4	40.5	58.3	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 76 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 76 Brushing teeth at least twice a day with or without fluoride toothpaste among all dentate older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.9	-6.5
Men	Women	Age group	0.7*	-17.2*
Māori	Non-Māori	Age group, Sex	0.7*	-16.3*
Pacific	Non-Pacific	Age group, Sex	0.7	-15.9*
Asian	Non-Asian	Age group, Sex	1.3*	16.3*
Age 85+	Age <85	Sex, Ethnicity	1.0	-2.0
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.9	-4.0
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.2*	10.9*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.9	-2.8

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Dentate older men were significantly less likely than dentate older women to brush their teeth at least twice a day with or without fluoride toothpaste.

Dentate older Māori were significantly less likely to report brushing their teeth at least twice a day with or without fluoride toothpaste than dentate older non-Māori.

Dentate Asian older adults were 1.3 times as likely as dentate non-Asian older adults to report brushing their teeth at least twice a day with or without fluoride toothpaste.

Dentate older adults who had visited a dental professional in the previous 12 months were 1.2 times as likely as those who had not made a visit to report brushing their teeth at least twice a day with or without fluoride toothpaste.

There were no significant differences in the prevalence of brushing teeth at least twice a day with or without fluoride toothpaste among all dentate older adults by residential location, age, SES or dependency level, or between Pacific and non-Pacific older adults.

### Brushing at least twice daily with fluoride toothpaste

The prevalence of brushing teeth at least twice a day with fluoride toothpaste was 49.0% in dentate older adults living in residential care and 51.5% in dentate older adults living in their own homes. Table 77 presents the prevalence of brushing teeth at least twice a day with fluoride toothpaste among dentate older adults, by population group.

**Table 77** Prevalence of brushing teeth at least twice a day with fluoride toothpaste among all dentate older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
<i>All</i>		49.0	41.7	56.3	51.5	46.4	56.6
<i>Sex</i>	<i>Women</i>	54.1	46.0	62.1	58.8	52.0	65.6
	<i>Men</i>	39.9	30.7	49.1	41.0	35.3	46.7
<i>Age group</i>	<i>65–74</i>	54.3	39.0	69.7	53.4	42.8	64.0
	<i>75–84</i>	50.3	40.4	60.1	44.5	37.2	51.9
	<i>85+</i>	46.5	37.9	55.1	57.9	51.4	64.4
<i>Ethnic group</i>	<i>Māori</i>	51.6	27.4	75.8	29.2	12.3	46.0
	<i>Pacific</i>	31.3	15.7	46.8	40.3	33.3	47.3
	<i>Asian</i>	63.5	35.5	91.6	67.5	50.0	85.0
	<i>Other</i>	48.7	41.2	56.2	52.0	46.6	57.4

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI	
NZSEI	1 (least deprived)	56.1	44.4	67.8	53.6	44.1	63.0
	2	53.7	41.7	65.8	51.3	43.2	59.3
	3	46.8	29.0	64.7	48.6	31.6	65.5
	4	45.2	31.4	59.0	59.7	47.9	71.4
	5 (most deprived)	46.4	29.8	63.0	44.9	26.2	63.6
Dependency status	Nursing home	54.5	43.6	65.4	.	.	.
	Psychogeriatric/Dementia	47.2	30.5	63.9	.	.	.
	Hospital care	44.7	35.6	53.7	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 78 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 78 Brushing teeth at least twice a day with fluoride toothpaste among all dentate older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.9	-3.7
Men	Women	Age group	0.7*	-15.9*
Māori	Non-Māori	Age group, Sex	0.8	-12.2
Pacific	Non-Pacific	Age group, Sex	0.7	-15.7*
Asian	Non-Asian	Age group, Sex	1.4*	19.5*
Age 85+	Age <85	Sex, Ethnicity	1.0	0.4
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.0	-1.5
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.1	6.8
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.0	-2.4

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Dentate older men were significantly less likely than dentate older women to brush their teeth at least twice a day with fluoride toothpaste.

Dentate Asian older adults were 1.4 times as likely as dentate non-Asian older adults to report brushing their teeth at least twice a day with fluoride toothpaste.



There were no significant differences in the prevalence of brushing teeth at least twice a day with fluoride toothpaste among all dentate older adults by residential location, age, SES, previous dental visit or dependency level, or between Māori and non-Māori, or Pacific and non-Pacific older adults.

### Difficulty in cleaning teeth

As people age, they may have greater difficulty cleaning their teeth as a result of conditions, which reduce their manual dexterity (such as rheumatoid arthritis or osteoarthritis), or which result in difficulties with opening the mouth (such as Parkinson’s Disease and dementia).

#### How was this measured?

In the 2012 OPOHS, dentate older adults were asked “Do you have any physical problems that make it difficult for you to clean your teeth such as opening your mouth or moving your hand?”

One in three (33.3%) dentate older adults living in residential care and one in five (18.9%) dentate older adults living in their own home reported having difficulty in cleaning their teeth. Table 79 presents the prevalence of having difficulty cleaning teeth among dentate older adults, by population group.

**Table 79** Prevalence of having difficulty cleaning teeth among all dentate older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
<i>All</i>		33.3	26.9	39.7	18.9	14.7	23.1
<i>Sex</i>	<i>Women</i>	33.1	25.0	41.1	16.6	10.5	22.7
	<i>Men</i>	33.7	25.1	42.4	22.2	17.3	27.1
<i>Age group</i>	<i>65–74</i>	40.8	27.8	53.8	33.1	21.1	45.0
	<i>75–84</i>	35.1	27.0	43.1	16.0	9.6	22.3
	<i>85+</i>	29.7	21.9	37.6	16.4	10.2	22.7
<i>Ethnic group</i>	<i>Māori</i>	22.4	4.1	40.6	10.5	0.0	21.2
	<i>Pacific</i>	44.5	26.8	62.2	27.8	14.3	41.2
	<i>Asian</i>	30.8	10.1	51.6	27.1	7.0	47.3
	<i>Other</i>	33.3	26.4	40.2	18.2	13.1	23.3

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI	
NZSEI	1 (least deprived)	31.6	20.9	42.3	20.9	16.0	25.9
	2	31.6	20.2	43.0	21.5	13.0	30.0
	3	35.4	18.5	52.2	14.9	7.3	22.5
	4	27.9	17.4	38.5	16.2	6.0	26.5
	5 (most deprived)	39.1	23.7	54.5	12.3	4.9	19.6
Dependency status	Nursing home	9.3	4.0	14.7	.	.	.
	Psychogeriatric/Dementia	40.8	26.4	55.3	.	.	.
	Hospital care	52.5	44.0	61.1	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 80 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 80 Having difficulty cleaning teeth among all dentate older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	1.8*	14.9*
Men	Women	Age group	1.1	1.4
Māori	Non-Māori	Age group, Sex	0.5*	-13.3*
Pacific	Non-Pacific	Age group, Sex	1.1	3.1
Asian	Non-Asian	Age group, Sex	1.0	1.0
Age 85+	Age <85	Sex, Ethnicity	0.8	-4.6
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.9	-3.7
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.7*	-10.5*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.3	9.2

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Dentate older adults living in residential care were almost twice as likely as dentate older adults living in their own homes to report that they have difficulty in cleaning their teeth.

Dentate older Māori were half as likely to report having difficulty cleaning their teeth as dentate older non-Māori.

Dentate older adults who had visited a dental professional in the previous year were 0.7 times as likely as those who did not make a dental visit to report having difficulty cleaning their teeth.

There were no significant differences in the prevalence of having difficulty cleaning teeth among all dentate older adults by sex, age, SES or dependency level, or between Pacific and non-Pacific, or Asian and non-Asian older adults.

## Mouthrinses

Although most people do not need to use a mouthrinse, some individuals may have one prescribed (by a health professional) for home use.

### Prevalence of use of clinically prescribed mouthrinses

The prevalence of using a mouthrinse in the week prior to the survey was 0.5% for older adults living in residential care, and 1.7% for older adults who lived in their own homes. Given the low prevalence of using a mouthrinse in the week prior to the survey, further data are not presented here. Data may be found in the supplementary tables in Appendix A.

## Denture cleaning

It is standard clinical practice to advise denture wearers to rinse their dentures after each meal and to clean their denture twice daily in order to remove plaque build-up and any debris which may have accumulated.

### Prevalence of cleaning dentures at least once a day

#### What were the survey questions?

In the 2012 OPOHS, older adults who wore full or partial dentures were asked how often they cleaned their dentures. The frequency of cleaning dentures was measured amongst all older adults who wore dentures (full or partial).

The prevalence of cleaning dentures at least once a day was 84.7% for older adults living in residential care (who wore full or partial dentures), and 88.6% for older adults living in their own homes (who wore full or partial dentures). Table 81 presents the prevalence of cleaning dentures at least once a day among dentate older adults, by population group.

**Table 81** Prevalence of cleaning dentures at least once a day among all older adults with full or partial dentures, by population group (unadjusted prevalence)

Population Subgroup	Setting					
	Residential Care			Home-Based		
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All	84.7	79.5	89.8	88.6	82.9	94.3

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
Sex	Women	88.8	83.8	93.8	92.2	86.6	97.7
	Men	76.0	64.6	87.3	82.9	74.3	91.5
Age group	65–74	76.0	46.1	100.0	72.6	54.3	90.8
	75–84	81.0	71.1	91.0	93.7	89.1	98.3
	85+	88.1	82.2	94.0	88.7	81.3	96.0
Ethnic group	Māori	86.5	71.0	100.0	86.3	74.3	98.3
	Pacific	100.0	100.0	100.0	69.9	34.8	100.0
	Asian	79.7	42.3	100.0	83.1	57.9	100.0
	Other	84.6	79.3	89.9	89.4	83.4	95.3
NZSEI	1 (least deprived)	82.3	72.5	92.1	90.3	82.4	98.2
	2	90.0	81.6	98.4	84.8	73.7	95.9
	3	71.1	49.9	92.3	87.9	74.7	100.0
	4	87.8	76.7	98.8	88.1	78.5	97.8
	5 (most deprived)	87.0	73.8	100.0	93.8	86.4	100.0
Dependency status	Nursing home	88.0	81.2	94.9	.	.	.
	Psychogeriatric/Dementia	77.6	63.8	91.4	.	.	.
	Hospital care	83.6	74.9	92.2	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 82 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 82** Cleaning dentures at least once a day among all older adults with full or partial dentures, by population group (adjusted rate ratio and rate difference)

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.9	-5.9
Men	Women	Age group	0.9*	-10.2*
Māori	Non-Māori	Age group, Sex	1.0	0.7
Pacific	Non-Pacific	Age group, Sex	1.0	-1.4
Asian	Non-Asian	Age group, Sex	1.0	-2.5
Age 85+	Age <85	Sex, Ethnicity	1.0	3.1
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.0	1.4

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.1	5.0
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.9	-5.6

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Older men with full or partial dentures were significantly less likely than older women with full or partial dentures to clean their dentures at least once a day.

There were no significant differences in the prevalence of cleaning dentures at least once a day among all older adults with full or partial dentures, by any other group of interest.

### Prevalence of cleaning dentures at least twice a day

Half of all older adults in both residential locations who wore a denture cleaned their dentures at least twice daily (RC, 47.0%; HB, 50.1%). Table 83 presents the prevalence of cleaning dentures at least twice a day among older adults, by population group.

**Table 83** Prevalence of cleaning dentures at least twice a day among all older adults with full or partial dentures, by population group (unadjusted prevalence)

<i>Population Subgroup</i>		<i>Setting</i>					
		<i>Residential Care</i>			<i>Home-Based</i>		
		<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>	<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>
<i>All</i>		47.0	38.2	55.8	50.1	41.7	58.6
<i>Sex</i>	<i>Women</i>	53.5	43.8	63.2	62.9	50.8	75.0
	<i>Men</i>	33.3	20.3	46.4	29.7	20.7	38.8
<i>Age group</i>	<i>65–74</i>	55.2	20.1	90.3	35.6	15.0	56.2
	<i>75–84</i>	39.4	27.4	51.3	53.0	44.6	61.5
	<i>85+</i>	52.0	40.8	63.1	51.5	40.8	62.3
<i>Ethnic group</i>	<i>Māori</i>	54.2	25.2	83.1	44.2	27.1	61.3
	<i>Pacific</i>	32.4	6.2	58.6	53.1	15.4	90.8
	<i>Asian</i>	63.0	16.7	100.0	43.4	20.8	66.0
	<i>Other</i>	46.6	37.5	55.8	50.7	41.6	59.9
<i>NZSEI</i>	<i>1 (least deprived)</i>	35.5	19.4	51.7	52.2	40.7	63.7
	<i>2</i>	55.8	40.1	71.6	44.9	32.7	57.2
	<i>3</i>	49.6	25.8	73.3	47.4	31.9	62.8
	<i>4</i>	56.0	41.5	70.5	56.7	40.4	73.0
	<i>5 (most deprived)</i>	43.0	24.0	61.9	52.7	36.6	68.7

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI	
Dependency status	Nursing home	44.5	34.1	54.9	.	.	.
	Psychogeriatric/Dementia	45.1	23.9	66.4	.	.	.
	Hospital care	51.2	37.4	64.9	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 84 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 84** Cleaning dentures at least twice a day among all older adults with full or partial dentures, by population group (adjusted rate ratio and rate difference)

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.9	-5.2
Men	Women	Age group	0.5*	-26.0*
Māori	Non-Māori	Age group, Sex	1.0	-1.2
Pacific	Non-Pacific	Age group, Sex	1.0	1.2
Asian	Non-Asian	Age group, Sex	1.2	10.2
Age 85+	Age <85	Sex, Ethnicity	1.1	5.5
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.1	4.7
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.3*	14.8*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.1	2.8

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Older men with full or partial dentures were half as likely as older women with full or partial dentures to clean their dentures at least twice a day.

Older adults who had visited a dental professional in the previous year were 1.3 times as likely as those who did not make a dental visit to clean their dentures at least twice a day. There were no significant differences in the prevalence of cleaning dentures at least twice a day among all older adults who wore a full or partial denture, by any other group of interest.

## Prevalence of removing dentures overnight

It is standard clinical practice to advise denture wearers to remove their dentures at night, so that the supporting oral tissues are rested and there is the opportunity for salivary flow and the intra-oral musculature to cleanse the mucosa.

### What were the survey questions?

In the 2012 OPOHS, older adults who had partial or full dentures were asked how often they wore their dentures overnight. Older adults who responded 'never' were considered to remove their dentures at night.

Almost two-thirds of all older adults who wore a partial or full denture removed their denture at night (RC, 61%; HB, 56.0%). Table 85 presents the prevalence of removing dentures at night, by population group.

**Table 85** Prevalence of removing dentures at night among all older adults with full or partial dentures, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
<i>All</i>		61.0	53.8	68.3	56.0	49.9	62.2
<i>Sex</i>	<i>Women</i>	64.3	55.8	72.8	58.0	50.9	65.1
	<i>Men</i>	54.2	41.7	66.7	52.8	41.5	64.1
<i>Age group</i>	<i>65–74</i>	29.7	0.0	59.4	65.6	49.9	81.4
	<i>75–84</i>	61.0	49.4	72.6	54.2	43.4	65.0
	<i>85+</i>	63.7	54.6	72.9	55.1	46.1	64.1
<i>Ethnic group</i>	<i>Māori</i>	61.3	34.9	87.8	57.8	42.3	73.3
	<i>Pacific</i>	11.6	0.0	37.1	44.5	14.6	74.4
	<i>Asian</i>	49.1	0.0	100.0	.	.	.
	<i>Other</i>	61.7	54.4	68.9	58.4	51.8	64.9
<i>NZSEI</i>	<i>1 (least deprived)</i>	61.4	48.2	74.5	59.7	46.5	72.9
	<i>2</i>	55.9	42.3	69.4	47.0	36.0	58.0
	<i>3</i>	54.4	30.8	78.0	68.1	52.0	84.2
	<i>4</i>	67.0	49.2	84.9	57.3	38.6	76.0
	<i>5 (most deprived)</i>	68.6	52.0	85.3	56.6	37.6	75.6
<i>Dependency status</i>	<i>Nursing home</i>	73.1	64.4	81.8	.	.	.
	<i>Psychogeriatric/Dementia</i>	56.3	36.4	76.1	.	.	.
	<i>Hospital care</i>	47.1	35.1	59.0	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### **Comparisons by population group**

Table 86 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 86 Removing dentures at night among all older adults with full or partial dentures, by population group (adjusted rate ratio and rate difference)**

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Residential care	Home-based	Age group, Sex, Ethnicity	1.1	3.5
Men	Women	Age group	0.9	-7.8
Māori	Non-Māori	Age group, Sex	1.0	0.5
Pacific	Non-Pacific	Age group, Sex	0.6	-24.0
Asian	Non-Asian	Age group, Sex	0.3	-41.3*
Age 85+	Age <85	Sex, Ethnicity	1.0	1.4
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.0	-1.7
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.9	-9.0
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.9	-4.8

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

There were no significant differences in the prevalence of removing dentures at night among all older adults who wore a full or partial denture in any group of interest.



## Chapter 5: Use of Oral Health Services

### Key findings

- One in four older adults (RC, 23.8%; HB, 27.8%) had visited a dental professional in the previous 12 months.
- One in six (16.9%) older people living in residential care, and one in four (26.9%) living in their own homes had last visited a dental professional for a check-up (rather than a problem).
- Overall, 12.9% of older adults living in residential care and 19.7% living in their own home usually visited a dental professional for a check-up.
- One in four (24.8%) older adults living in residential care and half (48.1%) of those living in their own home usually visited the same dental professional for dental care or advice.
- Overall, 52.3% of older adults living in residential care and 76% of those living in their own home reported being listened to carefully by a dental professional.
- Two in five (42.1%) older people living in residential care and one in three (31.6%) living in their own homes felt that they did not see a dental professional often enough.
- One in four (24.9%) older adults living in residential care and one in three (36%) living in their own homes felt that they needed dental treatment.
- One in six (17.3%) older people living in residential care and one in three (32.1%) living in their own homes reported that they avoided dental care in the previous year because of the cost.
- Less than 6% of older adults went without recommended routine dental treatment in the last year due to cost (RC, 2.3%; HB, 5.2%).
- The reasons for not visiting a dental professional in the previous year among those who had not made a visit were: that they did not have any dental problems (RC, 51.8%; HB, 59.7%); cost (RC, 9.3%; HB 25%); no teeth (RC, 15.9%; HB, 18.1%); and difficulty accessing services (RC, 13.6%; HB, 11.3%).
- The prevalence of accessing DHB clinic services in the previous 12 months was low (RC, 1.7%; HB, 2.0%).
- One in eight (12.3%) older adults in residential care, and one in five (21.3%) of those living in their own homes accessed a private dental practice to see a dentist in the previous 12 months.
- On average, older adults in residential care had visited a dentist at a private dental practice in the previous 12 months 1.8 times, and for those living in their own homes the average number of visits was 2.1.
- Almost half (49.7%) of older people in residential care and four out of five (82.5%) living in their own home paid to see a dentist at a private dental practice out-of-pocket on a user-charge basis or by way of co-payment.
- The average amount paid, either out-of-pocket, or by way of co-payment for dental services on the last visit was \$497.90 (excl. GST) for those living in residential care and \$386.20 (excl. GST) for those living at home.
- Transport was reported as the only support service that had been utilised by older adults to access dental care in the previous year.

- Approximately one in ten older adults (RC, 8.6%; HB, 11.7%) reported using a transport service in the previous year to help them obtain dental care.
- On average, the number of times a transport service was used to access dental care was 1.8 times for those living in residential care and 2.5 times for those living at home.
- The average amount paid the last time a transport service was used by older adults was \$25.10 (excl. GST) for those living in residential care and \$27.30 (excl. GST) for those living at home.

## Introduction

The provision of high-quality oral health services is a critical component of the Ministry of Health's oral health strategy. Oral health service provision, including treatment and oral health promotion, aims to restore and maintain good oral health, and reduce oral health-related inequalities within the population.

The majority of oral health services for older New Zealand adults is privately-funded on a user-pays basis. Publicly-funded services for older adults are primarily limited to low-income older adults and medically-compromised and disabled older adults who cannot access care in the community. The Funded Services Baseline Report (unpublished), prepared as part of the SOPOHI, provides a detailed account of the publicly-funded services available to older adults.

This chapter presents information on:

- visits to a dental professional in the 12 months prior to the survey
- the reason for the last visit to a dental professional
- continuity and patterns of oral health care (including the usual reason for visiting a dental professional)
- experiences of dental care
- unmet need, cost and barriers to accessing oral health care services
- types of clinical, non-clinical and support services accessed over the past 12 months
- the frequency of visiting clinical, non-clinical and support services
- out-of-pocket cost incurred at the last visit.

This chapter presents results for both dentate and edentulous older adults, as quality of care, and unmet need, are issues which can affect all older adults. Data presented are derived from self-reported data collected using the participant interviews.

## Visited a dental professional in the previous 12 months

All people, regardless of age, are advised to visit a dental professional regularly to detect and treat oral disease early and to receive preventive advice and measures to maintain and improve oral health. The Ministry of Health and the New Zealand Dental Association recommend regular professional check-ups and cleaning.

In this report, having made a dental visit in the previous 12 months includes visiting, for any reason: general and specialist dentists (at numerous locations, e.g. private clinics or hospitals), dental hygienists, and clinical dental technicians.

## Had a dental visit in the previous 12 months

### What were the survey questions?

In the 2012 OPOHS, all older adults were asked if they had made a dental visit in the previous 12 months.

One in four older adults living in residential care and in their homes (RC, 23.8%; HB, 27.8%) had visited a dental professional in the previous 12 months.

Table 87 presents the prevalence of having visited a dental professional in the previous 12 months.

**Table 87** Prevalence of having visited a dental professional in the previous 12 months among all older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
<i>All</i>		23.8	20.4	27.2	27.8	23.2	32.4
<i>Sex</i>	<i>Women</i>	24.2	20.1	28.3	25.3	20.2	30.3
	<i>Men</i>	22.9	17.6	28.3	32.9	27.3	38.5
<i>Age group</i>	<i>65–74</i>	24.0	13.7	34.2	30.1	22.6	37.7
	<i>75–84</i>	27.4	22.2	32.7	31.0	23.2	38.9
	<i>85+</i>	21.1	17.0	25.2	24.4	19.9	28.8
<i>Ethnic group</i>	<i>Māori</i>	18.2	8.6	27.9	19.1	8.1	30.1
	<i>Pacific</i>	13.3	3.5	23.1	35.2	26.0	44.5
	<i>Asian</i>	18.7	0.0	37.5	20.0	11.2	28.7
	<i>Other</i>	24.3	20.8	27.8	28.4	23.2	33.5

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI	
NZSEI	1 (least deprived)	35.0	27.6	42.3	42.7	36.4	49.0
	2	19.2	13.2	25.2	29.9	23.9	35.9
	3	20.9	13.3	28.4	20.6	13.4	27.8
	4	19.7	13.5	25.9	19.1	11.2	26.9
	5 (most deprived)	19.2	12.8	25.7	21.3	12.3	30.3
Dependency status	Nursing home	24.2	19.3	29.0	.	.	.
	Psychogeriatric/Dementia	24.6	14.9	34.4	.	.	.
	Hospital care	23.0	17.8	28.2	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 88 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 88 Having visited a dental professional in the previous 12 months among all older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.9*	-4.1*
Men	Women	Age group	1.1	2.5
Māori	Non-Māori	Age group, Sex	0.7*	-8.7*
Pacific	Non-Pacific	Age group, Sex	1.0	0.4
Asian	Non-Asian	Age group, Sex	0.7	-7.8
Age 85+	Age <85	Sex, Ethnicity	0.8*	-6.6*
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.6*	-15.5*
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.0	0.0
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.0	-0.5

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

In the previous 12 months, older adults living in residential care were significantly less likely than those living in their own homes to have visited a dental professional.

Older Māori were 0.7 times as likely as older non-Māori to have visited a dental professional in the previous 12 months.

The oldest older adults (that is, those aged over 85) were significantly less likely than younger older adults to have had a dental visit in the previous 12 months.

Lower-SES older adults were just over half as likely as higher-SES older adults to have had a dental visit in the previous 12 months.

There were no significant differences in the prevalence of having visited a dental professional in the previous 12 months among all older adults, by sex, dependency level, or between Pacific and non-Pacific, or Asian and non-Asian older adults.

## Reason for last visit to a dental professional

Understanding people’s reasons for visiting a dental professional provides insight into their attitudes to dental care. People may visit a dental professional for a number of reasons: for a regular check-up, for recommended dental treatment, or because of a dental problem, such as pain or infection. Regular visits for check-ups are recommended by the Ministry of Health and the New Zealand Dental Association: they provide an opportunity for early intervention in the oral disease process, along with the delivery of oral health education and preventive measures.

## Prevalence of last visit to a dental professional being for a check-up

### What were the survey questions?

In the 2012 OPOHS, all older adults were asked the main reason for their last visit to a dental professional. The response options offered were: *went in on own for check-up, examination or cleaning; was called in by the dental professional for check-up, examination or cleaning; went for treatment of a condition that dental professional discovered at earlier check-up or examination; something was wrong, bothering or hurting; to get treatment for teeth damaged in an accident.* The first three options were assumed to be for a check-up.

Overall, 16.9% of all older adults living in residential care and 26.9% of all older adults living in their own home had last visited a dental professional for a check-up (rather than for any other reason). Table 89 presents the prevalence of participants’ last visit to a dental professional being for a check-up, by population group.

**Table 89** Prevalence of last visit to a dental professional being for a check-up among all older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All		16.9	13.6	20.1	26.9	22.4	31.4
Sex	Women	16.8	13.2	20.5	27.3	22.3	32.4
	Men	16.9	12.2	21.7	25.9	21.0	30.8

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
Age group	65–74	22.9	13.2	32.7	19.6	13.0	26.2
	75–84	15.0	10.8	19.2	30.4	25.1	35.7
	85+	17.0	12.9	21.2	26.7	21.6	31.9
Ethnic group	Māori	8.7	0.0	17.4	17.2	9.1	25.2
	Pacific	3.9	0.0	7.9	13.2	9.0	17.3
	Asian	18.7	1.1	36.2	6.1	0.0	13.3
	Other	17.3	13.9	20.6	29.1	24.4	33.8
NZSEI	1 (least deprived)	27.0	19.7	34.2	38.7	32.8	44.6
	2	20.5	14.4	26.6	30.1	24.0	36.2
	3	12.3	7.2	17.5	16.5	10.9	22.2
	4	18.1	12.3	23.9	22.4	12.2	32.6
	5 (most deprived)	9.9	3.7	16.1	23.3	16.6	30.1
Dependency status	Nursing home	18.8	13.8	23.9	.	.	.
	Psychogeriatric/Dementia	13.2	5.6	20.8	.	.	.
	Hospital care	16.2	11.7	20.8	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 90 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 90 Last visit to a dental professional being for a check-up among all older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.6*	-10.8*
Men	Women	Age group	1.0	-0.3
Māori	Non-Māori	Age group, Sex	0.6*	-7.9*
Pacific	Non-Pacific	Age group, Sex	0.5*	-11.9*
Asian	Non-Asian	Age group, Sex	0.5	-10.6*
Age 85+	Age <85	Sex, Ethnicity	0.9	-1.7
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.7*	-6.8*

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	2.6*	23.8*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.7	-4.5

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Older adults who lived in residential care were just over half as likely to have last visited a dental professional for a check-up as those who lived in their own homes.

Older Māori were just over half as likely to have last visited a dental professional for a check-up as older non-Māori.

Pacific older adults were half as likely as non-Pacific older adults, to have visited a dental professional in the previous year for a check-up.

Lower-SES older adults were significantly less likely than higher-SES older adults to have last visited a dental professional for a check-up in the previous year.

Older adults who had a dental visit in the previous 12 months were 2.6 times as likely as those who had not made a visit in the previous year, to have last visited for a check-up.

There were no significant differences in the prevalence of the last visit being for a check-up among all older adults by sex, age or dependency level, or between Asian and non-Asian older adults.

## Patterns and continuity of oral health care

### Prevalence of usually visiting a dental professional for a check-up

Usually visiting a dental professional for check-ups is important for the early detection of signs of oral disease, because it allows for timely treatment and/or preventive measures.

#### What were the survey questions?

In the 2012 OPOHS, all older adults were asked whether their usual reason for visiting a dental professional was for check-ups, or because they had a dental problem.

Overall, 12.9% of older adults living in residential care and 19.7% of older adults living in their own home usually visited a dental professional for a check-up. Table 91 presents the prevalence of usually visiting a dental professional for a check-up, by population group.

**Table 91 Prevalence of usually visiting a dental professional for a check-up among all older adults, by population group (unadjusted prevalence)**

Population Subgroup	Setting					
	Residential Care			Home-Based		
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All	12.9	10.2	15.6	19.7	15.9	23.6
Sex						
Women	12.8	9.7	16.0	18.8	14.5	23.0
Men	13.0	9.2	16.9	21.8	16.8	26.7
Age group						
65–74	15.2	7.9	22.4	12.3	7.2	17.4
75–84	12.5	9.0	16.1	21.8	16.5	27.1
85+	12.7	9.3	16.1	20.8	15.7	25.9
Ethnic group						
Māori	0.9	0.0	2.5	5.7	0.7	10.6
Pacific	6.8	0.0	13.7	4.5	0.0	9.9
Asian	3.9	0.0	11.7	9.0	0.0	21.2
Other	13.6	10.7	16.5	21.8	17.7	25.9
NZSEI						
1 (least deprived)	22.3	15.9	28.8	36.1	30.7	41.6
2	16.1	10.9	21.3	21.9	16.1	27.8
3	10.4	5.1	15.6	11.8	5.5	18.0
4	12.1	6.6	17.6	10.8	4.5	17.1
5 (most deprived)	5.0	1.2	8.7	13.2	7.0	19.4
Dependency status						
Nursing home	13.2	8.8	17.5	.	.	.
Psychogeriatric/Dementia	10.6	5.5	15.8	.	.	.
Hospital care	13.5	9.8	17.3	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 92 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 92 Usually visiting a dental professional for a check-up among all older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.6*	-7.7*
Men	Women	Age group	1.1	1.9
Māori	Non-Māori	Age group, Sex	0.2*	-12.6*
Pacific	Non-Pacific	Age group, Sex	0.3*	-10.9*



<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Asian	Non-Asian	Age group, Sex	0.4*	-9.6*
Age 85+	Age <85	Sex, Ethnicity	1.0	-0.8
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.6*	-10.7*
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	4.6*	29.7*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.8	-3.1

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Older adults living in residential care were just over half as likely as those living in their own home to usually visit a dental professional for a check-up rather than for a problem.

Older Māori were one-fifth as likely as older non-Māori to usually visit a dental professional for a check-up rather than for a problem. Similarly, Pacific older adults were a third as likely as non-Pacific older adults to usually visit a dental professional for a check-up rather than for a problem. Asian older adults were also significantly less likely than non-Asian older adults to usually visit a dental professional for a check-up rather than for a problem.

Older adults of lower SES were just over half as likely as older adults of higher SES to usually visit a dental professional for a check-up rather than for a problem.

Older adults who had visited a dental professional in the previous year were four and a half times as likely as older adults who had not visited a dental professional in the previous 12 months, to usually visit a dental professional for a check-up rather than for a problem.

There were no significant differences in the prevalence of usually visiting for a check-up among all older adults by sex, age or dependency level.

### **Prevalence of usually visiting the same dental professional for dental care or dental advice**

Usually visiting the same dental professional implies an ongoing relationship with a particular dental professional, and continuity in dental care.

#### **What were the survey questions?**

In the 2012 OPOHS, all older adults were asked if there was a particular dental professional who they usually go to if they need dental care or dental advice.

One in four older adults living in residential care and nearly half of older adults living in their own home usually visited the same dental professional for dental care or advice

(RC, 24.8%; HB, 48.1%). Table 93 presents the prevalence of usually visiting the same dental professional for dental care or dental advice, by population group.

**Table 93 Prevalence of usually visiting the same dental professional for dental care or advice among all older adults, by population group (unadjusted prevalence)**

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All		24.8	21.1	28.5	48.1	43.4	52.8
Sex	Women	23.3	19.4	27.3	46.7	41.1	52.3
	Men	28.3	22.3	34.4	51.0	46.2	55.9
Age group	65–74	29.8	18.4	41.2	42.6	35.5	49.7
	75–84	25.5	20.1	30.8	50.0	43.7	56.2
	85+	23.4	19.1	27.7	48.6	43.5	53.6
Ethnic group	Māori	17.4	4.6	30.2	28.6	18.5	38.7
	Pacific	8.7	2.3	15.0	30.2	23.8	36.6
	Asian	10.4	0.0	21.9	36.9	20.6	53.2
	Other	25.7	21.9	29.6	50.6	45.6	55.6
NZSEI	1 (least deprived)	35.8	29.0	42.7	63.6	57.2	70.0
	2	27.1	21.1	33.1	51.8	45.3	58.4
	3	19.8	12.1	27.6	38.1	29.7	46.6
	4	27.1	19.4	34.8	43.2	34.5	51.9
	5 (most deprived)	17.2	11.3	23.0	39.2	29.6	48.9
Dependency status	Nursing home	24.6	19.6	29.6	.	.	.
	Psychogeriatric/Dementia	20.2	11.2	29.2	.	.	.
	Hospital care	27.0	20.7	33.2	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 94 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 94 Usually visiting the same dental professional for dental care or advice among all older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.5*	-24.2*
Men	Women	Age group	1.2*	5.2*

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Māori	Non-Māori	Age group, Sex	0.6*	-12.7*
Pacific	Non-Pacific	Age group, Sex	0.6*	-14.1*
Asian	Non-Asian	Age group, Sex	0.7	-11.2*
Age 85+	Age <85	Sex, Ethnicity	0.9	-3.4
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.8*	-7.5*
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	2.5*	39.0*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.7	-6.7*

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Older people in residential care were half as likely as those living in their own homes to visit the same dental professional for dental care or advice.

Older men were significantly more likely than older women to visit the same dental professional for dental care or advice.

Māori and Pacific older adults were significantly less likely than non-Māori and non-Pacific older adults, respectively, to visit the same dental professional for dental care or advice.

Lower-SES older adults were significantly less likely to visit the same dental professional for dental care or advice than higher-SES.

Older people who had visited a dental professional in the previous year were 2.5 times as likely as those who had not visited a dental professional in the previous year to visit the same dental professional for dental care or advice.

There were no significant differences in the prevalence of usually visiting the same dental professional for dental care or advice among all older adults by age or dependency level, or between Asian and non-Asian older adults.

## **Experiences of dental care**

An individual's overall experience of care is an important aspect of quality of care, and helps to assess the extent to which care is people-focused.

### **Prevalence of being listened to carefully by a dental professional**

One measure of experience of dental care is whether individuals feel they are listened to carefully by their dental professional.

### What were the survey questions?

In the 2012 OPOHS, all adults were asked to select whether, on their recent visits to the dental professional, the professional listened carefully to what they had to say: *always, often, sometimes, occasionally, never*. Older adults who answered 'always' and 'often' were considered to be listened to carefully by a dental professional.

Overall, 52.3% of older adults living in residential care and 76% of older adults living in their own home reported being listened to carefully by a dental professional. Table 95 presents the prevalence of being listened to carefully by a dental professional, by population group.

**Table 95** Prevalence of their dental professional listening carefully to what they had to say at their recent dental visit, among all older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
<i>All</i>		52.3	47.7	56.8	76.0	71.6	80.5
<i>Sex</i>	<i>Women</i>	50.9	45.5	56.4	75.6	70.7	80.6
	<i>Men</i>	55.4	49.7	61.1	76.9	71.5	82.3
<i>Age group</i>	<i>65–74</i>	53.2	41.7	64.7	79.6	73.5	85.6
	<i>75–84</i>	52.2	46.1	58.2	76.4	71.0	81.7
	<i>85+</i>	52.2	46.8	57.5	74.5	69.4	79.7
<i>Ethnic group</i>	<i>Māori</i>	33.5	19.6	47.4	60.9	48.9	73.0
	<i>Pacific</i>	46.6	29.2	64.0	62.5	56.1	68.8
	<i>Asian</i>	37.8	19.5	56.1	64.6	47.3	81.8
	<i>Other</i>	53.3	48.8	57.9	78.1	73.5	82.7
<i>NZSEI</i>	<i>1 (least deprived)</i>	63.6	55.9	71.4	82.1	76.5	87.7
	<i>2</i>	55.1	47.5	62.7	77.0	71.2	82.7
	<i>3</i>	57.8	49.6	66.0	72.6	64.3	80.9
	<i>4</i>	53.7	44.3	63.1	74.1	67.0	81.2
	<i>5 (most deprived)</i>	50.6	42.8	58.4	73.7	65.8	81.7
<i>Dependency status</i>	<i>Nursing home</i>	62.7	56.4	69.1	.	.	.
	<i>Psychogeriatric/Dementia</i>	23.1	15.0	31.2	.	.	.
	<i>Hospital care</i>	53.0	47.4	58.7	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

## Comparisons by population group

Table 96 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 96 Having what they had to say being listened to carefully by their dental professional at their recent dental visit, among all older adults, by population group (adjusted rate ratio and rate difference)**

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Residential care	Home-based	Age group, Sex, Ethnicity	0.7*	-24.4*
Men	Women	Age group	1.1	3.2
Māori	Non-Māori	Age group, Sex	0.8*	-15.0*
Pacific	Non-Pacific	Age group, Sex	0.9	-8.7
Asian	Non-Asian	Age group, Sex	0.8	-11.7
Age 85+	Age <85	Sex, Ethnicity	0.9	-3.7
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.1	3.8
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.3*	18.3*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.4*	-35.3*

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Older people living in residential care were significantly less likely than those living in their own homes to feel that they had been listened to carefully by a dental professional.

Older Māori were significantly less likely than older non-Māori to feel that they had been listened to carefully by a dental professional.

Older people who had visited a dental professional in the previous 12 months were 1.3 times as likely as those who had not made a visit to feel that they had been listened to carefully by a dental professional.

The most dependent older adults were less than half as likely as their more independent peers to feel that they had been listened to carefully by a dental professional.

There were no significant differences in the prevalence of being listened to carefully among all older adults by sex, age, or SES or between Pacific and non-Pacific, or Asian and non-Asian older adults.

## Unmet need, cost and barriers to accessing oral health care services

This section examines unmet need for oral health care services, including reasons for the unmet need, and barriers to accessing care. In particular, cost may make people less

likely to visit a dental professional, and may also affect the timeliness and comprehensiveness of the care that is sought and received.

## Prevalence of feeling they did not see a dental professional often enough

### What were the survey questions?

In the 2012 OPOHS, all adults were asked whether they felt they see a dental professional often enough.

Two in five (42.1%) older adults living in residential care and one in three (31.6%) living in their own homes felt that they did not see a dental professional often enough. Table 97 presents the prevalence of participants feeling that they did not see a dental professional often enough, by population group.

**Table 97** Prevalence of feeling they did not see a dental professional often enough, among all older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
<i>All</i>		42.1	37.5	46.7	31.6	27.3	36.0
<i>Sex</i>	<i>Women</i>	40.2	34.7	45.6	30.5	25.5	35.4
	<i>Men</i>	46.7	40.7	52.7	34.1	28.6	39.7
<i>Age group</i>	<i>65–74</i>	47.0	37.0	56.9	47.8	39.7	55.8
	<i>75–84</i>	46.4	40.2	52.5	34.8	28.5	41.1
	<i>85+</i>	38.1	32.6	43.5	23.5	18.8	28.1
<i>Ethnic group</i>	<i>Māori</i>	55.7	42.8	68.6	45.4	34.7	56.1
	<i>Pacific</i>	53.0	41.7	64.3	66.5	53.6	79.4
	<i>Asian</i>	67.5	50.9	84.1	52.6	37.1	68.1
	<i>Other</i>	40.8	36.0	45.5	28.3	23.6	32.9
<i>NZSEI</i>	<i>1 (least deprived)</i>	41.1	33.4	48.7	27.2	20.7	33.7
	<i>2</i>	40.9	33.6	48.2	28.9	23.4	34.3
	<i>3</i>	31.3	23.4	39.1	30.5	24.5	36.6
	<i>4</i>	36.6	28.6	44.5	36.7	28.8	44.6
	<i>5 (most deprived)</i>	44.3	36.6	51.9	35.6	27.0	44.1
<i>Dependency status</i>	<i>Nursing home</i>	33.6	26.8	40.3	.	.	.
	<i>Psychogeriatric/Dementia</i>	61.8	51.6	72.0	.	.	.
	<i>Hospital care</i>	43.2	36.3	50.1	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 98 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 98 Felt they did not see a dental professional often enough among all older adults, by population group (adjusted rate ratio and rate difference)**

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Residential care	Home-based	Age group, Sex, Ethnicity	1.4*	12.5*
Men	Women	Age group	1.1	3.4
Māori	Non-Māori	Age group, Sex	1.2*	8.1*
Pacific	Non-Pacific	Age group, Sex	1.6*	20.7*
Asian	Non-Asian	Age group, Sex	1.5*	19.2*
Age 85+	Age <85	Sex, Ethnicity	0.8*	-8.9*
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.9*	-5.9*
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.7*	-10.2*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.6*	22.4*

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Older people living in residential care were 1.4 times as likely as those who lived in their own home to feel that they did not see a dental professional often enough.

Older Māori were significantly more likely than older non-Māori to feel that they did not see a dental professional often enough. Similarly, Pacific older adults were 1.6 times as likely as non-Pacific older adults, and Asian older adults were 1.5 times as likely as non-Asian older adults to feel that they did not see a dental professional often enough.

Older adults aged over 85 years were significantly less likely than those aged 65–84 years to feel that they did not see a dental professional often enough.

Lower-SES older adults were significantly less likely than higher-SES older adults to feel that they did not see a dental professional often enough.

Similarly, older adults who had visited a dental professional in the previous year were significantly less likely than those who did not make a visit to feel that they did not see a dental professional often enough.

Older people who were most dependent on others for their care were 1.6 times as likely as their more independent peers to feel that they did not see a dental professional often enough.

There were no significant differences in the prevalence of feeling that they did not see a dental professional often enough, between all older men and women.

### Perceived need for dental treatment

People’s perception of their own need for dental care can influence their likelihood of visiting a dental professional, and has been used in a number of models to predict the probability of dental visits (Slade et al 2007). When people experience symptoms of oral disease (such as pain, swelling and bad breath), they are more likely to perceive a need for dental care. In contrast, perceived need among people who make dental visits, should be lower, as these people are more likely to have better overall oral health.

#### What was the survey question?

In the 2012 OPOHS, all older adults were asked whether they feel they currently need dental treatment. If they answered yes, participants were asked what type of dental care they thought they needed. Participants could select multiple responses from the following: *teeth filled or replaced (for example, fillings, crowns and/or bridges); teeth pulled/extracted; gum treatment; denture work; relief of pain; work to improve appearance (for example, braces or bonding); cleaning; other (please specify); nothing.*

One in four older adults living in residential care and one in three older adults living in their own homes felt that they needed dental treatment (RC, 24.9%; HB, 36.0%).

Table 99 presents the prevalence of perceived need for dental treatment, by population group.

**Table 99** Prevalence of perceived need for treatment among all older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
<i>All</i>		24.9	21.7	28.2	36.0	32.2	39.7
<i>Sex</i>	<i>Women</i>	22.9	19.2	26.6	34.6	30.1	39.2
	<i>Men</i>	29.6	24.2	35.1	38.7	32.9	44.5
<i>Age group</i>	<i>65–74</i>	32.3	22.1	42.4	50.8	43.7	57.9
	<i>75–84</i>	26.2	21.5	31.0	39.8	35.3	44.3
	<i>85+</i>	22.6	18.5	26.7	27.7	22.4	33.0
<i>Ethnic group</i>	<i>Māori</i>	24.6	14.4	34.8	45.8	38.3	53.4
	<i>Pacific</i>	38.2	27.4	48.9	59.2	47.4	71.1
	<i>Asian</i>	20.5	7.4	33.6	55.0	39.1	70.8
	<i>Other</i>	24.8	21.4	28.3	33.4	29.5	37.3



Population Subgroup	Setting						
	Residential Care			Home-Based			
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI	
NZSEI	1 (least deprived)	37.1	29.2	45.1	34.9	27.7	42.0
	2	19.9	14.4	25.4	35.0	30.3	39.6
	3	24.5	17.4	31.6	32.7	26.6	38.8
	4	21.5	14.8	28.2	40.2	33.3	47.1
	5 (most deprived)	26.8	19.0	34.6	36.0	28.5	43.5
Dependency status	Nursing home	24.0	19.8	28.2	.	.	.
	Psychogeriatric/Dementia	21.2	11.7	30.6	.	.	.
	Hospital care	27.5	22.2	32.8	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 100 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 100 Perceived current need for treatment among all older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.7*	-9.5*
Men	Women	Age group	1.1	4.2
Māori	Non-Māori	Age group, Sex	1.1	3.6
Pacific	Non-Pacific	Age group, Sex	1.6*	16.8*
Asian	Non-Asian	Age group, Sex	1.2	7.3
Age 85+	Age <85	Sex, Ethnicity	0.7*	-8.8*
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.9	-2.9
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.3*	9.2*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.8	-5.7

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Older people living in residential care were significantly less likely than older adults living in their own home to feel that they currently needed dental treatment.

Pacific older adults were 1.6 times as likely as non-Pacific older adults to feel that they currently needed dental treatment.

Older people aged over 85 years were significantly less likely than those aged 65–84 years to feel that they currently needed dental treatment.

Older people who had made a dental visit in the previous 12 months were 1.3 times as likely as those who had not visited a dental professional in the previous year to feel that they currently needed dental treatment.

There were no significant differences in the prevalence of feeling that they needed to see a dental professional among all older adults by sex, SES or dependency level, or between Māori and non-Māori, or Asian and non-Asian older adults.

### Prevalence of avoiding dental care due to cost

One of the key barriers to accessing oral health services in a timely way is the cost of dental care.

#### What was the survey question?

In the 2012 OPOHS, all older adults were asked whether they agree or disagree with the following statement: *In the last year, I have avoided going to a dental professional because of the cost.*

One in six older adults living in residential care and one in three older adults living in their own homes reported that they avoided dental care in the last year because of the cost (RC, 17.3%; HB, 32.1%). Table 101 presents the prevalence of avoiding dental care due to cost, by population group.

**Table 101** Prevalence of avoiding dental care due to cost in the last year, among all older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All		17.3	13.7	20.9	32.1	27.8	36.4
Sex	Women	15.3	11.2	19.3	31.3	26.8	35.8
	Men	22.0	16.8	27.2	33.8	27.2	40.4
Age group	65–74	27.9	16.5	39.3	54.5	45.6	63.4
	75–84	19.8	14.8	24.8	37.9	31.7	44.0
	85+	13.4	9.3	17.5	19.6	15.3	24.0
Ethnic group	Māori	23.2	13.2	33.2	47.7	38.1	57.3
	Pacific	32.9	15.9	49.9	68.6	55.1	82.1
	Asian	15.8	1.9	29.6	57.3	42.2	72.4
	Other	16.9	13.1	20.7	28.3	24.3	32.4

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI	
NZSEI	1 (least deprived)	20.7	14.0	27.3	23.6	17.6	29.5
	2	12.8	7.8	17.9	28.6	23.9	33.4
	3	16.0	9.4	22.6	32.6	24.8	40.3
	4	18.0	11.8	24.3	42.9	35.7	50.2
	5 (most deprived)	23.4	15.7	31.0	35.3	27.4	43.2
Dependency status	Nursing home	21.8	16.1	27.6	.	.	.
	Psychogeriatric/Dementia	10.4	3.7	17.0	.	.	.
	Hospital care	15.2	9.7	20.7	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 102 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 102 Avoiding dental care due to cost in the last year, among all older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.6*	-12.5*
Men	Women	Age group	1.1	2.8
Māori	Non-Māori	Age group, Sex	1.3*	7.6*
Pacific	Non-Pacific	Age group, Sex	2.0*	23.7*
Asian	Non-Asian	Age group, Sex	1.5*	10.8*
Age 85+	Age <85	Sex, Ethnicity	0.6*	-13.8*
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.3*	6.0*
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.9	-1.6
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.5*	-9.2*

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Older people living in residential care were just over half as likely as those living in their own home to avoid dental care in the last year due to cost.

Older Māori were 1.3 times as likely as older non-Māori, Pacific older adults were twice as likely as non-Pacific older adults, and Asian older adults were 1.5 times as likely as non-Asian older adults, to avoid dental care in the last year due to cost.

The oldest older adults (that is, aged over 85 years) were significantly less likely than younger older adults to avoid dental care in the last year due to cost.

Lower-SES older adults were significantly more likely than higher-SES older adults to avoid dental care in the last year due to cost.

Older adults most dependent on others for their care were half as likely as more independent older adults to avoid dental care in the last year due to cost.

There were no significant differences in the prevalence of avoiding dental care in the last year due to cost, between all older men and women.

### Prevalence of going without recommended routine dental treatment due to cost

Going without recommended routine dental treatment increases the chance of having ongoing dental damage caused by untreated disease. This section presents the prevalence of going without recommended routine dental treatment due to cost, in the previous 12 months.

#### What were the survey questions?

In the 2012 OPOHS, all older adults were asked whether cost prevented them from having any routine dental treatment that was recommended during the previous 12 months.

The prevalence of going without recommended routine dental treatment due to cost was less than 5.2% (RC, 2.3%; HB, 5.2%). Table 103 presents the prevalence of going without recommended routine dental treatment in the previous 12 months due to cost among older adults, by population group.

**Table 103** Prevalence of going without recommended routine dental treatment in the previous 12 months due to cost, among all older adults, by population group (unadjusted prevalence)

Population Subgroup	Setting					
	Residential Care			Home-Based		
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All	2.3	1.1	3.5	5.2	3.4	6.9
Sex						
Women	2.5	0.9	4.1	5.1	3.1	7.2
Men	1.9	0.4	3.4	5.3	2.6	7.9

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
Age group	65–74	1.9	0.0	4.5	12.0	7.3	16.6
	75–84	2.9	0.6	5.2	6.5	3.3	9.8
	85+	1.9	0.6	3.3	1.6	0.6	2.7
Ethnic group	Māori	0.5	0.0	1.6	5.9	0.4	11.4
	Pacific	.	.	.	19.7	10.8	28.7
	Asian	.	.	.	5.9	0.7	11.0
	Other	2.5	1.2	3.7	4.5	2.8	6.1
NZSEI	1 (least deprived)	5.9	1.4	10.3	4.5	2.0	6.9
	2	.	.	.	4.8	0.6	8.9
	3	1.7	0.0	3.9	3.8	0.8	6.8
	4	2.9	0.6	5.2	5.9	1.9	9.8
	5 (most deprived)	1.8	0.0	3.8	5.9	3.1	8.8
Dependency status	Nursing home	3.5	1.6	5.5	.	.	.
	Psychogeriatric/Dementia	.	.	.	.	.	.
	Hospital care	1.9	0.0	4.0	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 104 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 104** Going without recommended routine dental treatment in the previous 12 months due to cost, among all older adults, by population group (adjusted rate ratio and rate difference)

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.5*	-2.4*
Men	Women	Age group	0.8	-0.6
Māori	Non-Māori	Age group, Sex	0.8	-0.8
Pacific	Non-Pacific	Age group, Sex	2.7*	6.0
Asian	Non-Asian	Age group, Sex	0.7	-1.0
Age 85+	Age <85	Sex, Ethnicity	0.3*	-3.5*
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.7	-1.4

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.3*	-36.1*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	9.9*	45.0*

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Older people living in residential care were half as likely as those living in their own home to go without recommended treatment in the previous 12 months due to cost.

Pacific older adults were almost three times as likely as non-Pacific older adults to go without recommended treatment in the previous 12 months due to cost.

Older adults aged over 85 were about a third as likely as younger older adults (that is, aged 65–84) to go without recommended treatment in the previous 12 months due to cost.

Older adults who had visited a dental professional in the previous year were one-third less likely than those who had not visited a dental professional in the previous 12 months to go without recommended treatment in the previous 12 months due to cost.

The most dependent older people were nearly ten times as likely as those who were more independent to go without recommended treatment in the previous 12 months due to cost.

There were no significant differences in the prevalence of going without recommended dental care in the previous 12 months due to cost among all older adults by sex or SES, or between Māori and non-Māori, or Asian and non-Asian older adults.

### **Reasons for having not visited a dental professional in the last year**

The reason people give for not visiting a dental professional in the previous year provides a valuable summary of the range of barriers to accessing services that people experience.

This indicator presents results for older people who had not visited a dental professional in the previous year, representing 76.2% (72.8–79.6) of older adults living in residential care, and 72.2% (67.6–76.8) of older adults living in their own homes.

### What were the survey questions?

In the 2012 OPOHS, older adults who had not been to a dental professional in the previous 12 months were asked the reasons why they had not visited a dental professional in the previous 12 months. The following options were available, and participants could select all that applied: *afraid of dental professionals/don't like the thought of going to a dental professional; nervous; needles; cost; don't know dentist; dentist too far/difficult to make the journey; can't get there; no problems; no teeth; not important; didn't think of it; other*. For this analysis, 'fear' refers to the following: afraid of dental professional/don't like the thought of going to a dental professional; nervous; needles. 'Access' refers to the following: don't know dentist; dentist too far/difficult to make the journey; can't get there. 'Too busy' was formed from the large number of responses collected under 'other'.

Among those older adults who had not visited a dental professional in the previous 12 months: 51.8% living in residential care and 59.7% living in their own home reported that this was because they did not have any dental problems; one in ten (9.3%) living in residential care and one in four (25%) living in their own homes reported that cost was a reason for not visiting a dental professional in the previous 12 months; 15.9% living in residential care and 18.1% living in their own homes said that they did not visit a dental professional in the previous 12 months because they did not have any teeth; and 13.6% living in residential care and 11.3% living in their own home reported that difficulty in accessing dental services was the reason they did not attend a dental professional in the previous 12 months (Table 105).

**Table 105** Reasons for not having visited a dental professional in the last year, among all older adults who had not visited a dental professional in the previous 12 months, by population group (unadjusted prevalence)

Reason for not visiting	Prevalence % (95% CI)	
	RC	HB
No problems	51.8 (46.8–56.8)	59.7 (54.8–64.6)
Cost	9.3 (6.6–12.0)	25.0 (21.5–28.5)
Not important	8.2 (5.3–11.2)	12.3 (7.9–16.6)
Fear	1.3 (0.4–2.2)	4.1 (2.0–6.1)
Access	13.6 (9.6–17.5)	11.3 (7.9–14.7)
No teeth	15.9 (11.8–20.0)	18.1 (9.7–26.5)

## Publicly-funded oral health service utilisation

### What were the survey questions?

In the 2012 OPOHS, all older adults were asked to report which dental services they had used in the previous 12 months, as well as any other services that they had used to help them get dental care in the previous 12 months. For each reported dental or support service, the participant was asked (1) how many times they had used the service in the previous 12 months, (2) what the total cost of the service was when they last used it, (3) how much they paid out-of-pocket the last time they used the service, and (4) how much of the total cost was covered by private insurance.

### Clinical Services

In the 2012 OPOHS, the following publicly-funded oral health services were provided as response options:

- District Health Board (DHB) Emergency Department
- District Health Board (DHB) clinic
- Māori Provider clinic
- Community Clinic (e.g. “People's Centre”)
- Armed Services/Defence Force clinic.

Of the options above, survey participants reported using only DHB clinics and Community clinics.

### Prevalence of accessing services

The prevalence of accessing DHB clinic services in the previous 12 months was low, at 1.7% for older adults living in residential care and 2.0% for those living at home. Utilisation of Community Clinics was negligible, with only one older person living at home reporting having used such a service. Given the low proportion of older adults who reported accessing these services, further analyses (by location of residence, sex, ethnicity, age, SES and dependency level) are not presented here; instead, these can be found in the supplementary tables in Appendix A.

### Frequency of access in the previous 12 months

For those older adults who accessed DHB clinic services in the previous 12 months, the mean number of times per person the service was accessed was 1.6 for RC and 2.3 for HB in that 12-month period. Further analyses are available in the supplementary table in Appendix A.



## **Prevalence of user-charge or co-payment required**

The proportion of older adults who accessed DHB clinic services in the previous 12 months and who paid out-of-pocket on a user-charge basis or by way of co-payment was similar for participants living at home to those living in residential care (RC, 38.8%; HB, 40.0%). Further analyses are available in the supplementary table in Appendix A.

## **Mean value of user-charge or co-payment**

Older adults who paid for DHB clinic services out-of-pocket: those living in residential care paid a mean of \$52.70 (excl. GST), and older adults living in their own homes paid a mean of \$77.80 (excl. GST). Further analyses are available in the supplementary table in Appendix A.

## **Non-clinical services**

No publicly-funded non-clinical services were reported as having been accessed in the 12 months prior to the survey.

## **Privately-funded oral health service utilisation**

### **Clinical Services**

In the 2012 OPOHS, the following privately-funded oral health services were provided as response options:

- Private dental practice to see dentist (not just hygienist)
- Private dental practice to see hygienist
- Private specialist dental practice (e.g. orthodontist, endodontist)
- Dental Technician
- Clinical Dental Technician.

All of these services were reported as being accessed in the previous 12 months to some degree by older adults in both residential locations. In addition, eight participants reported using the University of Otago Community Oral Health Service. This service is privately-funded and is treated as a distinct service for the purpose of this analysis. There were no other dental services (public or privately-funded) reported as having been used by older adults in the previous 12 months.

## **Prevalence of accessing services**

The prevalence of accessing a private dental practice to see a dentist in the previous 12 months was much higher than for any other privately-funded service. One in eight (12.3%) older adults in residential care and one in five (21.3%) of those living in their own homes had accessed a private dental practice in the previous 12 months to see a dentist.

Table 106 presents the prevalence of visiting a private dental practice in the previous 12 months to see a dentist, by population group.

**Table 106** Prevalence of visiting a private dental practice to see a dentist in the previous 12 months among all older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All		12.3	9.9	14.7	21.3	18.0	24.6
Sex	Women	11.6	9.0	14.2	19.6	15.9	23.2
	Men	14.0	9.8	18.1	25.0	20.3	29.6
Age group	65–74	12.6	5.2	20.0	21.5	14.9	28.2
	75–84	13.8	9.4	18.2	22.5	17.0	28.1
	85+	11.2	8.5	13.9	20.3	16.2	24.4
Ethnic group	Māori	2.5	0.0	5.1	8.7	2.2	15.2
	Pacific	2.8	0.0	6.2	11.9	1.6	22.1
	Asian	4.0	0.0	11.4	17.0	9.4	24.6
	Other	13.0	10.5	15.6	22.7	18.8	26.6
NZSEI	1 (least deprived)	23.1	16.6	29.6	36.1	30.3	41.8
	2	10.7	5.9	15.5	23.7	17.6	29.9
	3	11.0	4.7	17.2	14.0	7.0	21.0
	4	11.1	5.4	16.9	14.6	8.8	20.4
	5 (most deprived)	7.9	4.1	11.7	12.6	6.1	19.2
Dependency status	Nursing home	13.6	9.4	17.9	.	.	.
	Psychogeriatric/Dementia	10.3	5.7	15.0	.	.	.
	Hospital care	11.7	8.5	15.0	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 107 presents results by location of residence, sex, ethnicity, age, SES and dependency level, adjusted for age (and other relevant demographic factors) to allow appropriate comparisons.

**Table 107** Visiting a private dental practice to see a dentist in the previous 12 months among all older adults, by population group (adjusted rate ratio and rate difference)

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.6*	-9.5*
Men	Women	Age group	1.3*	3.8*

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Māori	Non-Māori	Age group, Sex	0.3*	-11.0*
Pacific	Non-Pacific	Age group, Sex	0.5*	-8.6*
Asian	Non-Asian	Age group, Sex	0.6	-5.9
Age 85+	Age <85	Sex, Ethnicity	0.8	-3.3
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.6*	-10.7*
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.3*	13.7*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.7	-3.2

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Older adults who resided in residential care were significantly less likely to have accessed a private dental practice to see a dentist in the previous 12 months than those living in their own homes.

Older men were significantly more likely to have visited a private dental practice to see a dentist in the previous 12 months than older women.

Māori and Pacific older adults were significantly less likely than non-Māori and non-Pacific older adults, respectively, to have visited a dentist at a private dental practice in the previous 12 months.

Lower-SES older adults were significantly less likely than those of higher SES to have visited a private dental practice to see a dentist in the previous 12 months.

Older adults who had visited a dental professional in the previous year were significantly more likely than older adults who had not made a dental visit to have visited a dentist at a private dental practice in the previous 12 months.

There were no significant differences in the prevalence of visiting a dentist at a private dental practice in the previous 12 months among all older adults by age, dependency level, or between Asian and non-Asian older adults.

### **Use of other oral health services**

Survey participants' use of all other privately-funded services, listed in this section, in the previous 12 months, was low. The prevalence of accessing a hygienist in a private dental practice in the previous 12 months was negligible (RC and HB, 0.6%). Similarly, the utilisation of private specialist dental practices in the previous 12 months was extremely low (RC, 0.1%; HB, 0.2%). Reported access to dental technicians in the previous 12 months was slightly higher at 2.0% for those older adults living in residential care and 2.6% for those living at home. Reported access to clinical dental technicians in the previous 12 months was minor (RC, 1.3%; HB 0.9%). The eight people who had used the

Otago Community Oral Health Service in the previous 12 months represented 0.1% of the total RC sample and 0.5% of the total HB sample.

Given the small proportion of older adults who accessed the other services in this category in the previous 12 months, further analyses are not presented here; instead, these can be found in supplementary tables in Appendix A.

### Frequency of access in the previous 12 months

On average, older adults in residential care had visited a dentist at a private dental practice in the previous 12 months 1.8 times, and for those living in their own homes the average number of visits was 2.1. Table 108 presents the mean number of visits to a dentist in a private dental practice (for all older adults who had seen a dentist at a private dental practice in the previous 12 months), by population group.

**Table 108 Mean number of visits to a private dental practice to see a dentist, among those older adults who had seen a dentist at a private dental practice in the previous 12 months, by population group (unadjusted mean)**

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Mean	-95% CI	+95% CI	Mean	-95% CI	+95% CI
All		1.8	1.5	2.2	2.1	1.8	2.3
Sex	Women	1.9	1.5	2.3	2.0	1.7	2.2
	Men	1.8	1.2	2.5	2.2	1.7	2.8
Age group	65–74	1.8	1.3	2.2	2.1	1.6	2.7
	75–84	1.9	1.3	2.5	2.0	1.6	2.4
	85+	1.8	1.4	2.3	2.1	1.6	2.6
Ethnic group	Māori	1.7	0.5	2.9	1.7	0.8	2.7
	Pacific	1.6	-4.5	7.7	2.4	-0.6	5.3
	Asian	1.0	.	.	2.6	0.3	4.9
	Other	1.9	1.5	2.2	2.0	1.8	2.3
NZSEI	1 (least deprived)	2.0	1.5	2.6	2.4	1.7	3.0
	2	1.6	1.1	2.1	1.6	1.3	1.9
	3	2.3	0.5	4.2	2.0	1.1	2.8
	4	1.6	1.1	2.0	1.8	1.0	2.6
	5 (most deprived)	1.6	1.1	2.2	2.7	1.7	3.7
Dependency status	Nursing home	1.8	1.3	2.3	.	.	.
	Psychogeriatric/Dementia	1.8	1.2	2.3	.	.	.
	Hospital care	2.0	1.3	2.6	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

## Comparisons by population group

Table 109 presents results by location of residence, sex, ethnicity, age, SES and dependency level, adjusted for age (and other relevant demographic factors) to allow appropriate comparisons.

**Table 109** Number of visits to a private dental practice to see a dentist, among those older adults who had seen a dentist at a private dental practice in the previous 12 months, by population group (adjusted mean ratio and mean difference)

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Mean ratio</i>	<i>Mean difference</i>
Residential care	Home-based	Age group, Sex, Ethnicity	0.9	-0.2
Men	Women	Age group	1.1	0.2
Māori	Non-Māori	Age group, Sex	0.9	-0.2
Pacific	Non-Pacific	Age group, Sex	1.1	0.3
Asian	Non-Asian	Age group, Sex	1.2	0.4
Age 85+	Age <85	Sex, Ethnicity	1.0	0.0
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.8	-0.4
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.5*	0.7*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.9	-0.2

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Older adults who had visited a dental professional in the previous 12 months had a significantly higher mean number of visits to a dentist at a private dental practice than older adults who had not made a dental visit.

There were no significant differences in the mean number of visits to a dentist at a private dental practice in the previous 12 months, among all older adults who had seen a dentist at a private dental practice, by any other group of interest.

## Prevalence of user-charge or co-payment required

Almost half (49.7%) of older people in residential care and four out of five (82.5%) living in their own home paid either by an out-of-pocket payment on a user-charge basis or by way of co-payment the last time they saw a dentist at a private dental practice. Table 110 presents the prevalence of user-charges or co-payments being required at the last visit to a dentist in a private dental practice (for all older adults who had seen a dentist at a private dental practice in the previous 12 months), by population group.

**Table 110** Prevalence of user-charges or co-payments being required, when a dentist was last visited in a private dental practice, for all older adults who had seen a dentist at a private dental practice in the previous 12 months, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All		49.7	40.7	58.7	82.5	76.8	88.3
Sex	Women	51.5	40.1	62.8	79.8	74.2	85.3
	Men	46.2	30.9	61.6	87.0	77.6	96.3
Age group	65–74	43.6	15.9	71.3	76.8	64.4	89.2
	75–84	48.3	35.2	61.5	85.5	77.7	93.2
	85+	52.2	38.0	66.4	82.2	74.3	90.0
Ethnic group	Māori	.	.	.	68.3	34.7	100.0
	Pacific	.	.	.	67.4	44.9	89.9
	Asian	100.0	100.0	100.0	56.6	20.6	92.7
	Other	49.7	40.6	58.8	84.2	78.8	89.6
NZSEI	1 (least deprived)	59.9	44.9	75.0	81.4	73.7	89.0
	2	51.4	33.2	69.7	85.3	76.4	94.1
	3	44.2	17.3	71.1	94.9	84.4	100.0
	4	40.4	22.0	58.8	74.1	62.4	85.9
	5 (most deprived)	44.4	17.2	71.6	74.3	61.3	87.3
Dependency status	Nursing home	52.8	41.9	63.8	.	.	.
	Psychogeriatric/Dementia	14.8	0.0	31.4	.	.	.
	Hospital care	58.6	43.4	73.8	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 111 presents results by location of residence, sex, ethnicity, age, SES and dependency level, adjusted for age (and other relevant demographic factors) to allow appropriate comparisons.

**Table 111** User-charges or co-payments being required, when a dentist was last visited in a private dental practice, for all older adults who had seen a dentist at a private dental practice in the previous 12 months, by population group (adjusted rate ratio and rate difference)

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.6*	-34.2*
Men	Women	Age group	1.1	4.1

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Māori	Non-Māori	Age group, Sex	0.8	-11.1
Pacific	Non-Pacific	Age group, Sex	0.9	-9.8
Asian	Non-Asian	Age group, Sex	0.9	-5.6
Age 85+	Age <85	Sex, Ethnicity	1.0	0.2
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.0	-1.6
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.4	19.5
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.2*	-41.8*

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Older adults living in residential care were just over half as likely as their home-based peers to have paid an out-of-pocket user-charge or co-payment when they last visited a dentist in a private dental clinic in the previous 12 months.

Older adults who were the most dependent on others for their care, were 0.2 times as likely as their more independent peers, to pay an out-of-pocket charge when they last visited a dentist at a private dental practice, in the previous 12 months.

There were no significant differences in the prevalence of user-charges or co-payments being required on the last visit for all older adults who had seen a dentist at a private dental practice in the previous 12 months by sex, ethnicity, age, SES or previous dental visit.

### Mean value of user-charge or co-payment

Of those older adults who paid an out-of-pocket charge to see a dentist at a private dental practice, the average amount per person paid on the last visit was \$497.90 (excl. GST) for those living in residential care, and \$386.20 (excl. GST) for those living at home. Table 112 presents the mean charge paid by older adults on their last visit to see a dentist at a private dental practice (for all older adults who had seen a dentist at a private dental practice in the previous 12 months), by population group.

**Table 112 Mean charge paid by older adults on their last visit to see a dentist in a private dental practice, among those older adults who had seen a dentist at a private dental practice in the previous 12 months, by population group (unadjusted mean)**

<i>Population Subgroup</i>	<i>Setting</i>					
	<i>Residential Care</i>			<i>Home-Based</i>		
	<i>Mean (\$)</i>	<i>-95% CI (\$)</i>	<i>+95% CI (\$)</i>	<i>Mean (\$)</i>	<i>-95% CI (\$)</i>	<i>+95% CI (\$)</i>
<i>All</i>	497.90	288.20	707.60	386.20	287.30	485.00

<i>Population Subgroup</i>		<i>Setting</i>					
		<i>Residential Care</i>			<i>Home-Based</i>		
		<i>Mean (\$)</i>	<i>-95% CI (\$)</i>	<i>+95% CI (\$)</i>	<i>Mean (\$)</i>	<i>-95% CI (\$)</i>	<i>+95% CI (\$)</i>
<i>Sex</i>	<i>Women</i>	426.10	219.40	632.90	278.30	192.00	364.60
	<i>Men</i>	652.10	148.30	1155.90	544.90	338.40	751.40
<i>Age group</i>	<i>65–74</i>	389.30	52.90	725.80	683.60	362.40	1004.70
	<i>75–84</i>	355.10	120.40	589.80	371.40	218.30	524.40
	<i>85+</i>	631.70	268.40	994.90	293.30	187.60	398.90
<i>Ethnic group</i>	<i>Māori</i>	.	.	.	1072.20	-486.40	2630.80
	<i>Pacific</i>	.	.	.	149.70	57.20	242.10
	<i>Asian</i>	273.90	.	.	1517.80	-1006.30	4041.80
	<i>Other</i>	502.00	288.30	715.80	348.20	266.40	429.90
<i>NZSEI</i>	<i>1 (least deprived)</i>	360.70	152.10	569.30	372.00	207.50	536.40
	<i>2</i>	683.90	53.80	1314.00	359.90	167.80	552.00
	<i>3</i>	804.50	-769.00	2377.90	342.40	192.40	492.30
	<i>4</i>	338.00	89.30	586.80	250.20	157.50	343.00
	<i>5 (most deprived)</i>	691.50	-305.70	1688.60	861.30	10.10	1712.50
<i>Dependency status</i>	<i>Nursing home</i>	630.10	298.60	961.70	.	.	.
	<i>Psychogeriatric/Dementia</i>	134.20	-986.40	1254.70	.	.	.
	<i>Hospital care</i>	365.50	92.10	639.00	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### **Comparisons by population group**

Table 113 presents results by location of residence, sex, ethnicity, age, SES and dependency level, adjusted for age (and other relevant demographic factors) to allow appropriate comparisons.

**Table 113 Charge paid by older adults on their last visit to see a dentist in a private dental practice, among those older adults who had seen a dentist at a private dental practice in the previous 12 months, by population group (adjusted mean ratio and mean difference)**

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Mean ratio</i>	<i>Mean difference</i>
Residential care	Home-based	Age group, Sex, Ethnicity	1.5	173.5
Men	Women	Age group	1.7*	236.9*
Māori	Non-Māori	Age group, Sex	2.6	644.4
Pacific	Non-Pacific	Age group, Sex	0.3*	297.5*
Asian	Non-Asian	Age group, Sex	2.7*	691.1



<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Mean ratio</i>	<i>Mean difference</i>
Age 85+	Age <85	Sex, Ethnicity	0.9	-40.5
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.2	81.9
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.0	0.0
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.2*	392.3*

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

RD%: Rate differences are inflated because of a selection of small sample sizes; accordingly, these should be interpreted with caution (or disregarded)

After adjusting for age, older men paid 1.7 times as much as older women on their last visit to a dentist at a private dental practice, in the previous 12 months.

Pacific older adults paid a third less than non-Pacific older adults on their last visit to a dentist at a private dental practice, in the previous 12 months. By contrast, Asian older adults paid almost three times as much as non-Asian older adults in out-of-pocket charges, on their last visit to see a dentist at a private dental practice in the previous 12 months.

Older adults who were most dependent on others for their care paid significantly less than their more independent peers, on their last visit to see a dentist at a private dental practice, in the previous 12 months.

There were no significant differences in the mean charge paid on the last visit to see a dentist, among all older adults who had seen a dentist at a private dental practice in the previous 12 months, by residential location, age, SES or previous dental visit, or between Māori and non-Māori.

### **Non-clinical Services**

No privately-funded non-clinical services were reported as having been accessed by older adults in the previous 12-month period.

### **Support services utilisation**

Participants were asked whether there were any other services that they had used in the previous year to help them to access dental care. Transport was reported as the only support service that had been used.

### **Prevalence of accessing services**

Approximately one in ten older adults (regardless of residential location) reported using a transport service in the previous year to help them access dental care (RC, 8.6%; HB, 11.7%).

Table 114 presents the prevalence of accessing a transport service in the previous year to help access dental care, by population group.

**Table 114 Prevalence of accessing a transport service in the previous year to help access dental care among all older adults, by population group (unadjusted prevalence)**

<i>Population Subgroup</i>		<i>Setting</i>					
		<i>Residential Care</i>			<i>Home-Based</i>		
		<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>	<i>Percent</i>	<i>-95% CI</i>	<i>+95% CI</i>
<i>All</i>		8.6	6.4	10.8	11.7	8.2	15.2
<i>Sex</i>	<i>Women</i>	8.7	6.0	11.4	10.7	7.8	13.6
	<i>Men</i>	8.4	4.6	12.2	13.8	8.3	19.2
<i>Age group</i>	<i>65–74</i>	9.4	3.0	15.9	12.5	6.6	18.5
	<i>75–84</i>	9.2	5.7	12.7	12.6	7.1	18.2
	<i>85+</i>	8.0	5.1	10.9	10.7	5.9	15.5
<i>Ethnic group</i>	<i>Māori</i>	3.6	0.3	7.0	7.0	0.0	15.7
	<i>Pacific</i>	2.4	0.0	5.8	9.3	4.1	14.5
	<i>Asian</i>	8.5	0.0	19.1	7.5	0.4	14.6
	<i>Other</i>	8.8	6.5	11.2	12.3	8.5	16.0
<i>NZSEI</i>	<i>1 (least deprived)</i>	16.3	10.7	22.0	15.3	9.7	20.9
	<i>2</i>	5.5	1.4	9.6	12.8	6.5	19.0
	<i>3</i>	7.0	2.0	12.1	8.7	3.6	13.8
	<i>4</i>	8.0	3.1	12.9	8.5	3.4	13.6
	<i>5 (most deprived)</i>	8.5	2.6	14.5	12.1	6.7	17.5
<i>Dependency status</i>	<i>Nursing home</i>	10.0	6.2	13.9	.	.	.
	<i>Psychogeriatric/Dementia</i>	6.1	0.3	11.9	.	.	.
	<i>Hospital care</i>	8.0	5.2	10.9	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### **Comparisons by population group**

Table 115 presents results by location of residence, sex, ethnicity, age, SES and dependency level, adjusted for age (and other relevant demographic factors) to allow appropriate comparisons.

**Table 115 Utilising a transport service in the previous year to help access dental care among all older adults, by population group (adjusted rate ratio and rate difference)**

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Residential care	Home-based	Age group, Sex, Ethnicity	0.7*	-3.2*
Men	Women	Age group	1.1	1.2

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Māori	Non-Māori	Age group, Sex	0.5	-4.9*
Pacific	Non-Pacific	Age group, Sex	0.6	-3.7
Asian	Non-Asian	Age group, Sex	0.7	-2.7
Age 85+	Age <85	Sex, Ethnicity	0.8	-2.1
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.7*	-4.2*
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	.	.
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.6	-3.3

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Older adults living in residential care and of lower-SES were 0.7 times as likely as those living in their own homes, and of higher SES, to have used a transport service to access dental care in the previous 12 months.

There were no significant differences in the prevalence of accessing a transport service among all older adults in the previous year by any other group of interest.

### Frequency of access in the previous 12 months

Of those older adults who reported using a transport service in the previous year to access dental care, the mean number of times such a service was used was 1.8 for those living in residential care, and 2.5 for those living at home.

Table 116 presents the mean number of times a transport service was used to help access dental care, for all older adults who had used a transport service in the previous 12 months to access dental care, by population group.

**Table 116 Mean number of times a transport service was used to help access dental care, for all older adults who had used a transport service in the previous 12 months to access dental care, by population group (unadjusted mean)**

<i>Population Subgroup</i>		<i>Setting</i>					
		<i>Residential Care</i>			<i>Home-Based</i>		
		<i>Mean</i>	<i>-95% CI</i>	<i>+95% CI</i>	<i>Mean</i>	<i>-95% CI</i>	<i>+95% CI</i>
<i>All</i>		1.8	1.5	2.2	2.5	2.0	3.0
<i>Sex</i>	<i>Women</i>	1.6	1.3	2.0	2.5	2.0	3.1
	<i>Men</i>	2.2	1.3	3.2	2.4	1.7	3.1
<i>Age group</i>	<i>65–74</i>	2.2	1.3	3.2	2.5	1.6	3.4
	<i>75–84</i>	1.6	1.3	2.0	2.9	2.1	3.7
	<i>85+</i>	1.9	1.2	2.6	2.2	1.4	2.9

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Mean	-95% CI	+95% CI	Mean	-95% CI	+95% CI
Ethnic group	Māori	3.7	-0.8	8.2	1.9	1.6	2.3
	Pacific	1.0	1.0	1.0	2.1	1.6	2.6
	Asian	1.5	-4.9	7.8	2.6	-4.0	9.2
	Other	1.8	1.4	2.2	2.5	2.0	3.1
NZSEI	1 (least deprived)	1.6	1.3	1.9	2.9	1.6	4.2
	2	1.6	0.7	2.5	1.8	1.5	2.2
	3	3.1	0.7	5.5	2.0	1.1	2.9
	4	1.9	1.5	2.3	2.0	1.4	2.6
	5 (most deprived)	1.5	0.5	2.5	4.1	1.8	6.3
Dependency status	Nursing home	1.9	1.3	2.5	.	.	.
	Psychogeriatric/Dementia	2.4	1.0	3.7	.	.	.
	Hospital care	1.6	1.2	2.0	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 117 presents results by location of residence, sex, ethnicity, age, SES and dependency level, adjusted for age (and other relevant demographic factors) to allow appropriate comparisons.

**Table 117 Number of times a transport service was used to help access dental care, for all older adults who had used a transport service in the previous 12 months to access dental care, by population group (adjusted mean ratio and mean difference)**

Group of interest	Reference group	Adjustment variables	Mean ratio	Mean difference
Residential care	Home-based	Age group, Sex, Ethnicity	0.7*	0.7*
Men	Women	Age group	1.1	0.2
Māori	Non-Māori	Age group, Sex	1.0	-0.1
Pacific	Non-Pacific	Age group, Sex	0.8	-0.4
Asian	Non-Asian	Age group, Sex	0.9	-0.2
Age 85+	Age <85	Sex, Ethnicity	0.9	-0.3
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.0	0.1
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.0	0.0
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.3	0.5

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Participants living in residential care used a transport services to help access dental care significantly less frequently than their home-based counterparts.

There were no significant differences in the mean number of times a transport service was used to access dental care among all older adults, by any other group of interest.

### Prevalence of user-charge or co-payment required

One third (30.9%) of older adults living in residential care and two-thirds (67.9%) of those living in their own homes, paid for a transport service either out-of-pocket on a user-charge basis or by way of co-payment.

Table 118 presents the prevalence of user-charges or co-payments being required for transport services used to access dental care, for all older adults who had used a transport service to help access dental care in the previous 12 months.

**Table 118** Prevalence of user-charges or co-payments being required for transport services used to access dental care, for all older adults who had used a transport service to help access dental care, in the previous 12 months, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
<i>All</i>		30.9	13.7	48.1	67.9	57.5	78.3
<i>Sex</i>	<i>Women</i>	32.9	12.5	53.4	62.5	46.7	78.3
	<i>Men</i>	25.3	0.0	56.9	77.8	60.3	95.3
<i>Age group</i>	<i>65–74</i>	39.4	0.0	85.6	72.7	46.8	98.5
	<i>75–84</i>	36.0	7.4	64.7	79.1	60.7	97.5
	<i>85+</i>	22.4	1.8	43.0	57.1	41.4	72.8
<i>Ethnic group</i>	<i>Māori</i>	21.2	0.0	51.7	80.1	38.6	100.0
	<i>Pacific</i>	.	.	.	75.4	42.2	100.0
	<i>Asian</i>	.	.	.	60.0	0.0	100.0
	<i>Other</i>	32.4	14.1	50.6	67.6	55.8	79.4
<i>NZSEI</i>	<i>1 (least deprived)</i>	52.9	20.4	85.3	74.3	55.7	92.9
	<i>2</i>	52.5	3.4	100.0	68.6	52.7	84.4
	<i>3</i>	5.0	0.0	16.6	80.5	67.9	93.1
	<i>4</i>	11.9	0.0	35.2	61.4	31.9	90.9
	<i>5 (most deprived)</i>	22.9	0.0	66.5	54.5	22.8	86.1
<i>Dependency status</i>	<i>Nursing home</i>	15.8	0.0	32.2	.	.	.
	<i>Psychogeriatric/Dementia</i>	.	.	.	.	.	.
	<i>Hospital care</i>	62.8	32.3	93.4	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

## Comparisons by population group

Table 119 presents results by location of residence, sex, ethnicity, age, SES and dependency level, adjusted for age (and other relevant demographic factors) to allow appropriate comparisons.

**Table 119** User-charges or co-payments being required for transport services used to access dental care, for all older adults who had used a transport service to help access dental care, in the previous 12 months, by population group (adjusted rate ratio and rate difference)

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Residential care	Home-based	Age group, Sex, Ethnicity	0.4*	-38.0*
Men	Women	Age group	1.2	9.2
Māori	Non-Māori	Age group, Sex	0.9	-3.1
Pacific	Non-Pacific	Age group, Sex	1.3	14.0
Asian	Non-Asian	Age group, Sex	0.7	-17.2
Age 85+	Age <85	Sex, Ethnicity	0.7	-15.8
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.7	-17.6
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.0	0.0
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.4	15.3

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Older adults living in residential care were significantly less likely than those living in their own homes, to have paid an out-of-pocket charge for a transport service in order to help access dental care in the previous 12 months.

There were no significant differences in the prevalence of user-charges or co-payments being required for transport services, used to help access dental care in the previous 12 months, among all older adults by any other group of interest.

### Mean value of user-charge or co-payment

Of those older adults who used a transport service to help access dental care, the average amount paid the last time they used the service was \$25.10 (excl. GST) for those living in residential care, and \$27.30 (excl. GST) for those living at home.

Table 120 presents the mean charge paid by older adults with regard to their last use of a transport service, to help obtain dental care in the previous 12 months, by population group.

**Table 120 Mean out-of-pocket charge paid by older adults with regard to their last use of a transport service to help access dental care in the previous 12 months, by population group (unadjusted mean)**

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Mean (\$)	-95% CI (\$)	+95% CI (\$)	Mean (\$)	-95% CI (\$)	+95% CI (\$)
All		25.10	-4.50	54.80	27.30	20.70	33.90
Sex	Women	31.30	-8.20	70.70	26.30	17.20	35.40
	Men	3.20	-14.20	20.60	28.70	15.20	42.10
Age group	65–74	7.60	-32.90	48.00	19.30	3.40	35.20
	75–84	45.80	-26.80	118.40	35.30	22.10	48.50
	85+	8.80	-16.90	34.50	21.70	14.00	29.40
Ethnic group	Māori	4.60	.	.	48.90	-236.60	334.30
	Pacific	.	.	.	53.20	-80.90	187.30
	Asian	.	.	.	13.70	-44.30	71.70
	Other	25.40	-4.60	55.40	25.80	19.20	32.30
NZSEI	1 (least deprived)	18.30	0.60	35.90	22.40	11.40	33.30
	2	6.50	-51.50	64.50	22.90	6.70	39.20
	3	4.60	.	.	30.00	2.30	57.80
	4	4.60	.	.	37.90	-12.00	87.80
	5 (most deprived)	146.10	.	.	35.90	21.80	50.00
Dependency status	Nursing home	8.60	-16.20	33.40	.	.	.
	Psychogeriatric/Dementia	.	.	.	.	.	.
	Hospital care	33.00	-15.20	81.20	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 121 presents results by location of residence, sex, ethnicity, age, SES and dependency level, adjusted for age (and other relevant demographic factors) to allow appropriate comparisons.

**Table 121 Out-of-pocket charge paid by older adults with regard to their last use of a transport service to help access dental care in the previous 12 months, by population group (adjusted mean ratio and mean difference)**

Group of interest	Reference group	Adjustment variables	Mean ratio	Mean difference
Residential care	Home-based	Age group, Sex, Ethnicity	1.0	-1.2
Men	Women	Age group	0.9	-1.9

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Mean ratio</i>	<i>Mean difference</i>
Māori	Non-Māori	Age group, Sex	2.1	29.0
Pacific	Non-Pacific	Age group, Sex	2.0	27.0
Asian	Non-Asian	Age group, Sex	0.8	-5.0
Age 85+	Age <85	Sex, Ethnicity	0.7	-10.3
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.6	11.9
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.0	0.0
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.0	0.0

Source: 2012 Older People's Oral Health Survey

There were no significant differences in the mean out-of-pocket charge paid to use a transport service to help access dental care, in the previous 12 months, among all older adults by any group of interest.



# Chapter 6: Perceptions and Impact of Oral Health Status

## Key findings

- Nearly one third (29.4%) of older adults living in residential care and just under half (45.5%) living in their own homes rated their oral health as very good or excellent. This means that seven in ten (70.6%) people living in residential care, and more than one in two (54.5%) living in their own homes, consider their oral health to be good, fair, or poor.
- One in five (18%) older people in residential care and one in four (23.9%) living in their own homes had experienced impacts due to their oral health (that is, they reported experiencing one or more OHIP-14 impacts 'often or very often') in the 12 months prior to the survey.
- 14.5% of older adults living in residential care, and 21% living in their own homes experienced orofacial pain in the four weeks prior to the survey.

## Introduction

The clinical measures presented in earlier chapters are very important, but they reflect only the end-point of the disease process. Self-reported information can help to identify problems that people experience as a result of their teeth, and the impacts on people's day-to-day functioning and wellbeing due to various dental conditions (Shearer et al 2007). This chapter reports on people's perceptions of how they are affected as a whole by dental disease, and the data include domains such as toothache and quality of life.

This chapter includes two measures of oral-health-related quality of life (OHRQoL): single ("global") and multi-item. These measures represent people's subjective assessment: how their oral health affects their day-to-day wellbeing and enjoyment of life. Single (global) and multi-item measures aim to capture the functional, psychological and social impacts of oral disease (Gift and Redford 1992).

Global measures attempt to capture overall OHRQoL by asking a single question, usually with response options ranging from 'excellent' to 'poor'. These measures are widely used in research because they are simple to administer and provide an easily interpreted single summary of someone's experience of their oral health. The question taps into general health perceptions and therefore summarises people's perceptions of oral diseases and disorders and their impact on functioning and wellbeing (Locker 2001). The 2012 OPOHS included a global measure of oral-health-related quality of life, later validated against clinical disease using datasets from New Zealand and Australia (Thomson et al 2012).

Multi-item measures ask a number of conceptually related questions. The 2012 OPOHS questionnaire included the Oral Health Impact Profile (OHIP-14), which measures the impacts of a person's general oral condition (rather than the effects of specific disorders or the positive aspects of oral health). The OHIP-14 is the short form version of the OHIP

(Slade and Spencer 1994), and is a valid approach of determining impact of oral conditions (Slade 1997).

## Perceptions and impacts of oral health

### Self-rated very good or excellent oral health

Self-rated oral health is an important predictor of future oral health status and future demands for oral health services (Locker 2001). This indicator presents the results of a global measure of oral-health-related quality of life.

#### What was the survey question?

In the 2012 OPOHS, all older adults were asked, *How would you describe the health of your teeth or mouth? (Excellent, very good, good, fair, poor)*. Adults who answered 'very good' or 'excellent' were classified as having very good or excellent self-rated oral health.

Nearly one third (29.4%) of all older adults living in residential care and just under half (45.5%) living in their own homes rated their oral health as very good or excellent.

Table 122 presents the prevalence of self-rated very good or excellent oral health, by population group.

**Table 122** Prevalence of self-rated 'very good' or 'excellent' oral health among all older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
<i>All</i>		29.4	24.9	33.9	45.5	40.8	50.2
<i>Sex</i>	<i>Women</i>	32.5	27.0	37.9	48.6	42.9	54.2
	<i>Men</i>	22.2	16.9	27.5	39.1	33.6	44.6
<i>Age group</i>	<i>65–74</i>	20.9	11.9	29.9	37.2	32.2	42.1
	<i>75–84</i>	28.2	22.7	33.6	45.3	38.7	51.9
	<i>85+</i>	31.9	26.3	37.6	48.6	42.2	54.9
<i>Ethnic group</i>	<i>Māori</i>	22.5	11.6	33.4	38.4	29.8	47.0
	<i>Pacific</i>	8.9	2.9	14.9	20.0	12.0	28.0
	<i>Asian</i>	16.3	4.9	27.7	14.1	2.4	25.8
	<i>Other</i>	30.3	25.7	35.0	48.6	44.0	53.2

Population Subgroup	Setting						
	Residential Care			Home-Based			
	Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI	
NZSEI	1 (least deprived)	27.9	21.8	34.0	51.8	43.3	60.2
	2	35.9	28.4	43.4	43.9	37.8	50.0
	3	35.6	26.8	44.4	42.2	34.3	50.2
	4	35.6	26.5	44.8	45.5	36.1	54.9
	5 (most deprived)	21.3	14.6	28.0	43.8	36.6	51.1
Dependency status	Nursing home	39.6	32.9	46.3	.	.	.
	Psychogeriatric/Dementia	13.0	6.0	20.1	.	.	.
	Hospital care	25.0	19.1	31.0	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 123 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year, and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 123 Self-rated very good or excellent oral health among all older adults, by population group (adjusted rate ratio and rate difference)**

Group of interest	Reference group	Adjustment variables	Rate ratio	Rate difference (%)
Residential care	Home-based	Age group, Sex, Ethnicity	0.6*	-17.8*
Men	Women	Age group	0.8*	-8.8*
Māori	Non-Māori	Age group, Sex	0.9	-2.2
Pacific	Non-Pacific	Age group, Sex	0.5*	-19.5*
Asian	Non-Asian	Age group, Sex	0.4*	-21.5*
Age 85+	Age <85	Sex, Ethnicity	1.1	2.2
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.1	3.6
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	0.8*	-7.4*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.4*	-18.9*

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference (p<0.05)

Older people who lived in residential care were just over half as likely as those living in their own homes to report having very good or excellent oral health.

Older men were significantly less likely than older women to report having very good or excellent oral health.

Pacific and Asian older adults were half as likely and 0.4 times as likely as non-Pacific and non-Asian older adults, respectively, to report having very good or excellent oral health.

Older people who had visited a dental professional in the previous 12 months were significantly less likely than older adults who had not visited a dental professional in the previous 12 months, to report having very good or excellent oral health.

The most dependent older adults were 0.4 times as likely to report having very good or excellent oral health as their less dependent peers.

There were no significant differences in the prevalence of reporting having very good or excellent oral health among all older adults, by age or SES, or between Māori and non-Māori.

### **Experiencing impacts due to oral health, often or very often (one or more OHIP-14 impacts)**

The Oral Health Impact Profile (OHIP-14) is a multi-item oral-health-related quality of life measure, which measures the frequency and severity of oral problems in relation to functional and psychosocial wellbeing. It is intended to measure the impacts of a person's general oral condition rather than the effects of specific disorders, and is a measure of the burden of oral impairments (not the positive aspects of oral health).

The OHIP-14 consists of 14 statements that ask about experiences older adults may have had in the previous 12 months because of problems with their teeth, mouth or gums. There are seven domains within the OHIP-14, each having two questions (Table 124).

**Table 124 Oral Health Impact Profile (OHIP-14) domains and corresponding statements of experience**

<b>Domain</b>	<b>Statement of experience (OHIP-14 impacts)</b>
Functional limitation	<ul style="list-style-type: none"> <li>• Trouble pronouncing any words</li> <li>• Worsening of sense of taste</li> </ul>
Pain	<ul style="list-style-type: none"> <li>• Painful aching in the mouth</li> <li>• Uncomfortable to eat any foods</li> </ul>
Psychological discomfort	<ul style="list-style-type: none"> <li>• Been self-conscious</li> <li>• Felt tense</li> </ul>
Physical disability	<ul style="list-style-type: none"> <li>• Diet been unsatisfactory</li> <li>• Had to interrupt meals</li> </ul>
Psychological disability	<ul style="list-style-type: none"> <li>• Difficult to relax</li> <li>• Been a bit embarrassed</li> </ul>
Social disability	<ul style="list-style-type: none"> <li>• Been a bit irritable with other people</li> <li>• Difficulty doing usual jobs</li> </ul>
Handicap	<ul style="list-style-type: none"> <li>• Felt in general that life was less satisfying</li> <li>• Been totally unable to function</li> </ul>

Source: Slade (1997)

### What were the survey questions?

In the 2012 OPOHS, all older adults were asked to respond to the set of 14 statements comprising the OHIP-14 (*never, hardly ever, occasionally, fairly often, very often*). These statements ask about experiences adults may have had in the previous 12 months because of problems with their teeth, mouth or gums (see Table 124 for topics). Older adults who answered 'often' or 'very often' to one or more of the statements were classified as having 'one or more OHIP-14 impacts'.

One in five (18%) older adults living in residential care and one in four (23.9%) older adults living in their own homes had experienced impacts due to their oral health (that is, they reported experiencing one or more OHIP-14 impacts 'often or very often') in the previous 12 months. Table 125 presents the prevalence of older adults who experienced one or more OHIP-14 impacts often or very often, in the previous 12 months, by population group.

**Table 125** Prevalence of experiencing impacts due to oral health (one or more OHIP-14 impacts 'often or very often') in the previous 12 months among all older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
<i>All</i>		18.0	15.2	20.9	23.9	20.6	27.3
<i>Sex</i>	<i>Women</i>	16.2	13.2	19.2	23.9	19.8	28.1
	<i>Men</i>	22.4	17.6	27.2	23.9	18.9	28.9
<i>Age group</i>	<i>65–74</i>	13.9	7.6	20.3	33.5	26.2	40.8
	<i>75–84</i>	20.3	16.1	24.5	26.6	21.3	31.9
	<i>85+</i>	17.2	13.6	20.8	18.4	14.8	22.1
<i>Ethnic group</i>	<i>Māori</i>	16.7	6.9	26.6	26.9	17.9	35.9
	<i>Pacific</i>	35.5	23.9	47.2	42.7	34.8	50.7
	<i>Asian</i>	16.0	0.0	31.9	41.5	26.5	56.5
	<i>Other</i>	17.8	15.0	20.7	22.0	18.3	25.8
<i>NZSEI</i>	<i>1 (least deprived)</i>	21.0	15.4	26.6	16.8	13.0	20.6
	<i>2</i>	18.6	12.9	24.2	25.0	19.4	30.6
	<i>3</i>	12.8	7.0	18.7	26.7	21.7	31.6
	<i>4</i>	15.0	10.3	19.6	27.7	20.5	34.9
	<i>5 (most deprived)</i>	20.7	13.8	27.5	23.1	16.2	30.0
<i>Dependency status</i>	<i>Nursing home</i>	16.3	12.1	20.5	.	.	.
	<i>Psychogeriatric/Dementia</i>	13.8	6.8	20.9	.	.	.
	<i>Hospital care</i>	21.8	17.4	26.1	.	.	.

Source: 2012 Older People's Oral Health Survey

Note: Deprivation quintiles have been calculated using estimated NZSEI scores

### Comparisons by population group

Table 126 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year, and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 126 Experiencing impacts due to oral health (one or more OHIP-14 impacts 'often or very often') in the previous 12 months among all older adults, by population group (adjusted rate ratio and rate difference)**

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Residential care	Home-based	Age group, Sex, Ethnicity	0.8*	-5.0*
Men	Women	Age group	1.1	2.7
Māori	Non-Māori	Age group, Sex	1.0	0.1
Pacific	Non-Pacific	Age group, Sex	1.8*	17.0*
Asian	Non-Asian	Age group, Sex	1.4	8.3
Age 85+	Age <85	Sex, Ethnicity	0.8*	-4.9*
Lower SES	Higher SES	Age group, Sex, Ethnicity	1.1	2.0
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.3*	6.1*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	0.7	-5.7

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Older adults who lived in residential care were significantly less likely than those living in their own homes, to have experienced one or more OHIP-14 impacts often or very often, in the previous 12 months.

Pacific older adults were almost twice as likely as non-Pacific older adults to have experienced one or more OHIP-14 impacts, often or very often, in the previous 12 months.

The oldest older adults, that is, those aged over 85 years, were significantly less likely than those aged 65–84 years to have experienced one or more OHIP-14 impacts often or very often, in the previous 12 months.

Older adults who had visited a dental professional in the previous 12 months were 1.3 times as likely as those who had not visited in the last year, to have experienced one or more OHIP-14 impacts often or very often, in the previous 12 months.

There were no significant differences in the prevalence of having experienced one or more OHIP-14 impacts often or very often, in the previous 12 months, among all older adults, by sex, SES or dependency level, or between Māori and non-Māori, or Asian and non-Asian older adults.

## Experience of orofacial pain in the previous four weeks

Orofacial pain (pain in the mouth, jaw or face) can have many causes, including sensitivity to hot or cold food or drink, pain from trauma or fractured teeth, decayed teeth, infections, periodontal diseases, ulceration, or chronic jaw pain.

### What was the survey question?

In the 2012 OPOHS, older adults were asked whether they had experienced pain or discomfort in their teeth or mouth within the last four weeks. Older adults who answered 'always', 'often', 'sometimes', or 'occasionally' were said to have experienced orofacial pain in the last four weeks.

One in seven (14.5%) older adults living in residential care and one in five (21.0%) people living in their own homes reported experiencing orofacial pain in the previous four weeks. Table 127 presents the prevalence of having experienced any orofacial pain in the past four weeks, by population group.

**Table 127** Frequency of experiencing orofacial pain in the previous four weeks among all older adults, by population group (unadjusted prevalence)

Population Subgroup		Setting					
		Residential Care			Home-Based		
		Percent	-95% CI	+95% CI	Percent	-95% CI	+95% CI
All		14.5	12.5	16.6	21.0	18.2	23.7
Sex	Women	13.4	10.7	16.0	20.6	17.2	24.0
	Men	17.3	13.2	21.4	21.7	16.9	26.5
Age group	65–74	12.5	6.5	18.6	30.4	22.3	38.5
	75–84	16.4	12.7	20.1	22.5	18.8	26.1
	85+	13.6	10.8	16.3	16.4	12.9	20.0
Ethnic group	Māori	7.0	2.2	11.9	28.5	17.3	39.6
	Pacific	25.1	13.4	36.9	30.2	19.8	40.6
	Asian	25.6	6.1	45.1	31.9	19.7	44.2
	Other	14.2	12.0	16.5	19.6	16.7	22.4
NZSEI	1 (least deprived)	18.3	13.4	23.3	24.4	20.1	28.8
	2	9.4	5.4	13.3	20.3	15.2	25.5
	3	19.4	12.3	26.5	15.3	8.9	21.7
	4	16.6	10.9	22.3	20.6	14.8	26.4
	5 (most deprived)	12.4	7.7	17.1	26.0	19.6	32.4
Dependency status	Nursing home	13.8	10.7	17.0	.	.	.
	Psychogeriatric/Dementia	14.6	9.2	20.0	.	.	.
	Hospital care	15.3	11.6	19.0	.	.	.

Source: 2012 Older People's Oral Health Survey

## Comparisons by population group

Table 128 presents data by location of residence, sex, ethnicity, age, SES, dental visit in the previous year, and dependency level, adjusted for age (and other relevant demographic characteristics) to allow appropriate comparisons.

**Table 128 Experienced orofacial pain in the previous four weeks among all older adults, by population group (adjusted rate ratio and rate difference)**

<i>Group of interest</i>	<i>Reference group</i>	<i>Adjustment variables</i>	<i>Rate ratio</i>	<i>Rate difference (%)</i>
Residential care	Home-based	Age group, Sex, Ethnicity	0.7*	-5.7*
Men	Women	Age group	1.1	2.0
Māori	Non-Māori	Age group, Sex	1.1	0.9
Pacific	Non-Pacific	Age group, Sex	1.5*	8.2
Asian	Non-Asian	Age group, Sex	1.6*	10.1
Age 85+	Age <85	Sex, Ethnicity	0.8*	-4.4*
Lower SES	Higher SES	Age group, Sex, Ethnicity	0.9	-1.5
Dental visit in previous year	No dental visit in previous year	Age group, Sex, Ethnicity, SES	1.5*	7.9*
Highest dependency level	Other	Age group, Sex, Ethnicity, SES	1.0	0.0

Source: 2012 Older People's Oral Health Survey

\* Indicates a statistically significant difference ( $p < 0.05$ )

Older adults living in residential care were significantly less likely than those living in their own homes to have experienced orofacial pain in the previous four weeks.

Pacific and Asian older adults were one and a half and 1.6 times as likely as non-Pacific and non-Asian older adults, respectively, to have experienced orofacial pain in the previous four weeks.

People aged over 85 years were significantly less likely than those aged 65–84 years to have experienced orofacial pain in the previous four weeks.

Older adults who had visited a dental professional in the previous year were 1.5 times as likely to have experienced orofacial pain in the previous four weeks, as those who had not visited a dental professional in the previous year.

There were no significant differences in the prevalence of experiencing orofacial pain in the previous four weeks among all older adults by sex, SES or dependency level, or between Māori and non-Māori.



# Chapter 7: Summary and Conclusion

## Introduction

Older adults are identified as a priority group in *Good Oral Health for All, for Life*, the strategic vision for oral health policy in New Zealand. However, there is a substantial lack of information on older adults' oral health – particularly the most vulnerable older adults – in New Zealand and elsewhere, to inform policy. The 2012 OPOHS was undertaken in response to a RFP (request for proposals) from the Ministry of Health in 2011, to gather data on this specific group of older adults. The survey is the first of its kind to specifically investigate the oral health of the most vulnerable older adults. The 2012 OPOHS is a key source of information on the oral health issues facing this population, for the development of policy for this particular population group, and to inform the next steps of New Zealand's oral health strategic vision.

This part of the SOPOHI – the 2012 Older People's Oral Health Survey – presents a snapshot of the oral health of older New Zealanders who, in 2012, were living in residential aged-care facilities, or in their own homes receiving home-based personal care assistance. The survey provides important clinical and self-reported information on the oral health status of vulnerable older New Zealanders, and supplements the findings of the 2009 NZOHS. Current research shows that older adults, such as those who make up the Study population, experience poorer oral health and access to oral health services than the rest of the population (Ministry of Health 2010a). This chapter summarises the key findings of the 2012 OPOHS, the strengths and limitations of this survey, and the implications for policy makers; those involved in the care of vulnerable older adults and the dental profession.

## Key findings

### Tooth loss

Tooth loss, and in particular complete tooth loss (edentulism), diminishes people's quality of life, and has been shown to have psychosocial and functional consequences, particularly among older people. Just over half of all older adults who contributed to this Study, had lost all of their own teeth (RC, 56.6%; HB, 52.2%). This means that a substantial proportion of vulnerable older adults may be experiencing impacts relating to their diet, nutrition, general wellbeing and self-rated health.

Among the remaining dentate older adults (RC, 43.4%; HB, 47.8%), virtually all had at least one tooth missing. On average, dentate older adults had fifteen teeth missing (of a possible 32), due to dental caries or periodontal disease (RC, 15.6; HB, 15.1).

### Functional dentition

The retention of 21 or more natural teeth throughout a person's lifetime is considered to comprise a 'functional dentition' through which the functional, dietary and aesthetic needs

of most people can be met with natural teeth alone. One in three dentate older adults in 2012 had a functional dentition (RC, 35.1%; HB, 37.3%).

### **Dental decay experience**

Dental decay is still one of the most prevalent chronic diseases in the total population. Recent research shows that older adults are a caries-active group (Thomson 2004), and that older adults living in residential aged-care facilities in particular experience higher levels of untreated tooth decay than other older adults (Chalmers et al 2005). Almost two-thirds of older adults living in residential care (61.3%), and two in five people living in their own home (43.2%), had untreated coronal decay on one or more teeth. On average, dentate older adults living in residential care had just over two teeth with untreated coronal decay, and those living in their own home had just over one tooth with untreated coronal decay (RC, 2.2; HB, 1.3). Furthermore, one third of all dentate older adults had untreated root decay on one or more teeth (RC, 33.7%; HB, 32.7%). The substantial prevalence of untreated decay gives an indication of the demand for dental services in this population group.

The overall severity of dental decay experience reflects a person's lifetime experience of dental decay, and is presented as the DMFT score, combining the mean number of decayed, filled and missing teeth (due to decay or periodontal disease). The D component of the DMFT comprises teeth with coronal decay or root decay or both. On average, dentate older adults had 24 teeth per person which were decayed, missing or filled (RC, 24.2 comprising 2.6 decayed, 15.6 missing and 6.0 filled teeth; HB, 23.9 comprising 1.7 decayed, 15.1 missing and 7.1 filled teeth).

### **Dental treatment need**

In planning oral health care delivery, it is useful to estimate treatment need. Dental treatment need was estimated in two different ways in the 2012 OPOHS – an 'ideal' indicator based on the severity of dental caries and a 'realistic' indicator based on the opinion of the examining dentist given the individual's need and capability to undergo treatment, and their wishes. The latter is more pragmatic, and likely to reflect the true treatment need and demand for oral health services. Realistically, two in five older adults required at least one restoration (RC, 42.2%; HB, 45.6%). A further one in three older adults living in residential care (33.2%), and one in five people living in their own home (21.9%), required one or more teeth extracted.

### **Tooth replacement**

The replacement of missing teeth assists in improving function, appearance and self-esteem. However, wearing dentures may also have adverse consequences for the condition of the remaining teeth and the supporting soft tissues, in addition to increasing the risk of tooth decay on adjacent teeth. Pathologies of the oral mucosa, function and comfort may also be compromised. There are several permutations of denture wearing; aside from people who are fully edentulous, some dentate people may also wear partial dentures to replace their few missing teeth in each arch, or one complete arch may be edentulous opposing some standing natural teeth and replaced with a full denture.

Of the fully edentulous older adults (comprising just over half of the study population), three-quarters (73.9%) of those living in residential care wore both full upper and lower dentures, and nine in ten (86.9%) of those living in their own homes wore complete dentures. Of the dentate older adults, a quarter wore a full upper denture against standing lower natural teeth (RC, 23.8%; HB, 24.6%). The proportion of dentate older adults wearing a partial denture ranged from one in ten (RC, 7.7%; HB, 11.6%) for missing lower teeth, to one in six (RC, 13%; HB, 18.6%) for missing upper teeth. Very few (less than 5% for both) people had any missing teeth replaced with bridges or implants.

### **Oral hygiene status**

The accumulation of plaque and calculus on the teeth contributes to the development of tooth decay and gum disease. A third (35.8%) of older adults living in residential care and one in five (20.5%) living in their own homes had heavy plaque on their teeth, while 20.8% of older adults living in residential care and 13.8% of those living in their own home had heavy calculus on their teeth. One in five (RC, 21.1%; HB, 17.7%) older adults who wore dentures had staining or calculus on those dentures.

### **Periodontal disease**

The supporting structures of natural teeth (gingivae, periodontal ligaments and bone) can be affected by periodontal diseases, which are characterised by inflammation and, in the case of chronic periodontitis, by the loss of the tissues supporting the natural teeth. The progressive loss of supporting structures can be quantified by measuring periodontal pocketing, which is a measure of the severity of the destructive process of the disease periodontitis. One in ten (11.2%) older adults in residential care had periodontal pocketing of 4mm or more, and almost twice as many – one in five (20.8%) – living in their own home had periodontal pocketing greater than 4mm. A very small proportion (3.0%) of all older adults, regardless of residential location, had deep pocketing (that is, 6mm or more).

### **Oral mucosal conditions**

The causes and range of oral mucosal conditions are numerous. The most concerning condition of the soft tissues is oral cancer. However, the oral mucosal conditions more commonly seen in older adults are often associated with denture wearing, some medical conditions, or the side-effects of the numerous medications prescribed to older adults. One in four (25.4%) older adults in residential care and one in three (31.4%) living in their own homes had at least one soft tissue lesion, including oral ulceration (RC, 8.2%; HB, 11%), oral candidiasis (thrush) (HB, 6.5%; HB, 5.5%), and denture stomatitis (RC, 6%; HB, 2.9%). The prevalence of suspected oral malignancy was extremely low.

Reduced saliva flow has numerous implications for oral health, including greater risk of tooth decay, difficulty and discomfort in eating or in wearing dentures (particularly full dentures), trauma to (and infection of) the soft tissues, general mouth soreness and impaired quality of life. Experiencing a dry mouth may be the result of the side-effects of the numerous medications which older adults are prescribed, or it may be a side-effect of previous cancer treatments; it could also be associated with other medical conditions.

The prevalence of having a dry mouth reported by older adults in the 2012 OPOHS was particularly high, with 52.7% of older adults living in residential care, and 69.7% of those living in their own homes, reporting chronic dry mouth.

### **Toothbrushing and denture hygiene**

Half of all older adults brushed their teeth with fluoride toothpaste at least twice daily (RC, 49%; HB, 51.5%). Thus, half of all older adults do not meet the Ministry of Health recommendations for self-care. This finding is particularly pertinent given the high prevalence of untreated coronal and root decay in this population group, and their greater risk of developing dental decay. While considerable improvements in oral health status could be achieved by improving self-care practices and following recommendations known to reduce plaque levels and dental decay, these strategies may not be as feasible in this particular population group. It may be necessary to investigate other means by which to deliver fluoride and protective oral health care measures to older adults.

It is likely that older adults will have significant accumulations of debris (from food), plaque and calculus on their teeth due to their impaired dexterity (and therefore less effective toothbrushing), resulting from conditions such as arthritis, stroke, dementia and Parkinson's disease; reduced salivary flow (as a side-effect of medication commonly prescribed to older adults); or lack of muscle tone (both providing natural cleansing) owing to age-related changes and medical conditions such as stroke. A substantial proportion of the older adult population – one third (33%) living in residential care and one in five (18.9%) living in their own home – reported having physical difficulty in cleaning their teeth. This finding has significant implications for the risk of oral disease in this population group.

The removal of debris from dentures is also important for the optimal oral health of the surrounding and supporting soft tissues (and adjacent teeth and gums, in the case of partial denture wearers). The majority of older people reported that they cleaned their dentures at least once a day (RC, 84.7%; HB, 88.6%), and half reported that they cleaned their denture at least twice daily (RC, 47%; HB, 50.1%). In order to 'rest' oral tissues, and prevent the development of oral candidiasis in particular, denture wearers are advised to remove their dentures at night; just over half of older adults followed this advice (RC, 61%; HB, 56%). These findings indicate that there is still a substantial proportion of the older adult population who wear dentures who are at risk of developing infections, denture-related soft-tissue lesions, tooth decay and periodontal disease.

### **Use of oral health services**

Oral health care for most New Zealand older adults is privately-funded on a user-pays basis, although some publicly-funded (or co-funded) treatment is available for low-income older adults or those who are medically compromised or disabled. Everyone, regardless of age, is advised to be regularly examined by a dental professional so that oral disease may be detected and treated early, or so that preventive and educative measures can be instituted. The research shows that regular use of dental services, in the absence of symptoms, is associated with better oral health.

One in four older adults had visited a dental professional in the previous year (RC, 23.8%; HB, 27.8%). A small proportion of older adults' last visit to a dental professional was for a check-up (RC, 16.9%; HB, 26.9%) and an even smaller proportion usually visited for a check-up (RC, 12.9%; HB, 19.7%). This finding indicates that the majority of older adults – a caries-active group – are not being screened and monitored for early disease, and neither do they receive treatment or preventive interventions. A quarter (24.8%) of older adults living in residential care and a half (48.1%) of those living in their own home had an on-going relationship with the same dental professional when using dental services.

Just over half (52.3%) of older adults living in residential care and three-quarters (76%) of those living in their own homes felt that they were listened to 'always' or 'often' by the dental professional they attended for their recent dental visit.

Older adults almost exclusively access private oral health services rather than publicly-funded clinical services; use of the latter was extremely low. Most frequently, older adults attended private dental practices to visit a dentist (rather than any other dental professional) (RC, 12.3%; HB, 21.3%), each of those older adults visiting, making on average two visits in the year prior to the survey (RC, 1.8; HB, 2.1). Of the other privately-funded services, the next most frequently visited were dental technicians (RC, 2.0%; HB, 2.6%).

Half (49.7%) of all older adults living in residential care, and the majority (82.5%) of those living in their own homes, paid from their own pocket for the oral health services they received, or made a co-payment towards the cost. On average, the former paid \$497.90 (excl. GST), and the latter paid \$386.20 (excl. GST) on their last dental visit.

Transport was the only support service participants reported using to access their dental care, with approximately one in ten (RC, 8.6%; HB, 11.7%) reporting that they had used such a service. In the previous 12 months, on average, older people living in residential care used transport services 1.8 times to access a dental professional, and those living in their own home used the service 2.5 times. Out-of-pocket payments or co-payments were made for transportation to dental services by one-third (30.9%) of older adults living in residential care, and two-thirds (67.9%) of older adults living in their own homes. The mean cost being \$25.10 (excl. GST) for the former group and \$27.30 (excl. GST) for the latter group.

### **Unmet need for oral health care**

The survey provided strong evidence to suggest there is a high level of unmet dental need among older adults. A sizeable proportion of older adults in the survey – two in five (42.1%) living in residential care and almost a third (31.6%) living in their own homes – felt that they did not see a dental professional often enough, and a quarter (24.9%) of older adults in residential care and a third (36%) of those living in their own homes felt that they needed dental treatment.

Financial barriers are likely to exacerbate inequalities in oral health. The most significant finding related to the most dependent older adult population group; these older adults were almost ten times as likely to go without recommended oral health treatment due to cost, than their more independent peers. Overall, cost was a barrier to accessing oral

health care for one in six (17.3%) older adults living in residential care and one in three (32.1%) living in their own home. Fewer than 6% (RC, 2.3%; HB, 5.2%) reported going without recommended dental treatment because of the cost. Of the older adults who had not made a dental visit in the 12 months prior to the survey, one in ten (9.3%) living in residential care, and one quarter (25%) living in their own homes, reported cost to be a reason for not having visited.

Over half of the participants (RC, 51.8%; HB 59.7%) reported that they had not made a dental visit in the last year because they had no problems, and 13.6% of those living in residential care and 11.3% of those living in their own home, reported that difficulty in accessing dental services was a reason for their avoidance of care in the previous year.

### **Perceptions and impacts of oral health**

A large proportion of this population group experiences less-than-ideal oral health. Less than one-third (29.4%) of older adults living in residential care, and fewer than half (45.5%) of those living in their own homes, reported that they enjoyed very good or excellent oral health. Furthermore, one in five (18%) older adults living in residential care and a quarter (23.9%) living in their own homes, reported that their oral health impacted their day-to-day functioning and wellbeing. One in seven (14.5%) older adults living in residential care and one in five (21%) living in their own home reported experiencing oral pain or discomfort in the four weeks prior to the survey.

### **Priority population groups in the 2012 OPOHS**

Examining the oral health status of particular population groups helps identify where disparities in oral health exist, and it informs the development and implementation of future strategies and interventions to improve oral health and reduce inequalities.

#### **Māori**

Overall, older Māori had poorer dental status, were less likely to access services, viewed cost as a major barrier to accessing services, and did not enjoy the same level of OHRQoL as non-Māori. Older Māori experienced greater tooth loss, being significantly more likely than non-Māori to be edentulous, and those who had teeth had significantly fewer natural teeth present per person than dentate non-Māori. Consequently, dentate Māori were a third less likely to have a functional dentition. Māori older adults who had no teeth were significantly less likely to wear both upper and lower full dentures than edentulous non-Māori older adults.

Overall, Māori older adults accessed oral health services less frequently than non-Māori older adults. They were significantly less likely to have visited a dental professional in the previous year, half as likely to have visited at that time for a check-up, only one-fifth as likely as non-Māori to usually attend for a check-up, and only a third as likely to have accessed a privately-funded service to see a dentist. When older Māori did visit a dental professional, they were less likely to see the same person as at their previous visit, to visit a private dentist or feel that they were listened to carefully by the dental professional they attended.

Older Māori were significantly more likely to feel that they did not see a dental professional often enough. Cost was a significant barrier to accessing dental care for older Māori; they were significantly more likely than non-Māori to avoid going to a dental professional in the last year due to the cost.

## **Pacific peoples**

In contrast to non-Pacific older adults, Pacific older adults were significantly less likely to be fully edentulous. Dentate Pacific older adults had, on average, almost twice as many sound teeth present, fewer filled teeth, and a lower mean DMFT score, than non-Pacific older adults.

Despite these positive findings, there were a number of domains where the oral health of dentate older Pacific people was substantially worse. Pacific older adults were more likely to have untreated coronal decay, and had almost twice as many teeth with untreated coronal and root decay. Not only were they twice as likely to have periodontal pocketing as non-Pacific older adults, they were nine times more likely to have deep pocketing. Dentate Pacific older adults were twice as likely to have heavy calculus on their teeth as non-Pacific older adults.

Reflecting the level and severity of oral disease, Pacific older adults were twice as likely as non-Pacific older adults to require extractions, and (on average) required more than three times the number of teeth extracted than non-Pacific older adults. This suggests that their oral disease tended to be so extensive that the teeth involved could not be retained.

There were significant difficulties in accessing care for Pacific older adults. On their last visit to a dental professional, Pacific older adults were only half as likely as non-Pacific older adults to have attended for a check-up: they were more likely to have sought care for a dental problem. Furthermore, Pacific older adults were only a third as likely as non-Pacific older adults to usually visit a dental professional for a check-up. When accessing care, they were also significantly less likely to have visited a privately-funded service. Continuity of care was also lacking for Pacific older adults, who were significantly less likely to have attended the same dental professional as on previous visits.

There was also considerable unmet need among Pacific older adults; they had a higher perceived need for treatment and felt that they did not see a dental professional often enough. Cost was a substantial barrier to accessing care for Pacific older adults. They were twice as likely to avoid going to a dental professional and three times as likely to avoid undertaking recommended routine treatment as non-Pacific older adults due to cost. In addition, Pacific older adults paid twice as much as non-Pacific older adults to use a transport service to access their care.

The self-report findings indicated that Pacific older adults did not enjoy oral health which is as good as that of their non-Pacific peers; they were only half as likely to consider their oral health as excellent or very good, almost twice as likely to report having quality-of-life impacts due to their oral health, and significantly more likely to report having experienced orofacial pain in the previous month.

## **Lower-SES older adults**

The findings of the 2012 OPOHS also show that SES disparities in oral health exist among older adults, particularly in relation to dental status, access to services and unmet need. Those of lower SES were more likely than those of higher SES to be edentulous. Moreover, lower-SES dentate older adults were significantly more likely to experience a higher prevalence of partial tooth loss; consequently, they were less likely to have a functional dentition than those of higher SES. Concerning oral mucosal conditions, lower-SES older adults were more likely to report having oral ulceration and a dry mouth than their higher-SES peers.

In the year prior to the survey, lower-SES older adults were less likely to have visited a dental professional; those who had done so were more likely to have attended for a dental problem rather than a check-up, less likely to usually attend for a check-up, and were also less likely to have visited the same dental professional as on previous visits. They were also significantly less likely to have accessed a privately-funded dental service and to have used a transport service to access dental care. Lower-SES older adults were more likely to avoid seeking dental care due to cost.

## **Older adults in residential aged-care facilities**

The findings of the 2012 OPOHS are consistent with previous research which shows that older adults living in aged-care residential facilities experience poorer oral health than community-dwelling older adults. The oral health of dentate older adults in residential care was poorer than that of their dentate community-living peers. On average, they were more likely to have untreated coronal decay, with more lesions. They were also more likely to require extractions, and on average, require more teeth extracted than those living in their own homes. Interestingly, they were just over half as likely as those living in their own home to have periodontal pocketing of any depth. Older people in residential care, who were either fully or partially edentulous, were less likely to have had their missing teeth replaced.

Dentate older adults living in residential care had poorer oral self-care than their counterparts living in their own homes, being almost twice as likely to have heavy plaque and significantly more likely to have heavy calculus on their teeth. Possibly reflecting this finding, and indicated by their poorer oral health status, older adults living in residential care were significantly less likely than those living in their own homes to brush their teeth daily and to use fluoridated toothpaste when brushing their teeth. In addition, those living in residential care who were dentate were twice as likely as their community-dwelling peers to report having physical difficulty in cleaning their teeth.

Overall, almost all indicators of access to services, unmet need and OHRQoL were poorer for RC older adults. They were less likely to access oral health services, particularly privately-funded services, or to have visited a dental professional in the previous year. When they had attended, they were half as likely to have done so for a check-up (that is, they were more likely to attend for a problem), less likely to usually attend for a check-up, and less likely to have seen the same dental professional as at their previous visit. They were also less likely to have paid fully or paid a co-payment for



their treatment. Older adults in residential care were significantly less likely to have used transport services to access care.

Irregular and symptomatic attendance, and a lack of continuity in care, not only places older adults in residential care at greater risk of developing oral diseases, it means that they have fewer opportunities for preventive interventions and educative support. A high degree of unmet need was evident in this vulnerable population group. Older adults in residential care were significantly less likely to feel that they had been listened to carefully by their dental professional and significantly more likely to report that they felt they did not see a dental professional often enough. Nevertheless, older adults in residential care had significantly lower perceived need for treatment, and cost did not appear to be a significant barrier to accessing dental care.

Fewer older adults living in residential care reported experiencing orofacial pain in the mouth or teeth in the four weeks prior to the survey, and fewer reported OHRQoL impacts. Despite these somewhat counter-intuitive findings, significantly fewer reported that they thought they had very good or excellent oral health.

### **The most dependent older adults**

The residential care sample of the study was analysed to determine the oral health of those older adults who were most dependent on others for their day-to-day care. These older adults did not fare as well as the more independent older adults with regard to accessing services, unmet need and OHRQoL. The only significant findings regarding dental status in this population group were that the most dependent older adults who had no natural teeth remaining were significantly less likely to wear complete dentures, but more likely to wear only a full denture to replace their upper teeth.

Dependent older adults were more likely to feel that they did not see a dental professional often enough. Cost was a significant barrier to dental care for dependent older adults; as mentioned previously, they were almost ten times more likely to go without recommended treatment due to cost than their less dependent peers. When they did visit a dental professional they were less likely to feel that they were listened to carefully, and less likely to pay an out-of-pocket charge as their more independent peers, and to pay as much for their treatment. Overall, the most dependent older adults were less than half as likely as their more independent counterparts to feel that they had very good or excellent oral health.

## **Other key population groups**

### **The oldest older adults**

As would be expected, given the findings of other surveys, the oldest older adults were significantly more likely to be edentulous, and to have retained fewer of their own natural teeth. Unlike other age groups, however, they were more likely than their younger counterparts to be wearing prostheses to replace their missing teeth.

Dentate older adults aged over 85 years experienced poorer oral health than dentate older adults aged 65–84 years, in a number of the oral health indicators measured in this survey. They were less likely to have a functional dentition, they had fewer sound teeth, were more likely to have untreated root decay and greater severity of untreated root decay, had a significantly higher DMFT, on average, and more teeth that required extraction. Despite these differences, overall, the oldest older adults were more likely to report that they enjoyed better OHRQoL.

The oldest older adults were less likely to have visited a dental professional in the year prior to the survey. However, unmet need among the oldest older adults was low and cost did not appear to be a barrier to receiving dental care.

### **Older men and older women**

Although older men were less likely to have lost all of their own teeth than older women, the condition of the remaining teeth was significantly poorer, with more older men having untreated coronal and root decay, with greater severity of the latter. Subsequently, older men required more restorations and had a greater need for teeth to be extracted than women. The high level of treatment need may be partially explained by the finding that men were significantly more likely to have heavy plaque on their teeth and less likely to brush their teeth with or without fluoride toothpaste. Older men with dentures also had poorer denture care than women. Overall, the poor oral health of older men was reflected in poorer self-reported oral health.

### **Older adults who had made a dental visit in the previous year**

One way to maintain good oral health is to regularly visit a dental professional so that disease may be detected (and intercepted) early and preventive measures can be provided. The measure used in the 2012 OPOHS to assess a recent visit to a dental professional: 'made a dental visit in the previous year', includes regular visits made by older adults to their dental professional for routine check-ups, as well as older adults who visited occasionally for relief of pain and infection, or for other problems related to their oral health, such as denture-related or soft-tissue-related matters.

Overall, older adults who had made a recent dental visit had better oral health than those who had not, faring better in almost all measures, from the condition of the oral tissues to their oral health behaviours and patterns of behaviour. In particular, those older adults who had visited a dental professional in the previous year were nearly five times as likely to usually visit for a check-up than a problem. Of some concern is the high prevalence of periodontal disease in this population group – they were almost twice as likely as those who did not attend to have periodontal pocketing. However, they were significantly less likely to have heavy calculus on their teeth. Despite their better oral health, this population group reported experiencing a dry mouth, poorer OHRQoL, and more orofacial pain, and were less likely to perceive their oral health to be very good or excellent. They were also significantly more likely to feel that they needed dental treatment.

## **Asian peoples**

Asian older adults had better oral health (except for being more likely to have untreated coronal decay) and self-care practices than non-Asian older adults. Despite the majority of clinical findings indicating that they experienced better oral health status in almost all indicators measured, the self-report data show that Asian older adults did not feel that they saw a dental professional often enough, experienced poorer self-perceived oral health than other population groups, and more likely to have experienced orofacial pain in the four weeks prior to the survey. Overall, Asian older adults were more likely to have avoided dental care due to cost; when they did visit a private dentist, they paid almost three times as much as non-Asian older adults.

## **Other population groups and risk factors**

This report has covered only a portion of what is possible using the 2012 OPOHS. The Ministry of Health will make the survey dataset available to researchers for academic purposes. Future analysis of the 2012 OPOHS dataset could examine oral health status with regard to:

- differing residential locations relative to ethnicity, SES and other demographic indicators
- oral-health-related quality of life
- geographic location status
- toothbrushing practices (time of day; rinsing compared with spitting toothpaste)
- knowledge of (and attitudes to) oral health
- dental anxiety
- nutritional status
- denture wearing
- dry mouth status
- dementia
- tobacco use
- ideal versus realistic treatment requirements
- comparison with independent older adults from the 2009 NZOHS.

## **Strengths and limitations of this study**

The strengths of the 2012 OPOHS centre on the robust methodology employed and the high response rates achieved. The dental examinations carried out for this survey were robust and have provided assessments of the oral health status of older New Zealanders. Dental examiners, and interviewers/recorders, attended multi-day training courses, and dental examiners' clinical assessments were compared with those of a gold standard examiner, to assess reliability. Overall, high levels of reliability were found for almost all

measures. Furthermore, having the same lead examiner and dental examination protocols as the 2009 NZOHS has ensured comparability between these surveys.

This Study also provides unique insight into the most vulnerable and dependent older adults residing in New Zealand: those living in residential aged-care facilities. This population group was not included in the 2009 NZOHS, and as such the 2012 OPOHS provides an evidence base for future research and interventions. Another fundamental difference between the 2009 and 2012 oral health surveys, was that all older people who participated in the 2012 OPOHS interviews were invited to participate in the dental examination, irrespective of whether they had natural teeth or not. Only adults who had their natural teeth were examined in the 2009 NZOHS. Analysing the self-reported and clinical findings of older adults who do not have any natural teeth, offers important supplementary information about the overall oral health of this population group.

The implementation of the 2012 OPOHS with a robust statistical approach presented a number of methodological challenges, and although a number of strategies were employed to address these challenges, the Study has some important limitations. The sampling frames for the two target populations were well defined, being based on national claims databases. However, a small number of older people that did not receive any subsidised care in residential care would have been excluded from this project as they would not have appeared on the claims databases. To allow for the fluid nature of the target populations, samples were drawn each month, for specific residential care facilities or DHB regions, and therefore were relatively up-to-date when selected potential participants were contacted. The pilot phase of 2012 OPOHS suggested that approximately 10% of older people selected from these databases would have moved to another place of residence or passed away. In the first two months of the Study, it became clear that this figure was higher than expected; at about 20%. Older people who were close to death, or who were about to move into residential care, were therefore under-represented in the Study.

In the residential care setting, it was often necessary to collect information from proxies, when a participant was unable to fully engage with the survey's requirements, such as recalling information. Data for these participants are therefore less complete than for other participants.

To our knowledge, the 2012 OPOHS is the first population-based oral health survey in New Zealand, and internationally, to collect data in older adults' usual place of residence. While every effort was made to standardise the examination procedure (as is ideal), assessing older adults in their place of residence presents challenges and difficulties (such as the physical limitations and frailty of the study population), in ensuring consistency in the conduct of examinations. Therefore, some systematic error may be present given that the examination conditions were not able to be totally standardised within the survey (nor compared to the 2009 NZOHS where the environment was relatively well controlled).

It should be noted that the non-clinical findings presented in this report were self-reported. Accordingly, these responses may have some recall error.

## Implications of these findings

The findings of the 2012 OPOHS (together with the findings from the other constituent parts of the SOPOHI), will be used to inform the progression and future development of the strategic vision for oral health in New Zealand: *Good Oral Health for All, for Life*, as well as future oral health policies and programmes. In particular, the findings will help to identify the issues on which to focus efforts for vulnerable older adults.

Vulnerable older dentate New Zealand adults are a high-carries-risk population group. Given that the New Zealand population is expected to increase, and become older and increasingly dentate (Statistics New Zealand 2014; Thomson 2012), it is critical that policy is developed to address the oral health issues of this population group, particularly in the areas of continued monitoring, prevention and service delivery. In addition to having implications for policy-makers, the survey findings are important for oral health professionals, and the staff and administrators of residential aged-care facilities.

## Implications for oral health policy

The findings of the 2012 OPOHS (and other oral health surveys) show that older adults are increasingly retaining their own teeth, that there is a high prevalence of untreated decay, and that there is significant unmet need, with four in ten vulnerable older adults requiring restorations and a third requiring extractions. While these findings are indicative of the current oral health demands, they are also suggestive of the likely future demand for oral health services and burden of oral disease.

Data from the 2009 NZOHS shows that more of New Zealand's future older adults (that is, those adults currently aged 45–64) will be dentate, and that a large proportion will have filled or restored teeth, thus placing them at even greater risk of oral disease. Given that this survey shows that the most vulnerable older adults are at high risk of dental disease, the future burden of oral disease is likely to be very high. Oral health policies and initiatives need to focus on addressing the likely future burden of oral disease, including provision of services and preventive measures.

- A life course approach in oral health policy development is crucial to mitigate the development of oral disease and associated burdens.
- Continuing a common risk factor approach to chronic disease prevention.
- Oral health care should be integrated into all health policies and policy initiatives for all older adults, as well as other policies and policy initiatives which have a bearing on the health and wellbeing of older adults.
- Māori and Pacific older adults experience poorer oral health than non-Māori and non-Pacific older adults. Policy initiatives should focus on ways of delivering culturally appropriate oral health care which is also affordable and accessible. Oral health should be integrated into Whānau Ora approaches.
- Older adults living in residential aged-care facilities shoulder a greater burden of oral disease. Policy initiatives should focus on finding alternative and appropriate means to deliver oral health care (particularly treatment and preventive measures) to this population subgroup. Requirements to seamlessly integrate oral health into screening and the primary care of vulnerable older adults could be implemented.

- A substantial proportion of older adults, and several specific population groups, reported that they felt they did not see a dental professional often enough. They also reported that cost was a key barrier to accessing oral health services, many of whom in this study would most likely be on a fixed income. Particularly impacted were Māori, Pacific and lower-SES older adults. Difficulty in physically accessing oral health care was also identified as a key barrier to maintaining good oral health. Finding ways to deliver tailored, cost-effective oral health care to this population group should be a priority focus for policy.
- Initiatives to raise the awareness of the importance of oral health for older adults' quality of life and general health, among policy-makers, other health professionals, older adults themselves, carers of older adults, including residential aged-care facilities and the general public. Doing so would go some way to reducing the prevalence of oral disease.
- Developing population-specific recommendations for preventive care and procedures.

### **Implications for staff, carers and administrators of residential aged-care facilities**

The findings of the 2012 OPOHS will be of particular interest to those directly and more broadly involved in the care of older adults living in residential aged-care facilities. In contrast to older adults living in their own home, older adults in residential care were:

- more likely to have untreated coronal decay and greater severity of untreated coronal and root decay
- more likely to require one or more teeth extracted and require significantly more teeth extracted
- almost twice as likely to have heavy plaque and significantly more likely to have heavy calculus on their teeth
- less likely to brush their teeth daily and to use fluoridated toothpaste when doing so
- twice as likely to report having physical difficulty in cleaning their teeth (dentate older adults)
- less likely to have visited a dental professional in the previous year; when they did visit, they were more likely to attend for a problem than a check-up
- half as likely to usually attend for a check-up
- less likely to report seeing the same dental professional they saw at their previous dental visit
- more likely to report that they felt they did not see a dental professional often enough
- more likely to be aware that their oral health was poorer, with significantly fewer reporting they thought they had very good or excellent oral health.

Thus, older adults living in residential aged-care facilities experience poorer oral health and are less likely to access dental services. Also impacted are those older adults who are most dependent on others for their care, many of whom live in residential aged-care facilities. As this survey shows, these people are more likely to have issues with accessing oral health services and experience greater unmet need.

The implications of these findings include:

- specifically and systematically incorporating oral health into residents' care regimes, through measures such as regular screening and the provision of preventive measures and methods of plaque control
- increasing staff awareness of the oral health issues facing their residents and implementing measures to manage those issues, including ensuring residents have access to oral health care services.

### **Implications for oral health professionals**

The survey findings demonstrate the benefits of older adults' regularly attending a dental professional for the maintenance of their oral health and provision of preventive measures, especially given that the dentate portion of this population group is caries-active, has a high risk of developing dental caries and has a high prevalence of periodontal disease. However, older adults' practice of protective oral-health measures – oral self-care and use of oral health services – is low. Furthermore, there is substantial self-reported and measured unmet need. Without input from the wider oral health profession, these issues will remain unchanged in the future. The implications of the findings of this survey for dental professionals include:

- raising the profession's awareness of the prevalence of oral disease and unmet need among vulnerable older adults
- ensuring that they are engaging with their older adult patients in accordance with the Code of Health and Disability Services Consumers' Rights
- providing advice and oral health services for routine maintenance and dental treatment of older adults
- engaging with residential aged-care facilities to provide oral health advice and care
- engaging with other health care professionals on the implications of comorbidities and associated medications on oral health
- working with policy makers to address issues of oral health service delivery
- ensuring that the oral health workforce has the skills and capacity required to address the future needs of this population group.

## **Conclusion**

The 2012 OPOHS Key Findings Report has presented the most up-to-date and comprehensive information on the oral health status of the most vulnerable and dependent older adults residing in New Zealand: the people living in residential aged-care facilities, and those receiving home-based personal care assistance in their own homes. Overall, high rates of oral disease and unmet need exist within this population group. This study has found that, in general, people within this population group do not routinely engage in the oral health care practices which would assist in reducing disease, and maintaining oral health. Moreover, substantial ethnic, SES, locational and dependency-related disparities in oral health, and oral health care, are apparent.

The key findings from the 2012 OPOHS provide information for the further development of oral health policies and programmes for vulnerable older adults. Appendix A presents a detailed overview of all the key results from this survey. Academic researchers, policy analysts, dental professionals and non-governmental organisations are encouraged to undertake or commission their own analyses of the 2012 OPOHS data.



# Glossary

<b>95% confidence interval</b>	An indicator of the accuracy of a survey estimate. The 95% confidence interval (95% CI) is the interval that would be expected to contain the true population value 95% of the time, if many samples were taken. In this report, 95% confidence intervals have been presented as lower and upper bounds (-95% CI and +95% CI).
<b>Adjustment</b>	This is where rates or results have been adjusted to take account of differences in the distribution of other factors (such as age) between different groups (e.g. different ethnic groups).
<b>Bridge</b>	A prosthesis used to replace a tooth or teeth, which is cemented on to a natural tooth or teeth nearby and is not intended for removal by the participant.
<b>Caries</b>	The process by which tooth structure is destroyed by acid produced by bacteria in the mouth. See <i>Dental decay</i> .
<b>Caries-active</b>	Having clinically diagnosed dental decay.
<b>Caries-free</b>	Having no teeth that are decayed; missing due to pathology (dental decay or periodontal disease); or filled (i.e. a dmft/DMFT score of 0).
<b>Cervical tooth surface</b>	The portion of the tooth surface closest to the gum.
<b>Complete dentures</b>	Both upper and full lower dentures.
<b>Complete tooth loss</b>	Loss of all natural teeth (also referred to as edentulism).
<b>Coronal</b>	Pertaining to the crown of a tooth.
<b>CPI</b>	Community Periodontal Index.
<b>Crown</b>	The portion of tooth covered by white enamel that is usually visible in the mouth.
<b>Dental caries experience</b>	The cumulative effect of the caries process through a person's lifetime, manifesting as teeth that are decayed, missing or filled.
<b>Dental decay</b>	Cavity resulting from dental caries.
<b>Dental recorders</b>	Interviewers from CBG Health Research Ltd who were present at the clinical examinations to record the information provided by the dental examiners during the examinations.
<b>Dentate</b>	Having one or more natural teeth.
<b>Dentine</b>	The hard, calcified tissue which forms the major part of the tooth. It encloses the dental pulp, but is covered by enamel on the coronal surfaces.
<b>Dentition</b>	The set of natural teeth. The adult dentition comprises 32 teeth, while the primary dentition comprises 20 teeth.
<b>Denture</b>	A removable dental prosthesis that substitutes for missing natural teeth and adjacent tissues.

<b>DMFT</b>	An index of dental caries experience determined by counting the number of decayed (D), missing (M) and filled (F) permanent teeth (T).
<b>Edentulous</b>	( <i>edentulism, edentate</i> ) Being in the state of having complete loss of all natural teeth.
<b>Enamel</b>	Hard, creamy-white mineralised tissue covering the crown of a tooth.
<b>Extraction</b>	Removal of a natural tooth.
<b>Fissure sealant</b>	A material, usually a resin, that has been placed in the pits and fissures of teeth to protect against the development of caries. Sealants are also used in conjunction with filling materials.
<b>Fluoride</b>	A naturally occurring trace mineral that helps to prevent tooth decay.
<b>Functional dentition</b>	The minimum number of teeth required to allow attributes such as eating comfortably and socialising without embarrassment. For this report, a functional dentition was defined as having 21 or more natural teeth, although at an individual level the above attributes could be achieved with fewer teeth.
<b>Gingiva</b>	Gum tissue.
<b>Gold standard examiner</b>	A dental examiner whose role was to conduct replicate examinations for about six survey older adults per examiner, to ensure consistency between the dental examiners. For the 2012 OPOHS, the gold standard examiner was Dr. Moira Smith.
<b>HB</b>	Home-based.
<b>Implant</b>	Device support restorations that resemble a tooth or group of teeth to replace missing teeth.
<b>Incisor</b>	One of eight front teeth used during eating for cutting food.
<b>Intra-class coefficient (ICC)</b>	A statistical term referring to a measure of agreement between two or more examiners.
<b>Lead examiner</b>	An examiner who led the training and calibration course for the dental examiners. For the 2012 OPOHS, the lead examiner was Associate Professor Kaye Roberts-Thomson.
<b>Mean</b>	The arithmetic average of a set of values.
<b>MoH</b>	Ministry of Health.
<b>Molar</b>	One of 12 back teeth used in grinding food.
<b>Natural teeth</b>	A person's own teeth (as opposed to artificial teeth).
<b>NZDep2006</b>	New Zealand Index of Socioeconomic Deprivation 2006, an area-level (meshblock) measure of the socioeconomic status of an area.
<b>NZHS</b>	New Zealand Health Survey.
<b>NZOHS</b>	New Zealand Oral Health Survey.

<b>OPOHS</b>	Older People’s Oral Health Survey.
<b>Orofacial pain</b>	Pain located in the face, jaw, temple, in front of the ear or in the ear.
<b>Partially dentate</b>	Being in the state of having some, but not all, missing teeth.
<b>Percentage point difference</b>	The absolute difference between prevalence estimates. For example, if men have a prevalence of 40%, and women have a prevalence of 30%, this represents a 10 percentage point difference.
<b>Periodontal disease</b>	Disease of the gums and other tissues that attach to teeth and anchor them to the jaws.
<b>Periodontal pocket</b>	A space below the gum line that exists between the root of a tooth and the gum surrounding that tooth.
<b>Periodontal recession</b>	The shrinkage of gum tissue away from the tooth, resulting in exposure of dental roots and creating the appearance of being ‘long in the tooth’.
<b>Periodontitis</b>	Disease of the gums caused by bacteria, characterised by swelling and bleeding of the gums and loss of tissue that attaches the tooth to the jaw.
<b>Permanent teeth</b>	Adult teeth (secondary teeth).
<b>Plaque</b>	A film composed of bacteria and food debris that adheres to the tooth surface.
<b>Prevalence</b>	The proportion of people with a defined disease within a defined population.
<b>Probing pocket depth</b>	The measured depth of the periodontal pocket.
<b>Proxy</b>	A person authorised to act for another, on behalf of a person.
<b>P-value</b>	An indication of statistical significance. A p-value less than 0.05 (p-value < 0.05) indicates that an apparent difference is statistically significant at the 5% level of significance.
<b>Quintile</b>	A quintile contains a fifth (20%) of the data. For example, each quintile of the New Zealand Index of Socioeconomic Deprivation (NZDep2006) contains approximately 20% of the population.
<b>Rate</b>	The proportion affected within a defined population and a defined time period (i.e. prevalence).
<b>Rate ratio</b>	How prevalent an indicator is in one population group (e.g. men) compared with another (e.g. women).
<b>RC</b>	Residential care.
<b>Restoration</b>	The material end-result of operative procedures that restore the form, function and appearance of a tooth.
<b>Root</b>	That part of the tooth below the crown which is anchored to the jaw.
<b>Root surface</b>	The surface of the root of a tooth.

<b>SES</b>	Socioeconomic status.
<b>SOPOHI</b>	Study into Older People's Oral Health Issues.
<b>Standardised mean ratio</b>	A ratio of two means, standardised for one or more other factors (such as age).
<b>Standardised rate ratio</b>	A ratio of two prevalence rates, standardised for one or more other factors (such as age).
<b>Sub-gingival calculus</b>	Calculus below the gum line.
<b>Supra-gingival calculus</b>	Calculus above the gum line.
<b>Unadjusted prevalence</b>	A rate that has not been adjusted for other factors (such as age). This is an unadjusted (or 'crude') rate that shows the burden on a population group, and can be used to estimate the number of people affected in a population.
<b>WHO</b>	World Health Organization.

## References

- Ainamo J, Barmes D, Beagrie G, et al. 1982. Development of the World Health Organization (WHO) Community Periodontal Index of Treatment Needs (CPITN). *International Dental Journal* 32: 281–291.
- Al-Zubeidi M, Alsabeeha N, Thomson WM, et al. 2012. Patient satisfaction with mandibular 2-implant overdentures using different attachment systems: 5-year outcomes. *Clinical Implant Dentistry and Related Research* 14 (Supplement s10): e11–e19.
- Beaglehole R, Benzian H, Crail J, et al. 2009. *The Oral Health Atlas: Mapping a Neglected Global Health Issue*. Brighton: FDI World Dental Federation.
- Broad JB, Ashton T, Gott M, et al. 2015. Likelihood of residential aged care use in later life: a simple approach to estimation with international comparison. *Australian and New Zealand Journal of Public Health* 39: 374–379.
- Broadbent JM, Thomson WM, Poulton R. 2008. Trajectory patterns of dental caries experience in the permanent dentition to the fourth decade of life. *Journal of Dental Research* 87: 69–72.
- Burt BA, Eklund SA. 2005. *Dentistry, Dental Practice, and the Community*. St Louis: Elsevier Saunders.
- Burt BA, Pai S. 2001. Sugar consumption and caries risk: a systematic review. *Journal of Dental Education* 65: 1017–1023.
- Carter G, Lee M, McKelvey V, et al. 2004. Oral health status and oral treatment needs of dependent elderly people in Christchurch. *New Zealand Medical Journal* 117: U892.
- CBG Health Research. 2015. *Methodology Report for the New Zealand Older People's Oral Health Survey*. Auckland: CBG Health Research.
- Chalmers JM. 2003. Oral health promotion for our ageing Australian population. *Australian Dental Journal* 48: 2–9.
- Chalmers JM, Carter KD, Spencer AJ. 2005. Caries incidence and increments in Adelaide nursing home residents. *Special Care in Dentistry* 25: 96–105.
- Cutress T, Hunter PBV, Davis PB, et al. 1979. *Adult Oral Health and Attitudes to Dentistry in New Zealand 1976*. Wellington: Medical Research Council of New Zealand.
- Daly B, Watt R, Batchelor P, et al. 2002. *Essential Dental Public Health*. Oxford: Oxford University Press.
- Gift HC, Redford M. 1992. Oral health and the quality of life. *Clinics in Geriatric Medicine* 8: 673–683.
- Grace AM, Smales FC. 1989. *Mobility and overall destruction*. In: Grace AM, Smales FC, editors. *Periodontal Control: An Effective System for Diagnosis, Selection, Control and Treatment in General Practice*: 52. 1st ed. London: Quintessence Pub. Co.
- Greene JC, Vermillion JR. 1964. The Simplified Oral Hygiene Index. *Journal of the American Dental Association* 68: 7–13.

- Griffin SO, Griffin PM, Swann JL, et al. 2004. Estimating rates of new root caries in older adults. *Journal of Dental Research* 83: 634–638.
- Hunter PBV, Kirk R, de Liefde B. 1992. *The Study of Oral Health Outcomes: The New Zealand section of the WHO Second International Collaborative Study*. Wellington: Department of Health.
- Klein H, Palmer CE, Knutson JW. 1938. Studies on dental caries: 1. Dental status and dental needs of elementary school children. *Public Health Reports* 53: 751–765.
- Kleinman D, Swango P, Niessen L. 1991. Epidemiological studies of oral mucosal conditions – methodological issues. *Community Dentistry and Oral Epidemiology* 19: 129–140.
- Landis JR, Koch GG. 1977. The measurement of observer agreement for categorical data. *Biometrics* 33: 159–174.
- Locker D. 1997. Clinical correlates of changes in self-perceived oral health in older adults. *Community Dentistry and Oral Epidemiology* 25: 199–203.
- Locker D. 2001. *Oral Health Indicators and Determinants for Population Health Surveys: A report for Health Canada*. Toronto: University of Toronto.
- Ministry of Health. 2006. *Good Oral Health for All, for Life*. Wellington: Ministry of Health.
- Ministry of Health. 2010a. *Our Oral Health. Key Findings of the 2009 New Zealand Oral Health Survey*. Wellington: Ministry of Health.
- Ministry of Health. 2010b. *Cancer: Historical summary 1948–2006 [online data tables]*. Wellington: Ministry of Health. URL: [http://www.moh.govt.nz/moh.nsf/pagesmh/9240/\\$File/cancer-historical-summary-1948-2006.xls](http://www.moh.govt.nz/moh.nsf/pagesmh/9240/$File/cancer-historical-summary-1948-2006.xls). Accessed 27 September 2010.
- Moynihan P, Snow S, Jepson N, et al. 1994. Intake of non-starch polysaccharide (dietary fibre) in edentulous and dentate persons: an observational study. *British Dental Journal* 177: 243–247.
- Mylotte J, Goodnough S, Naughton BJ. 2003. Pneumonia Versus Aspiration Pneumonitis in Nursing Home Residents: Diagnosis and Management. *Journal of the American Geriatrics Society* 51:17–23.
- National Survey of Adult Oral Health 2004/05 ‘Protocol for Oral Epidemiological Examinations’. ©ARCPOH 2004.
- New Zealand Dental Association. 2010. *Healthy Mouth, Healthy Ageing: Oral Health Guide for Caregivers of Older People*. Auckland: New Zealand Dental Association.
- New Zealand Guidelines Group. 2009. *Guidelines for the Use of Fluorides*. Wellington: Ministry of Health.
- Nowjack-Raymer RE, Sheiham A. 2003. Association of edentulism and diet and nutrition in US adults. *Journal of Dental Research* 82: 123–126.
- Petersen PE, Yamamoto T. 2005. Improving the oral health of older people: the approach of the WHO Global Oral Health Programme. *Community Dentistry and Oral Epidemiology* 33: 81–92.
- Rossie K, Guggenheimer J. 1997. Oral candidiasis: clinical manifestations, diagnosis and treatment. *Practical Periodontics and Aesthetic Dentistry* 9: 635–641.

- Schofield WH. 1981. Estimating dental treatment needs from epidemiological data. *Journal of Public Health Dentistry* 41: 25–32.
- Shearer DM, MacLeod RJ, Thomson WM. 2007. Oral-health-related quality of life: an overview for the general dental practitioner. *New Zealand Dental Journal* 103: 82–87.
- Slade GD. 1997. Derivation and validation of a short-form oral health impact profile. *Community Dentistry and Oral Epidemiology* 25: 284–290.
- Slade GD, Spencer AJ. 1994. Development and evaluation of the Oral Health Impact Profile. *Community Dental Health* 11: 3–11.
- Slade GD, Spencer AJ, Roberts-Thomson KF, eds. 2007. Australia's Dental Generations: The National Survey of Adult Oral Health 2004–06. Canberra: *Australian Institute of Health and Welfare*.
- Smith MB. 2010. Oral health and well-being of older adults in residential aged-care facilities: issues for public health policy. *New Zealand Dental Journal* 106: 67–73.
- Spencer AJ. 1980. The estimation of need for dental care. *Journal of Public Health Dentistry* 40: 311–327.
- Statistics New Zealand. 2014. National Population Projections 2014 (base) – 2086. URL: [http://www.stats.govt.nz/browse\\_for\\_stats/population/estimates\\_and\\_projections/NationalPopulationProjections\\_HOTP2014.aspx](http://www.stats.govt.nz/browse_for_stats/population/estimates_and_projections/NationalPopulationProjections_HOTP2014.aspx)
- Steele JG, Sheiham A, Marcenes W, et al. 1998. *National Diet and Nutrition Survey: People aged 65 years and over Volume 2: Report of the oral health survey*. London: The Stationery Office.
- Sussex PV, Thomson WM, Fitzgerald RP. 2010. Understanding the 'epidemic' of complete tooth loss among older New Zealanders. *Gerodontology* 27: 85–95.
- Thomson WM. 2004. Dental caries experience in older people over time: what can the large cohort studies tell us? *British Dental Journal* 196: 89–92.
- Thomson WM. 2012. Monitoring edentulism in older New Zealand adults over two decades: a review and commentary. *International Journal of Dentistry*. Article ID 375407, doi:10.1155/2012/375407.
- Thomson WM. 2015. Dry mouth and older people. *Australian Dental Journal* 60: 54–63.
- Thomson WM, Brown RH, Williams SM. 1991. Dental status of a New Zealand institutionalised elderly population. *New Zealand Dental Journal* 87: 119–123.
- Thomson WM, Brown RH, Williams SM. 1992. Dentures, prosthetic treatment needs and mucosal health in an institutionalised elderly population. *New Zealand Dental Journal* 88: 51–55.
- Thomson WM, Mejia GC, Broadbent JM, et al. 2012. Construct validity of Locker's global oral health item. *Journal of Dental Research* 91: 1038–1042.
- Walls A, Steele JG, Sheiham A, et al. 2000. Oral health and nutrition in older people. *Journal of Public Health Dentistry* 60: 304–307.

WHO. 1967. *International Dental Epidemiological Methods Series: Manual no. 1: Introduction and general methodology (second draft, English only)*. Geneva: World Health Organization.

WHO. 1997. *Oral Health Surveys: Basic methods* (4th edition). Geneva: World Health Organization.



## Appendix A: Summary Tables of Findings

Table A1 presents the summary of findings for older adults by residential location. For the 95% confidence intervals of prevalence estimates, please see corresponding results Chapters: 3, 4, 5 and 6.

In each of the tables a common indicator reference number has been used to allow the reader to easily identify the same indicator across all of the summary tables.

**Table A1: Summary results for older adults by residential location (unadjusted prevalence or mean)**

Summary of Findings for Older Adults by Residential Location: Unadjusted Prevalence or Mean					
Indicator Ref.	Indicator	Page No.	Table No.	Residential Care	Home-Based
1	Prevalence of complete tooth loss (edentulism)	P. 24	T. 6	56.6	52.2
2	Prevalence of missing one or more teeth due to pathology (D)		In text	99.3	99.4
3	Mean number of missing teeth (D)	P. 27	T. 8	15.6	15.1
4	Mean number of natural teeth (D)	P. 29	T. 10	16.1	16.8
5	Prevalence of having a functional dentition (D)	P. 31	T. 12	35.1	37.3
6	Mean number of sound and untreated teeth (D)	P. 34	T. 14	7.2	7.8
7	Prevalence of untreated coronal decay on one or more teeth (D)	P. 36	T. 16	61.3	43.2
8	Mean number of teeth with untreated coronal decay (D)	P. 38	T. 18	2.2	1.3
9	Mean number of teeth with untreated coronal decay in older adults with untreated coronal decay (D)	P. 40	T. 20	3.5	3.0
10	Mean number of surfaces with untreated coronal decay (D)			1.8	1.2
11	Prevalence of untreated root decay (D)	P. 42	T. 22	33.7	32.7
12	Mean number of teeth with untreated root decay (D)	P. 43	T. 24	0.8	0.7
13	Mean number of teeth with untreated root decay in older adults with untreated root decay (D)	P. 45	T. 26	2.4	2.1
14	Mean number of surfaces with untreated root decay (D)			1.2	1.0
15	Mean number of filled teeth (coronal) (D)	P. 47	T. 28	6.0	7.1
16	Mean DMFT score (D)	P. 50	T. 30	24.2	23.9
17	Prevalence of requiring one or more restorations (actual) (D)	P. 52	T. 32	42.2	45.6
18	Mean number of teeth requiring one or more restorations (actual) (D)	P. 54	T. 34	1.0	1.1
19	Prevalence of one or more extractions required (actual) (D)	P. 56	T. 36	33.2	21.9
20	Mean number of extractions required (actual) (D)	P. 58	T. 38	1.1	0.7
21	Prevalence of one or more one-surface coronal restorations required (ideal) (D)			36.4	36.9

Summary of Findings for Older Adults by Residential Location: Unadjusted Prevalence or Mean					
Indicator Ref.	Indicator	Page No.	Table No.	Residential Care	Home-Based
22	Mean number of one-surface coronal restorations required (ideal) (D)			0.6	0.7
23	Prevalence of one or more two-surface coronal restorations required (ideal) (D)			22.7	19.9
24	Mean number of two-surface coronal restorations (ideal) (D)			0.3	0.3
25	Prevalence of one or more complex coronal restorations required (ideal) (D)			21.2	19.9
26	Prevalence of one or more one-surface root restorations required (ideal) (D)			29.6	31.0
27	Mean number of one-surface root restorations required per person (ideal) (D)			0.6	0.5
28	Prevalence of one or more two-surface root restorations required (ideal) (D)			12.5	10.0
29	Mean number of two-surface root restorations required per person (ideal) (D)			0.2	0.1
30	Prevalence of one or more complex root restorations required (ideal) (D)			6.5	5.5
31	Prevalence of wearing a full upper denture (D)	P. 61	T. 40	23.8	24.6
32	Prevalence of wearing a full lower denture (D)		In text	0.2	1.6
33	Prevalence of wearing only a full upper denture (E)	P. 63	T. 42	11.4	9.2
34	Prevalence of wearing only a full lower denture (E)		In text	0.2	0.2
35	Prevalence of wearing a full upper and lower denture (E)	P. 65	T. 44	73.9	86.9
36	Prevalence of wearing a partial upper denture (D)	P. 67	T. 46	13.0	18.6
37	Prevalence of wearing a partial lower denture (D)	P. 69	T. 48	7.7	11.6
38	Prevalence of having a bridge (D)		In text	3.1	5.1
39	Prevalence of having implants (D)		In text	0.3	0.5
40	Prevalence of having heavy plaque on the teeth (D)	P. 72	T. 50	35.8	20.5
41	Prevalence of having heavy calculus on the teeth (D)	P. 73	T. 52	20.8	13.8
42	Prevalence of having staining or calculus on dentures (DW)	P. 75	T. 54	21.1	17.7
43	Prevalence of periodontal pocketing (DP)	P. 78	T. 56	11.2	20.8
44	Prevalence of deep periodontal pocketing (DP)	P. 80	T. 58	2.1	3.0
45	Prevalence of any oral mucosal condition	P. 82	T. 60	25.4	31.4
46	Prevalence of oral ulceration	P. 84	T. 62	8.2	11.0
47	Prevalence of oral candidiasis	P. 86	T. 64	6.5	5.5
48	Prevalence of denture stomatitis (DW)	P. 87	T. 66	6.0	2.9
49	Prevalence of angular cheilitis		In text	1.8	1.2
50	Prevalence of dry mouth	P. 90	T. 68	52.7	69.7
51	Prevalence of brushing teeth at least once daily with or without fluoride toothpaste (D)	P. 94	T. 71	82.3	90.2
52	Prevalence of brushing teeth at least once daily with fluoride toothpaste (D)	P. 95	T. 73	70.1	76.1
53	Prevalence of brushing teeth at least twice daily with or without fluoride toothpaste (D)	P. 97	T. 75	55.0	60.2
54	Prevalence of brushing teeth at least twice daily with fluoride toothpaste (D)	P. 99	T. 77	49.0	51.5

Summary of Findings for Older Adults by Residential Location: Unadjusted Prevalence or Mean					
Indicator Ref.	Indicator	Page No.	Table No.	Residential Care	Home-Based
55	Prevalence of having difficulty cleaning teeth (D)	P. 101	T. 79	33.3	18.9
56	Prevalence of using a mouthrinse in the previous week		In text	0.5	1.7
57	Prevalence of cleaning dentures at least once a day (DW)	P. 103	T. 81	84.7	88.6
58	Prevalence of cleaning dentures at least twice a day (DW)	P. 105	T. 83	47.0	50.1
59	Prevalence of removing dentures at night (DW)	P. 107	T. 85	61.0	56.0
60	Prevalence of having visited a dental professional in previous year	P. 111	T. 87	23.8	27.8
61	Prevalence of last visit being for a check-up	P. 113	T. 89	16.9	26.9
62	Prevalence of usually visiting a dental professional for a check-up	P. 116	T. 91	12.9	19.7
63	Prevalence of usually visiting the same dental professional	P. 118	T. 93	24.8	48.1
64	Prevalence of always being listened to carefully by a dental professional	P. 120	T. 95	52.3	76.0
65	Prevalence of feeling they do not see a dental professional often enough	P. 122	T. 97	42.1	31.6
66	Prevalence of perceiving the need for dental treatment	P. 124	T. 99	24.9	36.0
67	Prevalence of having avoided dental care in the last year due to cost	P. 126	T. 101	17.3	32.1
68	Prevalence of cost preventing recommended routine dental treatment	P. 128	T. 103	2.3	5.2
69	Prevalence of accessing DHB clinic services in the previous 12 months		In text	1.7	2.0
70	Mean number of times DHB clinic services were accessed in the previous 12 months		In text	1.6	2.3
71	Prevalence of user charge or co-payment required when DHB services accessed		In text	38.8	40.0
72	Mean value of user charge of co-payment when DHB services accessed (excl. GST)		In text	\$52.70	\$77.80
73	Prevalence of accessing privately-funded dental practice to see a dentist in the previous 12 months	P. 134	T. 106	12.3	21.3
74	Prevalence of accessing privately-funded dental practice to see a hygienist in the previous 12 months		In text	0.6	0.6
75	Prevalence of accessing privately-funded dental practice to see a specialist in the previous 12 months		In text	0.1	0.2
76	Prevalence of accessing a dental technician in the previous 12 months		In text	2.0	2.6
77	Prevalence of accessing a clinical dental technician in the previous 12 months		In text	1.3	0.9
78	Prevalence of accessing the Otago Community Oral Health Service in the past 12 months		In text	0.1	0.5
79	Mean number of times a private practice had been accessed to see a dentist	P. 136	T. 108	1.8	2.1
80	Prevalence of user charge or co-payment required when a private practice had been accessed to see a dentist	P. 138	T. 110	49.7	82.5

Summary of Findings for Older Adults by Residential Location: Unadjusted Prevalence or Mean					
Indicator Ref.	Indicator	Page No.	Table No.	Residential Care	Home-Based
81	Mean value of user charge of co-payment when privately-funded services accessed (excl. GST)	P. 139	T. 112	\$497.90	\$386.20
82	Prevalence of accessing transport services to access dental care	P. 142	T. 114	8.6	11.7
83	Mean number of times a transport service was used to obtain dental care	P. 143	T. 116	1.8	2.5
84	Prevalence of user charge or co-payment required when transport services accessed	P. 145	T. 118	30.9	67.9
85	Mean value of user charge or co-payment when transport services accessed (excl. GST)	P. 147	T. 120	\$25.10	\$27.30
86	Prevalence of self-rated very good or excellent oral health	P. 150	T. 122	29.4	45.5
87	Prevalence of experiencing impacts due to oral health in previous year (OHIP-14)	P. 153	T. 125	18.0	23.9
88	Prevalence of experiencing orofacial pain in last four weeks	P. 155	T. 127	14.5	21.0

Source: 2012 Older People's Oral Health Survey

Notes:

- (D) Among dentate older adults
- (E) Among edentulous older adults
- (DW) Among denture wearing older adults
- (DP) Among dentate periodontally examined older adults

**Table A2: Summary of findings, by population group (adjusted ratio of rates or means)**

For Table A2 only significant differences have been presented.

Summary of Findings by Population Group: Adjusted Ratio of Rates or Means												
Indicator Ref.	Indicator	Page No.	Table No.	RC vs. HB	Men vs. Women	Māori vs. non-Māori	Pacific vs. non-Pacific	Asian vs. non-Asian	Age 85+ vs. ages 65–84	Lower SES vs. higher SES	Dental visit in previous year vs. no dental visit in previous year	Highest dependency level vs. more independent^
1	Prevalence of complete tooth loss (edentulism)	P. 25	T. 7		0.8	1.2	0.7	0.6	1.1	1.3	0.5	0.8
2	Prevalence of missing one or more teeth due to pathology (D)					0.5		0.5				
3	Mean number of missing teeth (D)	P. 27	T. 9			1.3			1.2	1.1	0.9	
4	Mean number of natural teeth (D)	P. 29	T. 11			0.7			0.9	0.9	1.2	
5	Prevalence of having a functional dentition (D)	P. 31	T. 13			0.3			0.7	0.7		
6	Mean number of sound and untreated teeth (D)	P. 34	T. 15				1.8	1.4	0.8			
7	Prevalence of untreated coronal decay on one or more teeth (D)	P. 36	T. 17	1.5	1.2		1.3	1.3			0.7	
8	Mean number of teeth with untreated coronal decay (D)	P. 39	T. 19	1.7			1.9				0.7	
9	Mean number of teeth with untreated coronal decay in older adults with untreated coronal decay (D)	P. 40	T. 21				1.5		1.2			
10	Mean number of surfaces with untreated coronal decay (D)			1.5			1.6				0.7	
11	Prevalence of untreated root decay (D)	P. 42	T. 23		1.4				1.3			
12	Mean number of teeth with untreated root decay (D)	P. 44	T. 25		1.7		1.9		1.4			
13	Mean number of teeth with untreated root decay in older adults with untreated root decay (D)	P. 46	T. 27				1.4					
14	Mean number of surfaces with untreated root decay (D)				1.5		2.0		1.5			
15	Mean number of filled teeth (coronal) (D)	P. 48	T. 29	0.8	0.8	0.4	0.2	0.4	0.8	0.8	1.6	

**Summary of Findings by Population Group: Adjusted Ratio of Rates or Means**

Indicator Ref.	Indicator	Page No.	Table No.	RC vs. HB	Men vs. Women	Māori vs. non-Māori	Pacific vs. non-Pacific	Asian vs. non-Asian	Age 85+ vs. ages 65–84	Lower SES vs. higher SES	Dental visit in previous year vs. no dental visit in previous year	Highest dependency level vs. more independent^
16	Mean DMFT score (D)	P. 51	T. 31				0.7	0.8	1.1			
18	Mean number of teeth requiring one or more restorations (actual) (D)	P. 55	T. 35		1.3	0.7						
19	Prevalence of one or more extractions required (actual) (D)	P. 57	T. 37	1.6	1.3		2.0				0.7	
20	Mean number of extractions required (actual) (D)	P. 58	T. 39	1.6	1.4		3.3		1.5			
24	Mean number of two-surface coronal restorations (ideal) (D)										0.7	
26	Prevalence of one or more one-surface root restorations required (ideal) (D)				1.5							
27	Mean number of one-surface root restorations required per person (ideal) (D)				1.8							
28	Prevalence of one or more two-surface root restorations required (ideal) (D)						2.1					
29	Mean number of two-surface root restorations required per person (ideal) (D)						2.1					
30	Prevalence of one or more complex root restorations required (ideal) (D)						3.3		2.0		0.5	
31	Prevalence of wearing a full upper denture (D)	P. 62	T. 41				0.3		1.5		0.6	
32	Prevalence of wearing a full lower denture (D)					6.1		6.1				
33	Prevalence of wearing only a full upper denture (E)	P. 63	T. 43		1.6				0.7			1.8
34	Prevalence of wearing only a full lower denture (E)					1.5	1.5	1.5	10.8#	0.7	1.3	
35	Prevalence of wearing a full upper and lower denture (E)	P. 65	T. 45	0.8	0.9	0.7			1.1			0.6
36	Prevalence of wearing a partial upper denture (D)	P. 68	T. 47	0.7					1.5			
37	Prevalence of wearing a partial lower denture (D)	P. 69	T. 49						2.1			

Summary of Findings by Population Group: Adjusted Ratio of Rates or Means												
Indicator Ref.	Indicator	Page No.	Table No.	RC vs. HB	Men vs. Women	Māori vs. non-Māori	Pacific vs. non-Pacific	Asian vs. non-Asian	Age 85+ vs. ages 65–84	Lower SES vs. higher SES	Dental visit in previous year vs. no dental visit in previous year	Highest dependency level vs. more independent^
38	Prevalence of having a bridge (D)					12.1#	12.0#					
39	Prevalence of having an implant (D)					2.2	2.2		12.6#	1.9		
40	Prevalence of having heavy plaque on the teeth (D)	P. 72	T. 51	1.8	1.3							
41	Prevalence of having heavy calculus on the teeth (D)	P. 74	T. 53	1.6			1.9				0.6	
43	Prevalence of periodontal pocketing (DP)	P. 79	T. 57	0.6			2.1				1.8	
44	Prevalence of deep periodontal pocketing (DP)	P. 81	T. 59				9.1#					
45	Prevalence of any oral mucosal condition	P. 83	T. 61	0.8							0.8	
46	Prevalence of oral ulceration	P. 85	T. 63	0.7			0.4			1.6		
47	Prevalence of oral candidiasis	P. 87	T. 65				0.2					
49	Prevalence of angular cheilitis						31.6#	31.4#				
50	Prevalence of dry mouth	P. 90	T. 69	0.7				0.8		1.2	1.1	0.6
51	Prevalence of brushing teeth at least once a day with or without fluoride toothpaste (D)	P. 94	T. 72	0.9	0.9	0.8					1.1	
52	Prevalence of brushing teeth at least once a day with fluoride toothpaste (D)	P. 96	T. 74	0.9	0.8					1.1		
53	Prevalence of brushing teeth at least twice a day with or without fluoride toothpaste (D)	P. 98	T. 76		0.7	0.7		1.3			1.2	
54	Prevalence of brushing teeth at least twice a day with fluoride toothpaste (D)	P. 100	T. 78		0.7			1.4				
55	Prevalence of having difficulty cleaning teeth (D)	P. 102	T. 80	1.8		0.5					0.7	
56	Prevalence of using a mouthrinse in the previous week			0.3							3.7	15.4#

Summary of Findings by Population Group: Adjusted Ratio of Rates or Means												
Indicator Ref.	Indicator	Page No.	Table No.	RC vs. HB	Men vs. Women	Māori vs. non-Māori	Pacific vs. non-Pacific	Asian vs. non-Asian	Age 85+ vs. ages 65–84	Lower SES vs. higher SES	Dental visit in previous year vs. no dental visit in previous year	Highest dependency level vs. more independent^
57	Prevalence of cleaning dentures at least once a day (DW)	P. 104	T. 82		0.9							
58	Prevalence of cleaning dentures at least twice a day (DW)	P. 106	T. 84		0.5						1.3	
60	Prevalence of having visited a dental professional in previous year	P. 112	T. 88	0.9		0.7			0.8	0.6		
61	Prevalence of last visit being for a check-up	P. 114	T. 90	0.6		0.6	0.5			0.7	2.6	
62	Prevalence of usually visiting a dental professional for a check-up	P. 116	T. 92	0.6		0.2	0.3	0.4		0.6	4.6	
63	Prevalence of usually visiting the same dental professional	P. 118	T. 94	0.5	1.2	0.6	0.6			0.8	2.5	
64	Prevalence of always being listened to carefully by a dental professional	P. 121	T. 96	0.7		0.8					1.3	0.4
65	Prevalence of feeling they do not see a dental professional often enough	P. 123	T. 98	1.4		1.2	1.6	1.5	0.8	0.9	0.7	1.6
66	Prevalence of perceiving the need for dental treatment	P. 125	T. 100	0.7			1.6		0.7		1.3	
67	Prevalence of having avoided dental care in the last year due to cost	P. 127	T. 102	0.6		1.3	2.0	1.5	0.6	1.3		0.5
68	Prevalence of cost preventing recommended routine dental treatment	P. 129	T. 104	0.5			2.7		0.3		0.3	9.9
69	Prevalence of accessing DHB clinic services in the previous 12 months						4.1#		0.3		0.1	
70	Mean number of visits to DHB clinics in the previous 12 months								0.6		2.3	
72	Mean value of out-of-pocket charges at DHB clinics in the previous 12 months					0.6	0.3		0.2			
72a	Prevalence of accessing Community clinic services in the previous 12 months				0.5							



Summary of Findings by Population Group: Adjusted Ratio of Rates or Means												
Indicator Ref.	Indicator	Page No.	Table No.	RC vs. HB	Men vs. Women	Māori vs. non-Māori	Pacific vs. non-Pacific	Asian vs. non-Asian	Age 85+ vs. ages 65–84	Lower SES vs. higher SES	Dental visit in previous year vs. no dental visit in previous year	Highest dependency level vs. more independent^
73	Prevalence of accessing private dental practices to see a dentist in the previous 12 months	P. 134	T. 107	0.6	1.3	0.3	0.5			0.6	1.3	
74	Prevalence of accessing private dental practices to see a hygienist in the previous 12 months					82.7#	83.9#				0.1	
74c	Mean value of out-of-pocket charges at private dental practices to see a hygienist in the previous 12 months				0.2							0.5
75	Prevalence of accessing private specialist dental practices in the previous 12 months				7.4#	2.6#	2.6#	2.6#			0.4	1.4
75c	Mean value of out-of-pocket charges at private specialist dental practices in the previous 12 months								2.7	2.7		
76	Prevalence of accessing dental technicians in the previous 12 months							21.0#			0.2	
76a	Mean number of visits to dental technicians in the previous 12 months						0.7			1.6		
76c	Mean value of out-of-pocket charges at dental technicians in the previous 12 months					0.5	10.5#					
77	Prevalence of accessing clinical dental technicians in the previous 12 months							42.9#			0.1	5.4#
77a	Mean number of visits to clinical dental technicians in the previous 12 months			0.3								
77c	Mean value of out-of-pocket charges at clinical dental technicians in the previous 12 months			0.4	0.1							
78	Prevalence of accessing University of Otago Community Oral Health Service in the previous 12 months							154.4*			0.1	1.4

Summary of Findings by Population Group: Adjusted Ratio of Rates or Means												
Indicator Ref.	Indicator	Page No.	Table No.	RC vs. HB	Men vs. Women	Māori vs. non-Māori	Pacific vs. non-Pacific	Asian vs. non-Asian	Age 85+ vs. ages 65–84	Lower SES vs. higher SES	Dental visit in previous year vs. no dental visit in previous year	Highest dependency level vs. more independent <sup>^</sup>
78c	Mean value of out-of-pocket charges at the University of Otago Community Oral Health Service in the previous 12 months			0.8		0.2	0.8			1.3		
79	Mean number of visits to private dental practices to see a dentist in the previous 12 months	P. 137	T. 109								1.5	
80	Prevalence of out-of-pocket charges at private dental practices to see a dentist in the previous 12 months	P. 138	T. 111	0.6								0.2
81	Mean value of out-of-pocket charges at private dental practices to see a dentist in the previous 12 months	P. 140	T. 113		1.7		0.3	2.7				0.2
82	Prevalence of accessing a transport service in the previous 12 months	P. 142	T. 115	0.7						0.7		
83	Mean number of times transport services accessed in the previous 12 months	P. 144	T. 117	0.7								
84	Prevalence of out-of-pocket charges required for transport service in the previous 12 months	P. 146	T. 119	0.4								
86	Prevalence of self-rated very good or excellent oral health	P. 151	T. 123	0.6	0.8		0.5	0.4			0.8	0.4
87	Prevalence of experiencing impacts due to oral health in previous year (OHIP-14)	P. 154	T. 126	0.8			1.8		0.8		1.3	
88	Prevalence of experiencing orofacial pain in last four weeks	P. 156	T. 128	0.7			1.5	1.6	0.8		1.5	

Source: 2012 Older People's Oral Health Survey

Notes:

(D) Among dentate older adults

(E) Among edentulous older adults

(DW) Among denture-wearing older adults

(DP) Among dentate older adults who had a periodontal examination

<sup>^</sup> Among RC sample only

# These rate ratio estimates are inflated because of some small sample sizes; accordingly, these should be interpreted with caution (or disregarded)

## Appendix B: Summary Tables of Findings by Residential Location

Only significant results have been presented.

In each of the tables a common indicator reference number has been used to allow the reader to easily identify the same indicator across all of the summary tables.

**Table B1: Summary results for older adults living in residential care, by population group (adjusted ratio of rates or means)**

Older Adults Living in Residential Care: Adjusted Ratio of Rates or Means									
Indicator Ref.	Indicator	Men vs. Women	Māori vs. non-Māori	Pacific vs. non-Pacific	Asian vs. non-Asian	Age 85+ vs. ages 65–84	Lower SES vs. higher SES	Dental visit in previous year vs. no dental visit in previous year	Highest dependency level vs. more independent ^
1	Prevalence of complete tooth loss (edentulism)	0.8	1.3	0.7	0.4		1.2	0.6	0.8
2	Prevalence of missing one or more teeth due to pathology (D)	0.5	0.6		0.6				
3	Mean number of missing teeth (D)		1.3			1.2		0.9	
4	Mean number of natural teeth (D)		0.7			0.9		1.2	
5	Prevalence of having a functional dentition (D)	0.7				0.7			
6	Mean number of sound and untreated teeth (D)			1.6		0.8			
7	Prevalence of untreated coronal decay on one or more teeth (D)			1.4				0.7	
8	Mean number of teeth with untreated coronal decay (D)	1.4		2.3		1.4		0.7	
9	Mean number of teeth with untreated coronal decay in older adults with untreated coronal decay (D)			1.7		1.4			
10	Mean number of surfaces with untreated coronal decay (D)			2.0					
11	Prevalence of untreated root decay	1.4		1.5					
12	Mean number of teeth with untreated root decay (D)	1.7		2.0		1.4			
14	Mean number of surfaces with untreated root decay (D)	1.7		2.5		1.6			
15	Mean number of filled teeth (coronal) (D)		0.2	0.1	0.3	0.8		1.7	
16	Mean DMFT score (D)	1.0^		0.8		1.1			

Older Adults Living in Residential Care: Adjusted Ratio of Rates or Means									
Indicator Ref.	Indicator	Men vs. Women	Māori vs. non-Māori	Pacific vs. non-Pacific	Asian vs. non-Asian	Age 85+ vs. ages 65–84	Lower SES vs. higher SES	Dental visit in previous year vs. no dental visit in previous year	Highest dependency level vs. more independent ^
18	Mean number of teeth requiring one or more restorations (actual) (D)							0.7	
19	Prevalence of one or more extractions required (actual) (D)			2.1					
20	Mean number of extractions required (actual) (D)	1.6		3.6		1.6			
26	Prevalence of one or more one-surface root restorations required (ideal) (D)	1.5							
27	Mean number of one-surface root restorations required per person (ideal) (D)	1.8							
28	Prevalence of one or more two-surface root restorations required (ideal) (D)			2.8					
29	Mean number of two-surface root restorations required per person (ideal) (D)			2.9					
30	Prevalence of one or more complex root restorations required (ideal) (D)	2.2		4.7 <sup>#</sup>	7.3 <sup>#</sup>	2.2			
31	Prevalence of wearing a full upper denture (D)			2.1				0.5	
32	Prevalence of wearing a full lower denture (D)	1.9	1.5	1.5	1.5	0.4	0.7		
33	Prevalence of wearing only a full upper denture (E)								1.8
34	Prevalence of wearing only a full lower denture (E)	0.6							
35	Prevalence of wearing a full upper and lower denture (E)			0.4		1.1			0.6
38	Prevalence of having a bridge (D)		15.9 <sup>#</sup>	15.9 <sup>#</sup>					
39	Prevalence of having implants (D)	1.6				2.4 <sup>#</sup>			
40	Prevalence of having heavy plaque on the teeth (D)	1.3							
42	Prevalence of having staining or calculus on dentures (DW)			2.1					
43	Prevalence of periodontal pocketing (DP)							1.8	
44	Prevalence of deep periodontal pocketing (DP)		23.9 <sup>#</sup>	5.3	23.4 <sup>#</sup>				
46	Prevalence of oral ulceration						2.0		
48	Prevalence of denture stomatitis (DW)			6.0	6.0				

Older Adults Living in Residential Care: Adjusted Ratio of Rates or Means									
Indicator Ref.	Indicator	Men vs. Women	Māori vs. non-Māori	Pacific vs. non-Pacific	Asian vs. non-Asian	Age 85+ vs. ages 65–84	Lower SES vs. higher SES	Dental visit in previous year vs. no dental visit in previous year	Highest dependency level vs. more independent ^
49	Prevalence of angular cheilitis		27.3 <sup>#</sup>	27.5 <sup>#</sup>	27.3 <sup>#</sup>			8.5 <sup>#</sup>	
50	Prevalence of dry mouth						1.2		0.6
51	Prevalence of brushing teeth at least once a day with or without fluoride toothpaste (D)	0.9							
52	Prevalence of brushing teeth at least once a day with fluoride toothpaste (D)	0.8							
53	Prevalence of brushing teeth at least twice daily with or without fluoride toothpaste (D)	0.7						1.2	
54	Prevalence of brushing teeth at least twice a day with fluoride toothpaste (D)	0.7							
55	Prevalence of having difficulty cleaning teeth (D)							0.6	
56	Prevalence of using a mouthrinse in the previous week		106.2 <sup>#</sup>		107.3 <sup>#</sup>				15.4 <sup>#</sup>
57	Prevalence of cleaning dentures at least once a day (DW)	0.9		0.6					
58	Prevalence of cleaning dentures at least twice a day (DW)	0.6							
60	Prevalence of having visited a dental professional in previous year			0.5		0.8	0.6		
61	Prevalence of last visit being for a check-up			0.2				2.4	
62	Prevalence of usually visiting a dental professional for a check-up		0.1				0.7	3.3	
63	Prevalence of usually visiting the same dental professional			0.3				2.6	
64	Prevalence of always being listened to carefully by a dental professional		0.6					1.3	0.4
65	Prevalence of feeling they do not see a dental professional often enough				1.6		0.8		1.6
66	Prevalence of perceiving the need for dental treatment						0.8	1.6	
67	Prevalence of having avoided dental care in the last year due to cost			1.7		0.7			0.5
68	Prevalence of cost preventing recommended routine dental treatment			21.3 <sup>#</sup>	21.0 <sup>#</sup>			0.2	9.9 <sup>#</sup>

Older Adults Living in Residential Care: Adjusted Ratio of Rates or Means									
Indicator Ref.	Indicator	Men vs. Women	Māori vs. non-Māori	Pacific vs. non-Pacific	Asian vs. non-Asian	Age 85+ vs. ages 65–84	Lower SES vs. higher SES	Dental visit in previous year vs. no dental visit in previous year	Highest dependency level vs. more independent ^
69	Prevalence of accessing DHB clinic services in the past 12 months				29.2 <sup>#</sup>			0.2	
70	Mean number of visits to DHB clinics in the past 12 months						1.8	1.5	
71	Prevalence of out-of-pocket charges at DHB clinics in the past 12 months						2.7		
72	Mean value of out-of-pocket charges at DHB clinics in the past 12 months	1.4				0.2	0.4		
73	Prevalence of accessing private dental practices to see a dentist in the past 12 months		0.2	0.2			0.6		
74	Prevalence of accessing private dental practices to see a hygienist in the past 12 months		82.2 <sup>#</sup>	83.3 <sup>#</sup>				0.1	
74c	Mean value of out-of-pocket charges at private dental practices to see a hygienist in the past 12 months	0.2				0.6			0.5
75	Prevalence of accessing private specialist dental practices in the past 12 months	2.1	1.6	1.6	1.6	0.3	0.6		1.4
76	Prevalence of accessing dental technicians in the past 12 months			24.0 <sup>#</sup>	23.8 <sup>#</sup>			0.2	
76a	Mean number of visits to dental technicians in the past 12 months	1.6	3.1						
76b	Prevalence of out-of-pocket charges at dental technicians in the past 12 months		2.4						
76c	Mean value of out-of-pocket charges at dental technicians in the past 12 months		0.5				3.4		
77	Prevalence of accessing clinical dental technicians in the past 12 months		7.9 <sup>#</sup>	7.9 <sup>#</sup>	7.9 <sup>#</sup>			0.3	5.4
77c	Mean value of out-of-pocket charges at clinical dental technicians in the past 12 months						0.3		
78	Prevalence of accessing University of Otago Community Oral Health Service in the past 12 months	1.9	1.4		1.4	3.0 <sup>#</sup>			1.4
79	Mean number of visits to private dental practices to see a dentist in the past 12 months				0.5				
80	Prevalence of out-of-pocket charges at private dental practices to see a dentist in the past 12 months								0.2

Older Adults Living in Residential Care: Adjusted Ratio of Rates or Means									
Indicator Ref.	Indicator	Men vs. Women	Māori vs. non-Māori	Pacific vs. non-Pacific	Asian vs. non-Asian	Age 85+ vs. ages 65–84	Lower SES vs. higher SES	Dental visit in previous year vs. no dental visit in previous year	Highest dependency level vs. more independent ^
81	Mean value of out-of-pocket charges at private dental practices to see a dentist in the past 12 months				0.5				0.2
82	Prevalence of accessing a transport service in the past 12 months		0.4				0.6	0.7	
83	Mean number of times transport services accessed in the past 12 months			0.6					
84	Prevalence of out-of-pocket charges required for transport service in the past 12 months						0.3		
85	Mean value of out-of-pocket charges required for transport service in the past 12 months	0.1	0.1				4.6		
86	Prevalence of self-rated very good or excellent oral health	0.7		0.3			1.4	0.7	0.4
87	Prevalence of experiencing impacts due to oral health in previous year (OHIP-14)	1.4		2.0					
88	Prevalence of experiencing orofacial pain in last four weeks		0.5	1.7				1.8	

Source: 2012 Older People's Oral Health Survey

Notes:

(D) Among dentate older adults

(E) Among edentulous older adults

(DW) Among denture-wearing older adults

(DP) Among dentate older adults who had a periodontal examination

# These rate ratio estimates are inflated because of some small sample sizes; accordingly, these should be interpreted with caution (or disregarded)

^ Value before rounding = 0.95

**Table B2: Summary results for older adults living in their own homes, by population group (adjusted ratio of rates or means)**

Home-Based Older Adults: Adjusted Ratio of Rates or Means								
Indicator Ref.	Indicator	Men vs. Women	Māori vs. non-Māori	Pacific vs. non-Pacific	Asian vs. non-Asian	Age 85+ vs. ages 65–84	Lower SES vs. higher SES	Dental visit in previous year vs. no dental visit in previous year
1	Prevalence of complete tooth loss (edentulism)	0.8	1.3			1.2	1.5	0.3
2	Prevalence of missing one or more teeth due to pathology (D)		0.6		0.6	0.5		
3	Mean number of missing teeth (D)		1.3			1.2	1.2	0.9
4	Mean number of natural teeth (D)		0.7			0.9	0.9	1.2
5	Prevalence of having a functional dentition (D)		0.2			0.6	0.7	
6	Mean number of sound and untreated teeth (D)	1.1		1.9	1.4	0.8		
7	Prevalence of untreated coronal decay on one or more teeth (D)	1.3					1.3	0.8
8	Mean number of teeth with untreated coronal decay (D)						1.8	
9	Mean number of teeth with untreated coronal decay in older adults with untreated coronal decay (D)						1.4	
10	Mean number of surfaces with untreated coronal decay (D)						1.6	
11	Prevalence of untreated root decay (D)	1.4						
12	Mean number of teeth with untreated root decay (D)	1.6						
14	Mean number of surfaces with untreated root decay (D)						1.7	
15	Mean number of filled teeth (coronal) (D)	0.8	0.4	0.2	0.5		0.7	1.5
16	Mean DMFT score (D)	0.9		0.7	0.9	1.1		
18	Mean number of teeth requiring one or more restorations (actual) (D)		0.5					
19	Prevalence of one or more extractions required (actual) (D)	1.5	2.0	2.3			1.6	0.7
20	Mean number of extractions required (actual) (D)			3.1			2.8	
23	Prevalence of one or more two-surface coronal restorations required (ideal) (D)	1.6						
26	Prevalence of one or more one-surface root restorations required (ideal) (D)	1.4						



Home-Based Older Adults: Adjusted Ratio of Rates or Means								
Indicator Ref.	Indicator	Men vs. Women	Māori vs. non-Māori	Pacific vs. non-Pacific	Asian vs. non-Asian	Age 85+ vs. ages 65–84	Lower SES vs. higher SES	Dental visit in previous year vs. no dental visit in previous year
27	Mean number of one-surface root restorations required per person (ideal) (D)	1.8	0.4					
31	Prevalence of wearing a full upper denture (D)					1.5		0.5
32	Prevalence of wearing a full lower denture (D)		5.2 <sup>#</sup>		5.2 <sup>#</sup>			
33	Prevalence of wearing only a full upper denture (E)		2.2	5.2		0.5		
34	Prevalence of wearing only a full lower denture (E)	1.5				2.7 <sup>#</sup>		
35	Prevalence of wearing a full upper and lower denture (E)	0.9	0.7			1.1		1.1
36	Prevalence of wearing a partial upper denture (D)					1.7		
37	Prevalence of wearing a partial lower denture (D)					2.3		
38	Prevalence of having a bridge (D)		9.4 <sup>#</sup>	9.3 <sup>#</sup>				
39	Prevalence of having implants (D)		2.4 <sup>#</sup>	2.4 <sup>#</sup>		9.2 <sup>#</sup>	1.9 <sup>#</sup>	
40	Prevalence of having heavy plaque on the teeth (D)	1.5						
41	Prevalence of having heavy calculus on the teeth (D)			2.6				0.4
42	Prevalence of having staining or calculus on dentures (DW)			2.9				
43	Prevalence of periodontal pocketing (DP)			2.2		0.6		1.6
44	Prevalence of deep periodontal pocketing (DP)			9.9 <sup>#</sup>			11.8 <sup>#</sup>	
46	Prevalence of oral ulceration			0.3				
47	Prevalence of oral candidiasis			8.7 <sup>*</sup>				
48	Prevalence of denture stomatitis (DW)			16.4 <sup>#</sup>	16.5 <sup>#</sup>			
49	Prevalence of angular cheilitis			38.6 <sup>#</sup>	38.9 <sup>#</sup>		0.1	
50	Prevalence of dry mouth				0.7		1.1	1.2
51	Prevalence of brushing teeth at least once a day with or without fluoride toothpaste (D)	0.9	0.7		1.1			1.1
52	Prevalence of brushing teeth at least once a day with fluoride toothpaste (D)	0.8						
53	Prevalence of brushing teeth at least twice daily with or without fluoride (D)	0.7	0.5		1.3			

Home-Based Older Adults: Adjusted Ratio of Rates or Means								
Indicator Ref.	Indicator	Men vs. Women	Māori vs. non-Māori	Pacific vs. non-Pacific	Asian vs. non-Asian	Age 85+ vs. ages 65–84	Lower SES vs. higher SES	Dental visit in previous year vs. no dental visit in previous year
54	Prevalence of brushing teeth at least twice a day with fluoride toothpaste (D)	0.7			1.4			
56	Prevalence of using a mouthrinse in the previous week							3.1
58	Prevalence of cleaning dentures at least twice a day (DW)	0.5						
60	Prevalence of having visited a dental professional in previous year	1.3	0.6			0.8	0.6	
61	Prevalence of last visit being for a check-up				0.2		0.6	2.5
62	Prevalence of usually visiting a dental professional for a check-up		0.3	0.2			0.4	5.9 <sup>#</sup>
63	Prevalence of usually visiting the same dental professional		0.6	0.6			0.7	2.3
64	Prevalence of always being listened to carefully by a dental professional		0.8	0.8			0.9	1.3
65	Prevalence of feeling they do not see a dental professional often enough			1.9	1.6	0.7		0.6
66	Prevalence of perceiving the need for dental treatment			1.5	1.5	0.7		
67	Prevalence of having avoided dental care in the last year due to cost			1.9	1.7	0.5	1.4	
68	Prevalence of cost preventing recommended routine dental treatment			2.8		0.2		0.4
69	Prevalence of accessing DHB clinic services in the past 12 months			5.1		0.2		0.1
72	Mean value of out-of-pocket charges at DHB clinics in the past 12 months		0.6	0.3			3.5	
72a	Prevalence of accessing Community clinic services in the past 12 months	0.5						
73	Prevalence of accessing private dental practices to see a dentist in the past 12 months		0.4				0.5	1.5
74	Prevalence of accessing private dental practices to see a hygienist in the past 12 months		83.5 <sup>#</sup>	84.7 <sup>#</sup>	84.8 <sup>#</sup>			0.2
74c	Mean value of out-of-pocket charges at private dental practices to see a hygienist in the past 12 months	0.1				0.2		
75	Prevalence of accessing private specialist dental practices in the past 12 months	5.8 <sup>#</sup>	2.3 <sup>#</sup>	2.3 <sup>#</sup>	2.3 <sup>#</sup>			0.5

Home-Based Older Adults: Adjusted Ratio of Rates or Means								
Indicator Ref.	Indicator	Men vs. Women	Māori vs. non-Māori	Pacific vs. non-Pacific	Asian vs. non-Asian	Age 85+ vs. ages 65–84	Lower SES vs. higher SES	Dental visit in previous year vs. no dental visit in previous year
75c	Mean value of out-of-pocket charges at private specialist dental practices in the past 12 months					2.7	2.7	
76	Prevalence of accessing dental technicians in the past 12 months				18.4 <sup>#</sup>			0.3
76a	Mean number of visits to dental technicians in the past 12 months		0.5	0.6			2.4	
76c	Mean value of out-of-pocket charges at dental technicians in the past 12 months			9.1 <sup>#</sup>				
77	Prevalence of accessing clinical dental technicians in the past 12 months				50.9 <sup>#</sup>			0.1
77a	Mean number of visits to clinical dental technicians in the past 12 months						2.9	
77c	Mean value of out-of-pocket charges at clinical dental technicians in the past 12 months	0.1						
78	Prevalence of accessing University of Otago Community Oral Health Service in the past 12 months			88.2 <sup>#</sup>	88.5 <sup>#</sup>			0.1
78c	Mean value of out-of-pocket charges at the University of Otago Community Oral Health Service in the past 12 months		0.2				0.2	
79	Mean number of visits to private dental practices to see a dentist in the past 12 months							2.2
81	Mean value of out-of-pocket charges at private dental practices to see a dentist in the past 12 months	2.0		0.3	3.4			
82	Prevalence of accessing a transport service in the past 12 months							136.4 <sup>#</sup>
86	Prevalence of self-rated very good or excellent oral health	0.8		0.5	0.3		0.8	0.8
87	Prevalence of experiencing impacts due to oral health in previous year (OHIP-14)			1.6	1.7	0.7	1.5	1.4
88	Prevalence of experiencing orofacial pain in last four weeks					0.7		

Source: 2012 Older People's Oral Health Survey

Notes:

(D) Among dentate older adults

(E) Among edentulous older adults

(DW) Among denture-wearing older adults

(DP) Among dentate older adults who had a periodontal examination

<sup>#</sup> These rate ratio estimates are inflated because of some small sample sizes; accordingly, these should be interpreted with caution (or disregarded)

## Appendix C: Comparison of Common Key Indicators Between 2009 NZOHS and 2012 OPOHS Older Adults

Note: Only two age groups (65–74 and 75+) were included for older adults in the 2009 NZOHS.

### Oral Health Conditions

		2009 NZOHS	2012 OPOHS	
			RC	HB
<b>Prevalence of complete tooth loss (edentulism) among all older adults by population group (unadjusted prevalence)</b>				
Age group	65–74	29.6	43.0	53.2
	75–84		55.2	45.6
	85+	39.6	60.2	57.2
<b>Mean number of teeth per person missing due to pathology among all dentate older adults, by population group (unadjusted mean)</b>				
Age group	65–74	12.1	11.8	12.6
	75–84		15.5	14.6
	85+	13.7	16.7	16.7
<b>Mean number of natural teeth present among all dentate older adults, by population group (unadjusted mean)</b>				
Age group	65–74	19.7	20.2	19.1
	75–84		16.1	17.4
	85+	18.1	14.9	15.3
<b>Prevalence of having a functional dentition among all dentate older adults by population group (unadjusted prevalence)</b>				
Age group	65–74	54.9	58.7	49.3
	75–84		33.7	42.1
	85+	54.0	29.6	27.6
<b>Mean number of sound teeth per person among all dentate older adults, by population group (unadjusted mean)</b>				
Age group	65–74	7.5	9.3	10.5
	75–84		7.8	8.2
	85+	6.9	6.2	6.3
<b>Prevalence of untreated coronal decay on one or more teeth, among all dentate older adults by population group (unadjusted prevalence)</b>				
Age group	65–74	31.0	65.5	46.4
	75–84		62.3	40.9
	85+	30.9	59.3	44.4
<b>Mean number of teeth with untreated coronal decay, among all dentate older adults, by population group (unadjusted mean)</b>				
Age group	65–74	0.6	1.8	1.8
	75–84		2.0	1.2
	85+	0.5	2.4	1.2
<b>Prevalence of untreated root decay on one or more teeth, among all dentate older adults by population group (unadjusted prevalence)</b>				
Age group	65–74	15.5	34.1	25.9
	75–84		30.6	31.2
	85+	29.3	36.1	37.0
<b>Mean number of filled teeth (coronal), among all dentate older adults, by population group (unadjusted mean)</b>				
Age group	65–74	11.5	8.5	6.2
	75–84		5.8	7.4
	85+	10.6	5.5	7.1
<b>Mean number of decayed, missing and filled teeth (DMFT) per person among all dentate older adults, by population group (unadjusted mean)</b>				
Age group	65–74	24.2	22.5	20.8
	75–84		23.6	23.5
	85+	24.8	25.2	25.4
<b>Prevalence of any oral mucosal condition among all older adults by population group (unadjusted prevalence)</b>				
Age group	65–74	32.2	20.3	38.6
	75–84		22.6	27.8
	85+	32.8	28.5	31.9

Sources: 2009 New Zealand Oral Health Survey and 2012 Older People's Oral Health Survey

## Protective Factors

	2009 NZOHS	2012 OPOHS		
		RC	HB	
<b>Prevalence of brushing teeth at least twice a day with fluoride toothpaste among all dentate older adults by population group (unadjusted prevalence)</b>				
Age group	65-74	64.8	54.3	53.4
	75-84	63.3	50.3	44.5
	85+		46.5	57.9

Sources: 2009 New Zealand Oral Health Survey and 2012 Older People's Oral Health Survey

## Use of Oral Health Services

	2009 NZOHS	2012 OPOHS		
		RC	HB	
<b>Prevalence of having visited a dental professional in the previous 12 months among older adults, by population group (unadjusted prevalence)</b>				
Age group	65-74	47.7	24.0	30.1
	75-84	40.3	27.4	31.0
	85+		21.1	24.4
<b>Prevalence of last visit to a dental professional being for a check-up, by population group (unadjusted prevalence)</b>				
Age group	65-74	39.6	22.9	19.6
	75-84	43.2	15.0	30.4
	85+		17.0	26.7
<b>Prevalence of usually visiting a dental professional for a check-up, by population group (unadjusted prevalence)</b>				
Age group	65-74	38.7	15.2	12.3
	75-84	37.1	12.5	21.8
	85+		12.7	20.8
<b>Prevalence of usually visiting the same dental professional for dental care or advice among older adults, by population group (unadjusted prevalence)</b>				
Age group	65-74	71.9	29.8	42.6
	75-84	63.2	25.5	50.0
	85+		23.4	48.6
<b>Prevalence of feeling they did not see a dental professional often enough, among older adults, by population group (unadjusted prevalence)</b>				
Age group	65-74	31.7	47.0	47.8
	75-84	25.1	46.4	34.8
	85+		38.1	23.5
<b>Prevalence of perceived need for treatment, among older adults, by population group (unadjusted prevalence)</b>				
Age group	65-74	28.9	32.3	50.8
	75-84	21.5	26.2	39.8
	85+		22.6	27.7
<b>Prevalence of avoiding dental care due to cost, among older adults, by population group (unadjusted prevalence)</b>				
Age group	65-74	22.8	27.9	54.5
	75-84	16.6	19.8	37.9
	85+		13.4	19.6

Sources: 2009 New Zealand Oral Health Survey and 2012 Older People's Oral Health Survey

## Perceptions and Impacts

	2009 NZOHS	2012 OPOHS		
		RC	HB	
<b>Experiencing impacts due to oral health (one or more OHIP-14 impacts 'often or very often') in the previous 12 months, among older adults by population group (unadjusted prevalence)</b>				
Age group	65-74	12.5	13.9	33.5
	75-84	13.0	20.3	26.6
	85+		17.2	18.4
<b>Frequency of experiencing orofacial pain in the last four weeks, among older adults (unadjusted prevalence)</b>				
Age group	65-74	19.4	12.5	30.4
	75-84	12.1	16.4	22.5
	85+		13.6	16.4

Sources: 2009 New Zealand Oral Health Survey and 2012 Older People's Oral Health Survey

## Appendix D: 2012 OPOHS Questionnaire

### M1: NUMBER OF TEETH

#### Q1. DO YOU HAVE ANY OF YOUR OWN NATURAL TEETH?

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

#### Skipping Instruction:

[If M1/Q1 is 2 Skip to Question M2/Q4; (Q1 will be used for many later skips)]

#### Q2. HOW MANY TEETH DO YOU HAVE IN YOUR UPPER JAW?

Numeric range 1–17

- 98 Don't know
- 99 Refused

#### Q3. HOW MANY TEETH DO YOU HAVE IN YOUR LOWER JAW?

Numeric range 1–17

- 98 Don't know
- 99 Refused

### M2: TOOTH LOSS

#### Q4. HOW OLD WERE YOU WHEN YOU LOST YOUR LAST ADULT NATURAL TOOTH?

- 1 1–97
- 98 Don't know
- 99 Refuse

#### [SHOWCARD PAGE 2]

#### Q5. WHEN YOU LOST YOUR LAST NATURAL TOOTH, WAS IT BECAUSE...

- 1 The tooth was decayed and couldn't be saved – the dentist advised me to have it taken out
- 2 The tooth was decayed and I couldn't afford to have it fixed
- 3 The gums were bad and the dentist couldn't save my tooth – the dentist advised me to have the tooth taken out
- 4 The gums were bad, the tooth could have been saved, but I couldn't afford the treatment
- 5 Of toothache
- 6 Of illness (e.g. heart surgery)
- 7 Of an accident
- 8 Of orthodontic reasons
- 9 Of a wisdom tooth problem
- 10 You wanted a full denture
- 11 Or was it for some other reason?
- 98 Don't know
- 99 Refused

#### [SHOWCARD PAGE 3]

#### OHSQ\_Q6. Do you have a denture or false teeth {removable} for your upper jaw?

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 3]**

**OHSA\_Q7. Do you have a denture or false teeth {removable} for your lower jaw?**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

[If answered No to OHSA\_Q6 and OHSA\_Q7, go to OHSA\_Q9]

**[SHOWCARD PAGE 4]**

**OHSA\_Q8. How long ago did you get your last false teeth/dentures?**

- 1 Less than 1 year
- 2-100 [ENTER AGE]
- 102 Don't know
- 103 Refused

**[SHOWCARD PAGE 4]**

**OHSA\_Q9. Do you have one or more bridges?**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 5]**

**OHSA\_Q10. Do you have any dental implants?**

! INTERVIEWER NOTE: Dental implant is an artificial tooth root replacement and is used in prosthetic dentistry to support restorations that resemble a tooth or group of teeth.

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

**M3: ASSESSMENT OF GENERAL ORAL HEALTH STATUS**

**Q6. HOW WOULD YOU DESCRIBE THE HEALTH OF YOUR TEETH OR MOUTH?**

- 1 Excellent
- 2 Very good
- 3 Good
- 4 Fair
- 5 Poor
- 98 Don't know
- 99 Refused

**Q7. COMPARED TO ONE YEAR AGO, WOULD YOU SAY THAT YOUR DENTAL HEALTH HAS:**

- 1 Stayed the same
- 2 Got worse
- 3 Improved
- 98 Don't know
- 99 Refused

**Q8. IN GENERAL, HOW SATISFIED ARE YOU WITH THE HEALTH OF YOUR TEETH AND MOUTH?**

- 1 Very satisfied
- 2 Satisfied
- 3 Neither satisfied nor dissatisfied
- 4 Dissatisfied
- 5 Very dissatisfied
- 98 Don't know
- 99 Refused

**M4: OROFACIAL PAIN/SYMPTOMS**

**Q9. IN THE LAST 4 WEEKS HAVE YOU HAD PAIN OR DISCOMFORT IN THE TEETH OR MOUTH?**

- 1 Always
- 2 Often
- 3 Sometimes
- 4 Occasionally
- 5 Never
- 98 Don't know
- 99 Refused

Skipping Instruction:

[If M4/Q9 is 5, Skip to Question M4/Q17]

**Q10. HOW WOULD YOU DESCRIBE THE INTENSITY OF THE PAIN/ DISCOMFORT?**

- 1 Mild
- 2 Moderate
- 3 Severe
- 98 Don't know
- 99 Refused

**Q11–Q16. IN THE LAST FOUR WEEKS HAVE YOU HAD...**

		Yes	No	Don't know	Refused
Q11	Toothache				
Q12	Pain in the teeth with hot/cold food/fluids				
<b>Q14</b>	<b>Pain in or around the jaw joints</b>				
<b>Q13</b>	<b>Pain in the mouth or face</b>				
Q15	Bleeding gums				
Q16	Bad breath				

**[SHOWCARD PAGE 5]**

**Q17. HOW OFTEN DOES YOUR MOUTH FEEL DRY?**

- 1 Never
- 2 Occasionally
- 3 Frequently
- 4 Always
- 98 Don't know
- 99 Refused



## **M5: OHIP-14 (ORAL HEALTH IMPACT PROFILE)**

### **[SHOWCARD PAGE 6]**

**Q18. IN THE LAST 12 MONTHS HAVE YOU HAD ANY TROUBLE PRONOUNCING ANY WORDS BECAUSE OF PROBLEMS WITH YOUR TEETH, MOUTH OR DENTURES?**

- 1 Never
- 2 Hardly ever
- 3 Occasionally
- 4 Fairly often
- 5 Very often
- 98 Don't know
- 99 Refused

### **[SHOWCARD PAGE 6]**

**Q19. IN THE LAST 12 MONTHS, HAVE YOU FELT THAT YOUR SENSE OF TASTE HAS WORSENEDED BECAUSE OF PROBLEMS WITH YOUR TEETH, MOUTH OR DENTURES?**

- 1 Never
- 2 Hardly ever
- 3 Occasionally
- 4 Fairly often
- 5 Very often
- 98 Don't know
- 99 Refused

### **[SHOWCARD PAGE 6]**

**Q20. IN THE LAST 12 MONTHS, HAVE YOU HAD PAINFUL ACHING IN YOUR MOUTH?**

- 1 Never
- 2 Hardly ever
- 3 Occasionally
- 4 Fairly often
- 5 Very often
- 98 Don't know
- 99 Refused

### **[SHOWCARD PAGE 6]**

**Q21. IN THE LAST 12 MONTHS, HAVE YOU FOUND IT UNCOMFORTABLE TO EAT ANY FOODS BECAUSE OF PROBLEMS WITH YOUR TEETH, MOUTH OR DENTURES?**

- 1 Never
- 2 Hardly ever
- 3 Occasionally
- 4 Fairly often
- 5 Very often
- 98 Don't know
- 99 Refused

### **[SHOWCARD PAGE 6]**

**Q22. IN THE LAST 12 MONTHS, HAVE YOU BEEN SELF-CONSCIOUS BECAUSE OF PROBLEMS WITH YOUR TEETH, MOUTH OR DENTURES?**

- 1 Never
- 2 Hardly ever
- 3 Occasionally
- 4 Fairly often
- 5 Very often
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 6]**

**Q23. IN THE LAST 12 MONTHS, HAVE YOU FELT TENSE BECAUSE OF PROBLEMS WITH YOUR TEETH, MOUTH OR DENTURES?**

- 1 Never
- 2 Hardly ever
- 3 Occasionally
- 4 Fairly often
- 5 Very often
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 6]**

**Q24. IN THE LAST 12 MONTHS, HAS YOUR DIET BEEN UNSATISFACTORY BECAUSE OF PROBLEMS WITH YOUR TEETH, MOUTH OR DENTURES?**

- 1 Never
- 2 Hardly ever
- 3 Occasionally
- 4 Fairly often
- 5 Very often
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 6]**

**Q25. IN THE LAST 12 MONTHS, HAVE YOU HAD TO INTERRUPT MEALS BECAUSE OF PROBLEMS WITH YOUR TEETH, MOUTH OR DENTURES?**

- 1 Never
- 2 Hardly ever
- 3 Occasionally
- 4 Fairly often
- 5 Very often
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 6]**

**Q26. IN THE LAST 12 MONTHS, HAVE YOU FOUND IT DIFFICULT TO RELAX BECAUSE OF PROBLEMS WITH YOUR TEETH, MOUTH OR DENTURES?**

- 1 Never
- 2 Hardly ever
- 3 Occasionally
- 4 Fairly often
- 5 Very often
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 6]**

**Q27. IN THE LAST 12 MONTHS, HAVE YOU BEEN A BIT EMBARRASSED BECAUSE OF PROBLEMS WITH YOUR TEETH, MOUTH OR DENTURES?**

- 1 Never
- 2 Hardly ever
- 3 Occasionally
- 4 Fairly often
- 5 Very often
- 98 Don't know
- 99 Refused

[SHOWCARD PAGE 6]

**Q28. IN THE LAST 12 MONTHS, HAVE YOU BEEN A BIT IRRITABLE WITH OTHER PEOPLE BECAUSE OF PROBLEMS WITH YOUR TEETH, MOUTH OR DENTURES?**

- 1 Never
- 2 Hardly ever
- 3 Occasionally
- 4 Fairly often
- 5 Very often
- 98 Don't know
- 99 Refused

[SHOWCARD PAGE 6]

**Q29. IN THE LAST 12 MONTHS, HAVE YOU HAD DIFFICULTY DOING YOUR USUAL JOBS BECAUSE OF PROBLEMS WITH YOUR TEETH, MOUTH OR DENTURES?**

- 1 Never
- 2 Hardly ever
- 3 Occasionally
- 4 Fairly often
- 5 Very often
- 98 Don't know
- 99 Refused

[SHOWCARD PAGE 6]

**Q30. IN THE LAST 12 MONTHS, HAVE YOU FELT THAT LIFE IN GENERAL WAS LESS SATISFYING BECAUSE OF PROBLEMS WITH YOUR TEETH, MOUTH OR DENTURES?**

- 1 Never
- 2 Hardly ever
- 3 Occasionally
- 4 Fairly often
- 5 Very often
- 98 Don't know
- 99 Refused

[SHOWCARD PAGE 6]

**Q31. IN THE LAST 12 MONTHS, HAVE YOU BEEN TOTALLY UNABLE TO FUNCTION BECAUSE OF PROBLEMS WITH YOUR TEETH, MOUTH OR DENTURES?**

- 1 Never
- 2 Hardly ever
- 3 Occasionally
- 4 Fairly often
- 5 Very often
- 98 Don't know
- 99 Refused

## **M6. EuroQoL**

**PLEASE INDICATE WHICH STATEMENTS BEST DESCRIBE YOUR OWN HEALTH STATE TODAY.**

[SHOWCARD PAGE 7]

**Q32. MOBILITY**

- 1 I have no problems in walking about
- 2 I have some problems in walking about
- 3 I am confined to bed

**[SHOWCARD PAGE 7]**

**Q33. SELF-CARE**

- 1 I have no problems with self-care
- 2 I have some problems washing or dressing myself
- 3 I am unable to wash or dress myself

**[SHOWCARD PAGE 8]**

**Q34. USUAL ACTIVITIES (E.G. WORK, STUDY, HOUSEWORK, FAMILY OR LEISURE ACTIVITIES)**

- 1 I have no problems with performing my usual activities
- 2 I have some problems with performing my usual activities
- 3 I am unable to perform my usual activities

**[SHOWCARD PAGE 8]**

**Q35. PAIN/DISCOMFORT**

- 1 I have no pain or discomfort
- 2 I have moderate pain or discomfort
- 3 I have extreme pain or discomfort

**[SHOWCARD PAGE 9]**

**Q36. ANXIETY/DEPRESSION**

- 1 I am not anxious or depressed
- 2 I am moderately anxious or depressed
- 3 I am extremely anxious or depressed

**Q37 EuroQoL Visual Analogue Scale**

Use paper so respondent indicates score on paper, but surveyor transcribes to number box format x.x.  
Surveyors will need paper VAS for each respondent.

**TO HELP PEOPLE SAY HOW GOOD OR BAD A HEALTH STATE IS, WE HAVE DRAWN A SCALE (RATHER LIKE A THERMOMETER) ON WHICH THE BEST STATE YOU CAN IMAGINE IS MARKED 100 AND THE WORST STATE YOU CAN IMAGINE IS MARKED 0.**

**WE WOULD LIKE YOU TO INDICATE ON THIS SCALE HOW GOOD OR BAD YOUR OWN HEALTH IS TODAY, IN YOUR OPINION. PLEASE DO THIS BY DRAWING A LINE FROM THE BOX BELOW TO WHICHEVER POINT ON THE SCALE THAT INDICATES HOW GOOD OR BAD YOUR HEALTH STATE IS TODAY.**

<b>M7: Mini Nutritional Assessment (MNA)</b>
--

**Q38. HAS FOOD INTAKE DECLINED OVER THE PAST 3 MONTHS DUE TO LOSS OF APPETITE, DIGESTIVE PROBLEMS, CHEWING OR SWALLOWING DIFFICULTIES?**

- 1 Severe decrease in food intake
- 2 Moderate decrease in food intake
- 3 No decrease in food intake

**Q39. WEIGHT LOSS DURING THE LAST 3 MONTHS**

- 1 Weight loss greater than 3 kg (6.6 lbs)
- 2 Does not know
- 3 Weight loss between 1 and 3 kg (2.2 and 6.6 lbs)
- 4 No weight loss

**Q40. MOBILITY**

- 1 Bed or chair bound
- 2 Able to get out of bed/chair but does not go out
- 3 Goes out

**Q41. HAS SUFFERED PSYCHOLOGICAL STRESS OR ACUTE DISEASE IN THE PAST 3 MONTHS?**

- 1 Yes
- 2 No

**Q42. NEUROPSYCHOLOGICAL PROBLEMS**

- 1 Severe dementia or depression
- 2 Mild dementia
- 3 No psychological problems

**Q43. WEIGHT IN KILOGRAMS (or stone/pounds from records or volunteered)**

**Q44. HEIGHT IN METRES (or feet/inches from records or volunteered)**

[If no height or weight then:]

**Q45. CALF CIRCUMFERENCE IN CM**

**M8: Dementia Assessment**

**DM1. How old are you?**

**DM2. What is the time? (Nearest hour)**

**DM3. Address for recall at the end of the test – this should be repeated by the respondent, e.g. 42 West Terrace.**

**DM4. What year is it?**

**DM5. What is the name of this place?**

**DM6. Can the respondent recognise two relevant people? (e.g. family, staff, photos)**

**DM7. What was the date of your birth?**

**DM8. When was the second World War?**

**DM9. Who is the present Prime Minister?**

**DM10. Count down from 20 to 1 (no errors, or cues)**

**M9: APPEARANCE**

[SHOWCARD PAGE 9]

**Q46. IN GENERAL, HOW SATISFIED ARE YOU WITH THE APPEARANCE OF YOUR TEETH, MOUTH OR DENTURES?**

- 1 Very satisfied
- 2 Satisfied
- 3 Neither satisfied nor dissatisfied
- 4 Dissatisfied
- 5 Very dissatisfied
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 10]**

**Q47. IN GENERAL, COMPARED TO OTHER PEOPLE, DO YOU THINK THE APPEARANCE OF YOUR TEETH, MOUTH OR DENTURES IS...**

- 1 Among the nicest
- 2 Better than average
- 3 Average
- 4 Below average
- 5 Among the worst
- 98 Don't know
- 99 Refused

[If M1/Q1 is 2 Skip to Question M7Q53; i.e. no natural teeth]

**Q48. DO YOU HAVE ANY MARKS ON YOUR TEETH WHICH WON'T BRUSH OFF?**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

Skipping Instruction:

[If Q48 is 2, Skip to Q50]

**Q49. DO THESE MARKS BOTHER YOU?**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

**Q50. ARE YOU PLANNING, IN THE FUTURE, TO HAVE DENTAL TREATMENT TO IMPROVE THE APPEARANCE OF YOUR TEETH AND/OR GUMS?**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

Skipping Instruction:

[If M6/Q50 is 2, 98, 99, Skip to Question M7/Q52]

**[SHOWCARD PAGE 11]**

**Q51. WHAT WOULD YOU LIKE TO HAVE DONE? I WOULD LIKE TO...**

- 1 Have my teeth cleaned
- 2 Have my gums looking better
- 3 Have my broken or chipped teeth repaired
- 4 Have my decayed teeth fixed
- 5 Have my teeth straightened
- 6 Have my teeth whitened
- 7 Have gaps closed
- 8 Have the shape of my teeth changed
- 9 Have white fillings in back teeth
- 10 Have new dentures or existing dentures replaced
- 11 Other, please specify
- 98 Don't know
- 99 Refused

[Skip to Q53]

**Q52. WHY NOT?**

- 1 My teeth are OK as they are
- 2 I would like to but I couldn't afford it
- 3 I don't want fancy treatment
- 98 Don't know
- 99 Refused

<b>M10: SELF-PERCEIVED NEED FOR DENTAL CARE</b>
---

**Q53. DO YOU FEEL THAT YOU CURRENTLY NEED DENTAL TREATMENT?**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

[If M7/Q53 is 2, 98, 99, Skip to Question M8/Q55]

[If M1/Q1 is 2 Skip to Question M7/Q54B; i.e. no natural teeth]

**[SHOWCARD PAGE 12]**

**Q54. WHAT TYPE OF DENTAL CARE DO YOU THINK YOU NEED NOW?**

- 1 Teeth filled or replaced (for example, fillings, crowns and/or bridges)
- 2 Teeth pulled
- 3 Gum treatment
- 4 Denture work
- 5 Relief of pain
- 6 Work to improve appearance (for example, braces or bonding)
- 7 Cleaning
- 8 Other, please specify
- 9 Nothing
- 98 Don't know
- 99 Refused

[Skip to Q55]

[Q54B subset for people with no teeth]

**[SHOWCARD PAGE 13]**

**Q54B. WHAT TYPE OF DENTAL CARE DO YOU THINK YOU NEED NOW?**

- 3 Gum treatment
- 4 Denture work
- 5 Relief of pain
- 6 Work to improve appearance (for example, braces or bonding)
- 8 Other, please specify
- 9 Nothing
- 98 Don't know
- 99 Refused

[SKIP to Q60]

## **M11: PREVENTATIVE CARE [Adults with natural teeth]**

[If M1/Q1 is; i.e. no natural teeth skip to M8/Q60]

### **[SHOWCARD PAGE 14]**

#### **Q55. HOW OFTEN DO YOU BRUSH YOUR TEETH?**

- 1 Never
- 2 Less than once a week
- 3 Once or twice a week
- 4 More than twice a week but not once a day
- 5 Once a day
- 6 Twice a day
- 7 More than twice a day
- 98 Don't know
- 99 Refused

### **[SHOWCARD PAGE 14]**

#### **Q56. HOW OFTEN DO YOU CLEAN BETWEEN YOUR TEETH (USING DENTAL FLOSS, DENTAL TAPE, AN INTERDENTAL BRUSH OR A TOOTHPICK)?**

- 1 Never
- 2 Less than once a week
- 3 Once or twice a week
- 4 More than twice a week but not once a day
- 5 Once a day
- 6 Twice a day
- 7 More than twice a day
- 98 Don't know
- 99 Refused

#### **Q57. DO YOU HAVE ANY PHYSICAL PROBLEMS THAT MAKE IT DIFFICULT FOR YOU TO CLEAN YOUR TEETH SUCH AS OPENING YOUR MOUTH OR MOVING YOUR HAND?**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

#### **Q58. HAVE YOU EVER HAD YOUR TEETH CLEANED BY A DENTIST OR DENTAL HYGIENIST?**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

#### **Q59. WHEN WAS THE LAST TIME THEY WERE CLEANED BY A DENTIST OR DENTAL HYGIENIST?**

- 1 6 months ago or less
- 2 Over 6 months to 12 months
- 3 Over 12 months to 2 years
- 4 Over 2 years to 5 years
- 5 More than 5 years
- 98 Don't know
- 99 Refused



## M12: PREVENTATIVE CARE – ADULTS WITH DENTURES

[If does not have dentures skip to Q64]

### [SHOWCARD PAGE 14]

#### Q60. HOW OFTEN DO YOU CLEAN YOUR DENTURES?

- 1 Never
- 2 Less than once a week
- 3 Once or twice a week
- 4 More than twice a week but not once a day
- 5 Once a day
- 6 Twice a day
- 7 More than twice a day
- 98 Don't know
- 99 Refused

### [SHOWCARD PAGE 14]

#### Q61. HOW OFTEN DO YOU WEAR YOUR UPPER DENTURE?

- 1 Never
- 2 Sometimes
- 3 Most days
- 4 Every day
- 98 Don't know
- 99 Refused

### [SHOWCARD PAGE 14]

#### Q62. HOW OFTEN DO YOU WEAR YOUR LOWER DENTURE?

- 1 Never
- 2 Sometimes
- 3 Most days
- 4 Every day
- 98 Don't know
- 99 Refused

### [SHOWCARD PAGE 15]

#### Q63. HOW OFTEN DO YOU SLEEP WEARING YOUR DENTURES?

- 1 Never
- 2 Some nights
- 3 Most nights
- 4 Every night
- 98 Don't know
- 99 Refused

### **M13: USE OF FLUORIDATED TOOTHPASTE [ADULTS WITH NATURAL TEETH]**

[If M1/Q1 is 2, Skip to Question M11/Q68; i.e. no natural teeth]

[SHOWCARD PAGE 15]

**Q64. DO YOU USE TOOTHPASTE WHEN YOU CLEAN YOUR TEETH?**

- 1 Always
- 2 Often
- 3 Sometimes
- 4 Occasionally
- 5 Never
- 98 Don't know
- 99 Refused

[SHOWCARD PAGE 16]

**Q65. WHICH TOOTHPASTE DO YOU USUALLY USE? [SHOWCARD OF BRANDS IN FLUORIDE STRENGTHS]**

- 1 (1000 ppm fluoridated group)
- 2 (400–500 ppm)
- 3 (Non-fluoridated)
- 98 Don't know
- 99 Refused

### **M14: USE OF MOUTHRINSES [ADULTS WITH NATURAL TEETH]**

**Q66. IN THE LAST WEEK, DID YOU USE A MOUTHRINSE OR MOUTH WASH?**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

[Skip: if Q66, 2, 98, 99 skip to M11/Q68]

**Q67. IN THE LAST WEEK, HOW MANY TIMES DID YOU USE A MOUTHRINSE OR MOUTH WASH?**

- 1 1–96
- 97 None
- 98 Don't know
- 99 Refused

### **M15: CURRENT SMOKING STATUS**

**Q68. HAVE YOU EVER SMOKED CIGARETTES OR TOBACCO AT ALL, EVEN JUST A FEW PUFFS? PLEASE INCLUDE PIPES AND CIGARS.**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

**Q69. HAVE YOU EVER SMOKED A TOTAL OF MORE THAN 100 CIGARETTES IN YOUR WHOLE LIFE?**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 17]**

**Q70. HOW OFTEN DO YOU NOW SMOKE?**

- 1 You don't smoke now
- 2 At least once a day
- 3 At least once a week
- 4 At least once a month
- 5 Less often than once a month
- 98 Don't know
- 99 Refused

<b>M16: ORAL HEALTH SERVICE UTILISATION Public/Private; Clinical/Other</b>
--

**[SHOWCARD PAGE 18]**

**Q71. WHICH DENTAL SERVICES HAVE YOU USED IN THE LAST 12 MONTHS?**

**[Tick all that apply]**

- 1 Private dental practice to see dentist (not just hygienist)
- 2 Private dental practice to see hygienist
- 3 Private specialist dental practice (e.g. orthodontist, endodontist)
- 4 District Health Board (DHB) Emergency Department
- 5 District Health Board (DHB) clinic
- 6 Māori Provider clinic
- 7 Community Clinic e.g. 'People's Centre'
- 8 Dental Technician
- 9 Clinical Dental Technician
- 10 Armed Services/Defence Force clinic
- 11 Other site specify
- 12 None
- 98 Don't know
- 99 Refused

[Coding instruction: Q71\_1\_1 / Q71\_1\_2/ Q71\_1\_3 / Q71\_1\_4]

**Then for each service (1–11) ask:**

- 1. How many times in the last year did you use this service?
- 2. What was the total cost of the service last time you used it?
- 3. What did you have to pay yourself out-of-pocket?
- 4. How much of the total cost was covered by private insurance?

**Q72. What other services have you used in the last year to help you get dental care, e.g. transport?**

- 1 Transport
- 2 Other service1 specify
- 3 Other service2 specify
- 12 None
- 98 Don't know
- 99 Refused

**Then for each service (1–3) ask:**

- 1. How many times in the last year did you use this service?
- 2. What was the total cost of the service last time you used it?
- 3. What did you have to pay yourself out-of-pocket?
- 4. How much of the total cost was covered by private insurance?

## M17: DENTAL VISITS

[If Q71 not 1–11 then go to Q74]

### Q73. HAVE YOU HAD A TOOTH TAKEN OUT BY A DENTAL PROFESSIONAL DURING THE LAST 12 MONTHS?

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

[Skip to Q75]

### [SHOWCARD PAGE 19]

### Q74. WHAT ARE THE REASONS YOU HAVE NOT VISITED A DENTAL PROFESSIONAL IN THE LAST 12 MONTHS?

[Tick all that apply]

- 1 Afraid of dental professionals/don't like the thought of going to a dental professional
- 2 Nervous
- 3 Needles
- 4 Cost
- 5 Don't know dentist
- 6 Dentist too far/difficult to make the journey
- 7 Can't get there
- 8 No problems
- 9 No teeth
- 10 Not important
- 11 Didn't think of it
- 12 Other, please specify
- 98 Don't know
- 99 Refused

### [SHOWCARD PAGE 20]

### Q75. WHAT WAS THE MAIN REASON THAT YOU LAST VISITED A DENTAL PROFESSIONAL?

- 1 Went in on own for check-up, examination or cleaning
- 2 Was called in by the dental professional for check-up, examination or cleaning
- 3 Something was wrong, bothering or hurting
- 4 Went for treatment of a condition that dental professional discovered at earlier check-up or examination
- 5 To get treatment for teeth damaged in an accident
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 21]**

**Q76. WHAT DID YOU HAVE DONE DURING THIS LAST VISIT?**

**[Tick all that apply]**

[Q76B – subset for people with no teeth]

- 1 General exam, check-up or consultation
- 2 Cleaning, prophylaxis, or polishing
- 3 X-rays, radiographs or bite-wings
- 4 Fluoride treatment
- 5 Sealant (plastic coatings on back teeth)
- 6 Fillings
- 7 Inlays
- 8 Crowns or caps
- 9 Root canal
- 10 Periodontal scaling, root planning, or gum surgery
- 11 Periodontal recall visit (periodic or recall)
- 12 Extraction, tooth pulled
- 13 Implants
- 14 Abscess or infection treatment
- 15 Other oral surgery (e.g. third molar surgery)
- 16 Fixed bridges
- 17 Dentures or removable partial dentures
- 18 Relining or repair of bridges or dentures
- 19 Orthodontics, braces or retainers
- 20 Bond whiten or bleach
- 21 Treatment for TMD or TMJ
- 22 Other, please specify
- 98 Don't know
- 99 Refused

**[Skip to Q77]**

**[SHOWCARD PAGE 22]**

**Q76B. WHAT DID YOU HAVE DONE DURING THIS LAST VISIT? [NO TEETH] [Tick all that apply]**

- 1 General exam, check-up or consultation
- 2 Cleaning, prophylaxis, or polishing
- 3 X-rays, radiographs or bite-wings
- 5 Sealant (plastic coatings on back teeth)
- 13 Implants
- 14 Abscess or infection treatment
- 15 Other oral surgery
- 16 Fixed bridges
- 17 Dentures or removable partial dentures
- 18 Relining or repair of bridges or dentures
- 19 Orthodontics, braces or retainers
- 21 Treatment for TMD or TMJ
- 22 Other, please specify
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 23]**

**Q77. WHERE DID YOU MAKE YOUR LAST DENTAL VISIT? AT A:**

- 1 Private dental practice to see dentist (not just hygienist)
- 2 Private dental practice to see hygienist
- 3 Private specialist dental practice (e.g. orthodontist, endodontist)
- 4 District Health Board (DHB) Emergency Department
- 5 District Health Board (DHB) clinic
- 6 Māori Provider clinic
- 7 Community Clinic e.g. 'People's Centre'
- 8 Dental Technician
- 9 Clinical Dental Technician
- 10 Armed Services/Defence Force clinic
- 11 Other site
- 12 None
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 24]**

**Q78. WHY DID YOU CHOOSE TO VISIT THAT DENTAL PROVIDER FOR YOUR LAST VISIT?**

- 1 They were the closest dental care provider
- 2 It was cheaper than going to another dental care provider
- 3 They are my usual provider of dental treatment
- 4 They offer the specialist services that I need
- 5 I find they are willing to spend more time discussing my dental health
- 6 I felt more comfortable talking to someone who understands my culture
- 7 They are interested in the impact that my dental health, and its treatment, has on my family/whanau/aiga
- 8 I was referred to them by another healthcare worker e.g. GP or Nurse
- 9 I was referred to them by a friend or relative
- 10 Other, please specify
- 98 Don't know
- 99 Refused

**M18: ACCESS**

**[SHOWCARD PAGE 25]**

**Q79. THE LAST TIME YOU WENT TO THAT DENTAL PROFESSIONAL, HOW LONG DID IT TAKE YOU TO GET THERE?**

- 1 0–9 minutes
- 2 10–29 minutes
- 3 30–60 minutes
- 4 More than one hour
- 98 Don't know
- 99 Refused

**Q80. DO YOU THINK THE TRAVEL TIME WAS TOO LONG OR NOT TOO LONG TO TRAVEL FOR DENTAL CARE?**

- 1 Too long
- 2 Not too long
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 25]**

**Q81. FOR THIS LAST VISIT TO THE DENTAL PROFESSIONAL, WHEN YOU MADE AN APPOINTMENT, HOW SOON WERE YOU ABLE TO BE SEEN?**

- 1 The same day
- 2 Within a couple of days
- 3 Within a week
- 4 After one or two weeks
- 5 After more than 3 weeks
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 26]**

**Q81B. WHEN YOU LAST VISITED THE DENTAL PROFESSIONAL WHO ACCOMPANIED YOU?**

- 1 Family member
- 2 Care staff member
- 3 Friend
- 4 Community worker
- 5 No one
- 6 Other
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 27]**

**Q81C. WHEN YOU LAST VISITED THE DENTAL PROFESSIONAL HOW DID YOU GET THERE?**

- 1 They came to me at my home or residential care facility
- 2 Private vehicle
- 3 Taxi
- 4 Residential care facility provided transport
- 5 A community organisation provided transport
- 6 Walk
- 7 Other
- 98 Don't know
- 99 Refused

**Q82. DO YOU FEEL THAT YOU SEE THE DENTIST OFTEN ENOUGH?**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

Skipping Instruction:

[If Q82 is 1, skip to 84]

**[SHOWCARD PAGE 28]**

**Q83. IF NO, WHY NOT?**

- 1 Afraid of dentist/don't like the thought of going to the dentist
- 2 Nervous
- 3 Needles
- 4 Cost
- 5 Don't know dentist
- 6 Dentist too far/difficult to make the journey
- 7 Can't get there
- 8 No problems
- 9 No teeth
- 10 Not important
- 11 Didn't think of it
- 12 Other; please specify other reason for no dental visits. This should be a reason that is not on the list
- 98 Don't know
- 99 Refused

Skipping Instruction:

[If Q71 not 1–11, then go to Q88]

**Q84. HAS THE COST PREVENTED YOU FROM HAVING ANY ROUTINE DENTAL TREATMENT THAT WAS RECOMMENDED DURING THE LAST 12 MONTHS?**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

Skipping Instruction:

[If Q84 is 2, skip to Q87]

**Q85. DID YOU TAKE UP AN ALTERNATIVE LOWER-COST OPTION FOR THE DENTAL TREATMENT THAT WAS RECOMMENDED?**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 29]**

**Q87. DURING THE PAST 12 MONTHS, HOW MUCH DIFFICULTY WOULD YOU HAVE HAD PAYING A \$150 DENTAL BILL OUT OF YOUR OWN POCKET? WOULD YOU SAY:**

- 1 None
- 2 Hardly any
- 3 A little
- 4 A moderate amount of difficulty
- 5 A lot of difficulty
- 98 Don't know
- 99 Refused

**Q88. DO YOU AGREE OR DISAGREE WITH THE FOLLOWING STATEMENTS?**

- 1 The cost of my dental care has been a financial burden to me (or my family)
- 2 In the last year I have avoided going to a dental care provider because of the cost
- 3 In the last year I have been unable to have all of the dental treatment that was necessary because of the cost



**Q89. DO YOU HAVE PRIVATE INSURANCE COVER FOR DENTAL EXPENSES?**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

**Q90. IF DENTAL TREATMENT WAS AVAILABLE TO YOU AT A LOWER COST, WOULD YOU GO TO A DENTAL PROFESSIONAL MORE OFTEN?**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

**Q91. IF THERE WAS A DENTAL SCHEME THAT WOULD DECREASE THE COST OF DENTAL TREATMENT, HOW MUCH WOULD YOU BE PREPARED TO SPEND PER MONTH?**

- 1 In favour, specify amount – \$
- 2 Not in favour
- 98 Don't know
- 99 Refused

<b>M19: USUAL PROVIDER OF DENTAL CARE</b>
---

“I have asked you about your last visit to the dentist. I would now like to ask you about what you usually do for dental treatment”

**Q92. IS THERE A PARTICULAR DENTAL PROFESSIONAL WHO YOU USUALLY GO TO IF YOU NEED DENTAL CARE OR DENTAL ADVICE?**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

[If Q92 = 2 (no) then Q95]

**Q93. IS THIS THE SAME DENTAL PROFESSIONAL YOU WENT TO FOR YOUR LAST DENTAL VISIT?**

- 1 Yes
- 2 No
- 98 Don't know
- 99 Refused

Skipping Instruction:

[If M14/Q93 is 1, skip to Q95]

**[SHOWCARD PAGE 30]**

**Q94. WHAT WERE THE REASONS YOU CHANGED FROM YOUR USUAL DENTAL PROFESSIONAL TO THE DENTAL PROFESSIONAL YOU SAW FOR YOUR LAST DENTAL VISIT?**

- 1 I moved to a new area
- 2 I changed to a dental professional that understood my culture/language better
- 3 I changed when I found a dental professional who I felt more comfortable with (other than for reason of culture/language)
- 4 I changed to a dental professional I could more easily afford
- 5 I was referred to a specialist for treatment
- 6 Other reason, please specify
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 31]**

**Q95. ON YOUR LAST VISIT TO A DENTAL PROFESSIONAL WOULD YOU SAY THAT THE DENTAL PROFESSIONAL LISTENED CAREFULLY TO WHAT YOU HAD TO SAY?**

- 1 Always
- 2 Often
- 3 Sometimes
- 4 Occasionally
- 5 Never
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 31]**

**Q96. DID THE DENTAL PROFESSIONAL DISCUSS WITH YOU, AS MUCH AS YOU WANTED, YOUR ORAL HEALTH CARE AND TREATMENT?**

- 1 Always
- 2 Often
- 3 Sometimes
- 4 Occasionally
- 5 Never
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 31]**

**Q97. DID THE DENTAL PROFESSIONAL TREAT YOU WITH RESPECT AND DIGNITY?**

- 1 Always
- 2 Often
- 3 Sometimes
- 4 Occasionally
- 5 Never
- 98 Don't know
- 99 Refused

**M20: REGULAR DENTAL CHECK-UPS**

**Q98. WHAT IS YOUR USUAL REASON FOR VISITING A DENTAL PROFESSIONAL? FOR CHECK-UPS OR WHEN YOU HAVE A PROBLEM?**

- 1 Check-up
- 2 Problem
- 98 Don't know
- 99 Refused

## **M21: DENTAL ANXIETY**

### **[SHOWCARD PAGE 32]**

#### **Q99. IF YOU HAD TO GO TO A DENTAL PROFESSIONAL TOMORROW, HOW WOULD YOU FEEL ABOUT IT?**

- 1 I would look forward to it as a reasonably enjoyable experience
- 2 I wouldn't care one way or another
- 3 I would be a little uneasy about it
- 4 I would be afraid that it would be unpleasant and painful
- 5 So anxious that I sometimes break out in a sweat or almost feel physically sick
- 98 Don't know
- 99 Refused

### **[SHOWCARD PAGE 33]**

#### **Q100. WHEN YOU ARE WAITING IN THE DENTAL PROFESSIONAL'S WAITING ROOM FOR YOUR TURN IN THE CHAIR, HOW DO YOU FEEL?**

- 1 Relaxed
- 2 A little uneasy
- 3 Tense
- 4 Anxious
- 5 So anxious that I sometimes break out in a sweat or almost feel physically sick
- 98 Don't know
- 99 Refused

### **[SHOWCARD PAGE 33]**

#### **Q101. WHEN YOU ARE IN THE DENTAL CHAIR WAITING WHILE THE DENTAL PROFESSIONAL GETS HIS OR HER DRILL READY TO BEGIN WORKING ON YOUR TEETH, HOW DO YOU FEEL?**

- 1 Relaxed
- 2 A little uneasy
- 3 Tense
- 4 Anxious
- 5 So anxious that I sometimes break out in a sweat or almost feel physically sick
- 98 Don't know
- 99 Refused

### **[SHOWCARD PAGE 33]**

#### **Q102. YOU ARE IN THE DENTAL CHAIR TO HAVE YOUR TEETH CLEANED. WHILE YOU ARE WAITING AND THE DENTAL PROFESSIONAL IS GETTING OUT THE INSTRUMENTS WHICH HE OR SHE WILL USE TO SCRAPE YOUR TEETH AROUND THE GUMS, HOW DO YOU FEEL?**

- 1 Relaxed
- 2 A little uneasy
- 3 Tense
- 4 Anxious
- 5 So anxious that I sometimes break out in a sweat or almost feel physically sick
- 98 Don't know
- 99 Refused

## M22: OPINIONS ABOUT DENTAL CARE

“I would now like to ask you your opinions about dental care and oral health”

[SHOWCARD PAGE 34]

**Q103. DO YOU THINK THAT DENTAL PROBLEMS IN OLDER PEOPLE’S TEETH ARE?**

- 1 Very important
- 2 Somewhat important
- 3 Neutral
- 4 Not very important
- 5 Not important at all
- 98 Don’t know
- 99 Refused

[SHOWCARD PAGE 34]

**Q104. HOW IMPORTANT DO YOU THINK THE HEALTH OF YOUR MOUTH AND TEETH IS TO YOUR GENERAL WELLBEING?**

- 1 Very important
- 2 Somewhat important
- 3 Neutral
- 4 Not very important
- 5 Not important at all
- 98 Don’t know
- 99 Refused

## SOCIO-DEMOGRAPHICS

“We’re nearly finished these questions – I’d just like to ask you some questions about yourself”

**D1. FIRSTLY, WHAT IS YOUR DATE OF BIRTH?**

D1DOBD Day of Month  
1 – 31

D1DOBM Month  
January – December

D1DOBY Year  
1 1900 – 1947

- 98 Don't know
- 99 Refused

**D2. [IF REFUSED] WOULD YOU MIND TELLING ME YOUR AGE?**

- 1 Enter age\_\_
- 2 Refused to give age

**[SHOWCARD PAGE 35]**

**D3. WHICH ETHNIC GROUP OR GROUPS DO YOU BELONG TO? [ALL THAT APPLY]**

- 1 New Zealand European
- 2 Māori
- 3 Samoan
- 4 Cook Island Māori
- 5 Tongan
- 6 Niuean
- 7 Chinese
- 8 Indian
- 9 Other, such as Dutch, Japanese, Tokelauan, please specify
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 36]**

**D4. LOOKING AT SHOWCARD, WHAT IS YOUR HIGHEST SECONDARY SCHOOL QUALIFICATION? [SELECT ONE]**

- 1 None
- 2 NZ School Certificate in one or more subjects
- 3 NZ Sixth Form Certificate in one or more subjects
- 4 NZ Higher School Certificate or Higher Leaving Certificate or NZ University Entrance
- 5 Bursary/Scholarship
- 6 Other secondary school qualification gained in NZ, please specify
- 7 Other secondary school qualification gained overseas
- 98 Don't know
- 99 Refused

**[SHOWCARD PAGE 37]**

**D5. LOOKING AT SHOWCARD, APART FROM SECONDARY SCHOOL QUALIFICATIONS DO YOU HAVE ANOTHER COMPLETED QUALIFICATION? PLEASE DO NOT COUNT INCOMPLETE QUALIFICATIONS OR QUALIFICATIONS THAT TAKE LESS THAN 3 MONTHS OF FULL-TIME STUDY TO GET. PLEASE TELL US YOUR HIGHEST QUALIFICATIONS [SELECT ONE]**

- 1 No qualification beyond secondary school
- 2 Bachelors degree, for example, BA, BSc
- 3 Bachelors degree with honours
- 4 Masters degree, for example, MA, MSc
- 5 PhD
- 6 Diploma (not postgraduate)
- 7 Diploma – Postgraduate
- 8 Trade or technical certificate which took more than 3 months' full-time study
- 9 Professional qualification, for example, ACA, teachers, nurses
- 10 Other, please specify
- 98 Don't know
- 99 Refused

**D6. WHAT WAS YOUR ADDRESS THE LAST TIME YOU WERE LIVING INDEPENDENTLY?**

**[Interviewer may explain that this lets us analyse the results from this survey in the same way as other health surveys, based on census data about their area]**

D6AD1 Street address:

D6AD2 Suburb/Town:

D6AD3 City/District:

Don't know

Refused

[SHOWCARD PAGE 38]

**D7. WHAT IS THE TOTAL INCOME THAT YOU YOURSELF GOT FROM ALL SOURCES, BEFORE TAX OR ANYTHING WAS TAKEN OUT OF IT, IN THE LAST 12 MONTHS?**

- 1 Less than or = \$5,000
- 2 \$5,001 – \$10,000
- 3 \$10,001 – \$15,000
- 4 \$15,001 – \$20,000
- 5 \$20,001 – \$25,000
- 6 \$25,001 – \$30,000
- 7 \$30,001 – \$40,000
- 8 \$40,001 – \$50,000
- 9 \$50,001 – \$60,000
- 10 \$60,001 – \$70,000
- 11 \$70,001 – \$80,000
- 12 \$80,001 – \$100,000
- 13 \$100,001 – \$120,000
- 14 \$120,001 – \$150,000
- 15 \$150,001 or more
- 98 Don't know
- 99 Refused

**D8. WHAT WAS YOUR MAIN OCCUPATION BEFORE YOU RETIRED?**

**Free text:**

**D9. WHAT WAS THE MAIN OCCUPATION OF YOUR SPOUSE?**

“We have finished the questionnaire. Thank you very much for your time”

<b>INVITATION TO PARTICIPATE IN DENTAL EXAMINATION COMPONENT OF OPOHS</b>
---

“Now that you have kindly completed the interview for the Study into Older People’s Oral Health Issues, you are able to participate in the simple dental examination if you wish.

I have an information brochure which briefly explains the examination. A qualified and registered dentist will do the examination free of charge for you, and the exam can be done in your home at a time to suit you. The dentist will explain the examination in more detail before the examination, and ask for your written consent to do the exam.

Would you be happy to take part in the simple dental examination for the Oral Health Survey? Saying yes to this question will not commit you; it just means that we can contact you again to arrange the examination.

- 1 Yes
- 2 No

## Appendix E: 2012 OPOHS Examination Protocol Manual



# Study into Older People's Oral Health Issues

## Clinical Exam Protocol

Version 1.6 – June 2012

# 1. INTRODUCTION

## **Aims of the Survey**

### **Ethical Clearance**

Ethical approval for the 2012 Older Person's Oral Health Survey has been given by the Multi-Region Ethics Committee in March, 2012 (MEC/12/03/034).

As part of the survey procedures that gained ethical approval, emphasis was placed on obtaining the informed consent of the participants at each stage of the survey. Adults, with and without teeth, will be included in the interview component of the 2012 OPOHS.

Those participants who agree to undertake the interview are then invited to participate in the dental examination. Participants will be asked to have a dental examination only if they complete the interview. Participants who agree to have the dental examination will be given opportunities to opt out of the dental examination either at the conclusion of the interview, before the dental examination commences or during the examination. The dental examination will not take place on the same day as the interview.

At each stage a guardian or proxy may be asked to provide consent and answer the interview questions.

### **Scope of the Examination**

The scope of the examination needs to be dealt with very clearly in order that participants do not consider the survey examination to be a complete dental check-up. The 2012 OPOHS brochures explain that the survey dental examinations are different to normal check-ups that dentists would do in order to plan dental treatment. The brochures state that some conditions (e.g. hidden caries) may not be detected in the survey examination. This must be stressed again by the dentist prior to the examination. Survey examiners will be provided with a card that provides specific information about the dental examination.

### **Reporting the findings of the dental survey examination to the participant**

At the end of the examination participants will be given a report from the survey dentist. This report advises participants about any dental conditions seen that, in the examiner's opinion, may require some dental treatment. In the event that a suspected malignancy is seen, the protocol outlined in Section 18 of this Manual: Reporting of Serious Pathology and Medical Emergencies, is to be adhered to.



## 2. DATA COLLECTION METHODS

### ***Computer assisted personal interviews***

2012 OPOHS participants will be invited to participate in a CAPI-based interview. For those who agree, this interview is conducted in the participant's home or residential care facility by trained interviewers from CBG Health Research Ltd. Survey participants or proxy will be asked about oral health status, access to dental care, receipt of dental treatment, and sociodemographic characteristics. This interview will take approximately 30 minutes. Written consent is obtained prior to the interview commencing.

### ***Oral epidemiological examinations***

Interviewed study participants will be asked by the interviewer from CBG Health Research Ltd to undergo an oral epidemiological examination that will be conducted by a qualified and registered dentist who will be trained and calibrated in survey procedures. If the participant or proxy agrees to the examination the interviewer leaves the information brochure about the examination, with the participant.

CBG Health Research Ltd will organise the dental appointments for interviewed participants. Examinations for the 2012 OPOHS will be undertaken in residential facilities or in the participant's home. Some examinations may be undertaken on a marae. No x-rays will be taken and no treatment will be provided.

Before the examination, the dentist will need to confirm the participant's or proxy's understanding of the procedures and, if necessary, give them another information sheet and explanation. Survey participants or their proxy are then asked to read and sign a consent form.

Written informed consent of participants or proxy must be obtained before the examination can commence.

A dentist and a dental recorder will be present at all times during the examination.

### **The dental examination**

Examinations will take approximately 30 minutes; however, the whole process (explaining about the examination, completing and checking the Medical History form, obtaining written informed consent and completing the Findings of the Dental Survey Examination' report for the participant) is likely to take up to one hour.

The examination will record extra-oral (facial) health, presence of removable dentures, oral mucosal health, tooth loss, dental decay history and periodontal (gum) status, using standardised criteria defined for oral epidemiological studies. An intra-oral mirror which has its own battery-powered light source and periodontal (gum) probes will be used to record oral epidemiological indices. A CPI periodontal probe will be used for assessing periodontal destruction (described in Section 14 of this Manual). Sharp explorers will not be used, and no radiographs will be taken. No treatment will be provided.

During data collection, replicate examinations will be conducted for approximately five study participants per examiner to evaluate the consistency of their findings when judged against the principal survey examiner.

### ***Medical screening for participants***

After the participant or proxy has provided written consent to take part in the dental examination, and before the examination commences, the dentist must ask the participant or proxy to complete the written Medical History Form (Section 25 of this Manual). The questions in the Medical History specifically relate to any risk that the examination may pose to the participant's health and are to be used to determine if dentate participants have any medical contra-indications to periodontal probing (e.g. to exclude participants susceptible to subacute bacterial endocarditis). Dentate participants will be asked about a history of rheumatic fever, endocarditis and valvular heart disease. They will also be asked about the presence of any artificial joints (usually hip or knee). Despite the extremely low risk of the examination, no risk is seen as acceptable in a survey of this sort, and those who respond affirmatively to these questions will not undergo the periodontal examination. There is no reason at all why the rest of the examination should be a problem, as the gingivae will not be probed.

The Medical History form records the participant's name, signature and 2012 OPOHS ID number and proxy if required. The dentist is required to initial the Medical History form to indicate whether the participant is clear, or contraindicated for periodontal probing, before the examination proceeds and to record the details on the computer examination data sheet.

### **Training and Calibration of Dental Survey Examiners**

Professor Kaye Roberts-Thomson, principal survey examiner for the Australian Survey of Adult Oral Health 2004–06 will train and calibrate all dental examiners in survey procedures for the oral epidemiological examinations. Training sessions will run over a day and a half and will include an overview of:

- the survey
- oral epidemiological methods and the role of individuals of the data collection process
- examination procedures, diagnostic criteria, instrumentary, DVD viewing and NIDR slides, and
- examination of volunteers from a limited pool focusing on order of examination, instrumentary, defining examination sites, index teeth, tooth surfaces, periodontal probing sites, finding the cemento-enamel junction, testing rules.

In addition, the Gold Standard Examiner will monitor each examiner's first session in the field.

All survey dentists will be qualified dentists, registered with the Dental Council of New Zealand (DCNZ), and with a current Annual Practising Certificate. All survey dentists must hold a current New Zealand Resuscitation Council Modular Core Certificate Level 4.

### Data recording for examinations

Each code called by an examiner will be recorded directly onto laptop computers using Microsoft Access software designed for the purpose. The software includes logic checks and skip sequences to reduce the probability of recording errors. Paper-based forms for recording the dental data will be carried by the dental examiners in the event that a problem with the electronic data recording occurs or that the examination cannot be undertaken systematically. In this case, dental data will be entered manually by CBG Health Research Ltd.

Recording will be done by the interviewer from CBG Health Research Ltd, who completed the interview with the individual participant. Recorders will be trained in the use of the software during the training session for examiners and recorders held at Auckland University of Technology.

### Dental examiner supply list

Supplies	Starter	Quantity	Further supplied
Cotton wool rolls			
Gauze			
Bibs			
Tissues			
Foil trays – round			
Foil trays – rectangular			
Alcohol wipes			
Hand wash			
Plastic sleeves for mirror			
Plastic sleeves for towels			
Autoclave pouches			
Toothbrushes for exam			
Mirror heads for Denlite			
Gloves			
Bib chain			
Rubbish bags			
Paper tabs for mirror light			
Plastic bags			
1 x plastic box			
1 x headlamp			
Tweezers/probes			
Towels			
Kneeling pad			
Disposable cups			
1 x participant safety glasses			
Spare batteries			
Gown			
Pens			
Notebook			
Chair			
Denlite			

### Notes

### 3. PURPOSE OF THIS MANUAL

This Manual provides you with a general description of the 2012 Older Person's Oral Health Survey. It also provides an overview of the tasks that the staff involved will be expected to perform during the survey. The main part of the Manual consists of oral examination procedures, diagnostic coding systems and diagnostic criteria to be used in this survey.

#### Conventions used in this Manual

Survey participants – not patients: In this Manual and during the survey we use the term Survey participant to refer to people who participate in the project.

Each section is described in three sub-sections:

- Clinical procedures
- Diagnostic codes
- Diagnostic criteria.

#### *Hierarchy of diagnostic codes*

For many observations being recorded in this epidemiological examination, two diagnostic codes may co-exist but there is space to record only one condition.

*If you are certain that two diagnoses co-exist, record the code that is listed higher in the hierarchy of listed codes*

For example, an occlusal surface may have a filling (**F**) and separate decay (**D**)

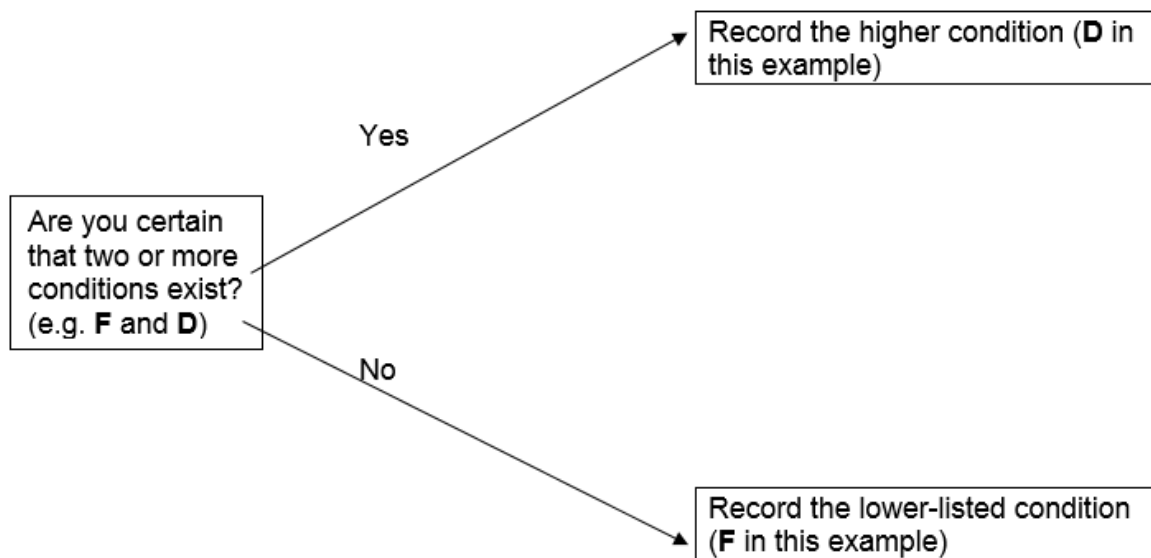
- In this example, decay is listed above filling in the diagnostic codes, so you would call **D** for decay. In other words, **D** trumps **F**.

#### *What to do if you are uncertain about the diagnosis*

In other circumstances, you may be uncertain whether one condition or another exists. For example, there may be some signs of early coronal decay, but you are not certain that cavitation has occurred.

If you are uncertain whether a condition meets the criteria for one diagnosis or another, select the diagnosis that is listed lower in the hierarchy of listed codes

Figure 1: Decision tree for deciding on two or more diagnoses



*What to do if you can't determine the appropriate code*

If, after consulting this protocol, you cannot determine how to correctly code a condition, you record a call of X for that part of the examination, and write a description of the condition.

The diagnostic criteria and codes contained in this document are based on the Protocol for Oral Epidemiological Examinations used in the Australian Survey of Adult Oral Health 2004–05.

## 4. EQUIPMENT AND CROSS-INFECTION CONTROL

The dental team is responsible for having all necessary equipment ready for examinations. If there are supply shortages or equipment failure of dental equipment, immediately contact Dr. Moira Smith. If there is an equipment failure with laptops, immediately contact CBG Health Research Ltd.

### Paperwork and office supplies

- This Examination Protocol, including laminated “cheat sheet” of codes
- Laptop Manual and “cheat sheet” of keyboard shortcuts
- Street Directories and Maps
- Pens, scissors
- Extra information sheets (for those who didn't receive them)
- Dental Examination Consent forms
- Medical History forms
- 'Findings of the Dental Survey' report forms
- Paper forms for data entry (emergency use only)
- Folders for completed documents
- Comments notebook

### Equipment

- Laptop computer
- Extension cord and power board
- Flash drive

### In home examination equipment

- Portable dental chair
- Headlamps

### Examination instruments

- Plastic instrument boxes (one marked 'Clean'; one marked 'Dirty')
- Protective safety glasses for survey participants
- Mirror light kit with disposable mirror heads and disposable plastic sleeve
- CPI periodontal probe
- Tweezers
- Foil containers; one each for dentures and instruments

### Examination supplies

- Examiner's mask, gloves (non-latex), eye protection
- Gauze, cotton rolls (bagged and sterilised)
- Cross-Infection control supplies (Avagard Hand and Body Wash, Ultra Swipes, waste bags)

### **Cross-infection control guidelines**

Dental examinations for the 2012 OPOHS will be undertaken in residential care facilities or in participants' homes. Each examiner will carry sufficient sets of sterile instruments to ensure that there are sterile instruments for every examination.

This section provides general guidelines, and guidelines which are specific for particular equipment used in this survey. Standard precautions for cross-infection control apply. Cross-infection control procedures must conform to The New Zealand Dental Association and The Dental Council of New Zealand Code of Practice 'Control of Cross Infection in the Dental Practice' August 2007 (accessible at [www.NZDA.org.nz](http://www.NZDA.org.nz)). The survey dentist is responsible for all cross-infection control during and after the 2012 OPOHS examinations.

Standard precautions for cross-infection control in health care settings:

- Aseptic technique, including appropriate use of skin disinfectants
- Personal hygiene practices, particularly hand washing before and after participant contacts
- Use of personal protective equipment, which includes gloves, masks and eye protection
- Appropriate handling and disposal of clinical waste
- Appropriate reprocessing of reusable equipment and instruments, including appropriate use of disinfectants
- Environmental controls, including cleaning and spills management
- Assume that every participant is infectious.

### **Transport of instruments**

The probes and tweezers are to be bagged and sterilised together in the sterilisation facility. The best option is to bag together one probe and one pair of tweezers, with some cotton wool rolls and gauze.

Dental instruments and all equipment to be used during the survey examination are to be transported to the clinical examination site in a lidded plastic instrument container marked as 'CLEAN'. Dirty instruments will be returned to the defined sterilisation site in a lidded plastic instrument container marked 'DIRTY'.

Separate storage containers are to be used for consumables and non-consumables.

### **Sterilisation of reusable instruments**

Sterilisation of examination instruments (periodontal probes, tweezers) should follow guidelines for instrument sterilisation. Used instruments must be sterilised after the oral examination when and where applicable.

As the examination will be undertaken in residential care facilities or participants' homes, the dentist will be advised of appropriate sterilisation facilities to use.

### **On site**

The tables for instruments and consumables are wiped clean with Ultra Swipes, and a paper napkin placed on the table top.

The bagged sterilised instruments can be left unopened until the participant is seated in the portable dental chair. Instruments are then debagged and placed in a new foil container, on the paper napkin. The container and instruments are covered with a clean paper towel. Instruments are picked up by the gloved examiner as needed.

### **Managing mirror light kit**

The mirror light kit with disposable mirror head is used routinely for oral examinations. The mirror head is for single use only and it is compulsory to discard it after each examination. Always use a disposable barrier sleeve to cover the handle for each examination and dispose used sleeve after single use.

When storing the mirror light in its box, make sure the light is switched off as the battery may run out.

### **Cross-infection control procedures**

The dental examiner is responsible for the cross-infection control procedures described in this section.

#### *Prior to the examination*

The following must be completed prior to the start of each session:

- The examiner must wear a facemask, safety glasses, and a new pair of powder-free examination gloves for each participant's examination.

#### *After each examination*

The sequence of procedures for maintaining cross-infection control between SP examinations is as follows:

- Used instruments will be deposited in the used instrument container
- Disposable mirror head and plastic sleeve must be removed from mirror light unit and disposed
- Mirror-lite handle must be wiped with disinfectant wipe
- Used consumables are disposed in wastebag
- Reusable instruments are put into plastic container marked as DIRTY for later cleaning and sterilisation
- Protective glasses (for participant) must be wiped with disinfectant.



## 5. PROCEDURES BEFORE THE EXAMINATION

### **Interviews and scheduling of appointments**

Prior to their examination, participants to be examined will have been interviewed by interviewers from CBG Health Research Ltd. The interview will have been conducted by computer assisted personal interview in the participant's home. Names and contact information of participants willing to have a survey examination will be forwarded to the CBG dental appointment coordinator and an appointment for the examination will have been scheduled.

The CBG interviewers and coordinators will be responsible for making and confirming appointments for participants and notifying the survey dentist.

### **Duties of examination teams**

Prior to commencement of each session, the dental team is responsible for:

- Transporting equipment, instruments and supplies to the examination facility
- Setting up the examination area
- Checking all equipment, instruments and supplies
- Making sure enough supplies are available for the session.

### *Sequence of procedures for each examination*

1. Welcoming survey participant, providing a brief explanation about the examination, giving the participant the opportunity to ask questions, and to withdraw from the examination, if the participant decides to do so.
2. Asking the adult participant to complete the consent form and the medical history form. For a participant unable to give consent, asking the guardian to complete the consent form and the medical history form for the participant.
3. Finding and opening the SP's examination form on the laptop computer.
4. Reviewing completed adult medical history, signing off Clear/Contra-indicated for periodontal probing section and recording selected items on laptop computer.
5. Conducting the required components of the examination:
  - Extra-oral examination
  - Oral Mucosal Tissue Assessment
  - Presence and assessment of dentures
  - Tooth presence
  - Coronal surfaces
  - Root surfaces
  - Periodontal destruction.
6. Thanking the participant for their participation.
7. Completing the 'Findings from the Dental Survey Examination' form.

## 8. Welcoming survey participants

Examiner: Upon arrival, they are to introduce themselves and the recorder, and verify with the participant that he/she is attending for the New Zealand Older Person's Oral Health Survey, and to obtain their name. Check their name against the appointment schedule. Enquire whether or not the participant received the information sheet on the dental examination and whether they have read this. If they do not have the information sheet about the dental examination, please give the appropriate sheet to the participant (Appendix F).

It is important to explain the following to participants before asking them to consent to the examination:

- The survey dental examination is designed to collect information about the health of older New Zealanders' teeth, gums and mouths. To do this we count the number of teeth and record the condition of each of the surfaces of those teeth. For adults, the condition of their gums is also recorded. No treatment will be provided and no x-rays will be taken
- That the examinations have to be performed by qualified and registered dentists and that this is normal practice throughout the world for oral health surveys. We are grateful for their participation; they are not being judged and they should not feel embarrassed about the condition of their mouths and teeth. We have information about dental services and support local to their area which may be helpful to them if they are having difficulty seeking dental care
- That we value their participation in this survey because the information they provide about their teeth, when combined with the information collected from other participants in this survey, provides a very valuable set of much needed information for planning oral health care
- That they may withdraw from the examination now or they may do so at any time during the examination and this will not affect their rights to future health care.

Following this explanation, ask the participant or guardian if you have their consent to perform the examination.

Hand them the:

- Consent Form for participant or guardian
- Medical History questionnaire.

### Consent Form

Confirm that the consent form has been completed. The dentist should complete the declaration at the bottom of the form and sign as witness.

### Reviewing medical history to determine medical contraindications to periodontal probing

(See Section 25 of this Manual: Medical History Form)

A positive response to any of the following questions should be queried and confirmed with the adult participant by the dentist. Participants who confirm any of the following medical conditions queried on the front page of the questionnaire **MUST NOT** undergo gingival or periodontal assessments:

- Q2: Participant must ALWAYS take antibiotics before routine dental care
- Q3: Joint replacement (hip or knee) during the last six months
- Q4: Rheumatic fever

- Q6a: Congenital or acquired heart murmur
- Q6b: Heart valve problems
- Q6c: Congenital heart disease
- Q6d: Bacterial endocarditis
- Q6e. Congestive heart failure
- Q7: Bleeding disorder
- Q9: Immuno-suppressed or on immuno-suppression therapy.

Note that participants are **not precluded** from periodontal probing if they respond positively to Q6f (heart attack) in the absence of any other conditions listed above.

After reviewing these questions on the front page of the medical history questionnaire, the dentist must mark and initial one of the two check-boxes on the second page of the form to indicate whether or not periodontal assessment is contraindicated and then record the details on the computer examination data sheet.

Dental examiners should make further queries about dental implants so that any such implants are not probed during periodontal assessments.

The Medical History form has space to record participants' medical conditions, medications and allergies. Although this information is not required for the survey, it will be vital in the event of a medical emergency.

Enter SP's date of birth onto the computer. Also record the date of the examination. The computer will generate SP's age based on that. Compare the generated age with age appearing on the screen. Check with the SP to ensure the date of birth is correct.

### **Equipment set up**

For each survey participant, set up the following equipment, instruments and supplies:

- Protective glasses for survey participant
- Mirror light kit with disposable mirror head and sleeve
- CPI periodontal probe
- Tweezers
- Examiner's mask, gloves, eye protection
- Gauze and cotton rolls
- Foil container for dentures (if SP wears them)
- Foil container for instruments.

### **Positioning of SP and examiners**

The participant should be in a supine position for the examination with the examiner at the 11 o'clock position. If this is not possible, please make a note to that effect in Comment box.

### **Rule for recording**

Do not leave any blanks; any dentures, all teeth, all surfaces of both crown and root, all sites for periodontal assessment, and debris index should be recorded. If that is not possible, record reason in the Comment box or in the notebook provided.

## 6. EXTRA-ORAL EXAMINATION

The extra-oral examination will be performed in the following sequence: general overview of exposed skin areas (head, neck, limbs); perioral skin areas (nose, cheeks, chin); lymph nodes (head, neck); cutaneous parts of upper and lower lips; vermilion border and commissures; temporomandibular joint (TMJ); and the parotid gland region. Up to two codes may be recorded. Codes used to record this are presented in the following Table.

Categories and codes used to record participants' extra-oral appearance

Code	Extra-oral findings
0	Normal extra-oral appearance
1	Ulceration, sores, erosions, fissures (head, neck, limbs)
2	Ulceration, sores, erosions, fissures (nose, cheeks, chin)
3	Ulceration, sores, erosions, fissures (commissures)
4	Ulceration, sores, erosions, fissures (Vermillion border)
5	Cancrum oris
6	Abnormalities of upper and lower lips
7	Enlarged lymph nodes (head, neck)
8	Other swellings of face and jaws
9	Unable to code

Abnormalities of the upper and lower lips are defined as scars for repair of cleft lip, other surgical or traumatic scarring, or other physical deformity. There is no detailed examination of the temporo-mandibular joint.

## 7. REMOVABLE DENTURE ASSESSMENT

Dentate is marked **Y** if one or more teeth or roots are remaining in the arch or **N** otherwise.

### Clinical Procedures

- Ask SP “Are you wearing any dentures today?”
- If SP is wearing denture(s) ask that he/she remove them.
- Identify whether each denture is a full or partial denture, then ask SP to place dentures(s) in foil container.
- Place the container on the bracket table – you may need to refer to partial dentures when coding tooth presence.

### Diagnostic criteria

Categories and codes used to record prosthetic status and prosthetic need separately for the upper and lower arches.

Code	Prosthetic Status	Code	Prosthetic Need
No	No prosthesis	0	No prosthetic treatment needed
Br	Bridge	1	Need for one-unit prosthesis
Bb	More than one bridge	2	Need for multi-unit prosthesis
Pd	Partial denture	3	Need for a combination of one- and/or multi-unit prostheses
Bp	Both bridge(s) and partial denture(s)	4	Need for full prosthesis (replacement of all teeth)
Fd	Full removable denture	5	Repair
Np	Partial denture owned not worn	6	Reline/rebase
Nf	Full denture owned not worn	7	Adjustment
S or U	Retention	8	Denture cleaning
S or U	Stability	9	Unable to be recorded
S or U	Occlusion		
P, L, S	Material inadequacies		
S, M, L	Defects		
Z	Unable to code		

A full denture is defined as one that replaces all teeth in the arch, whether or not it has 16 teeth.

A denture with full coverage is still coded as a full denture, even if it overlays one or more prepared root abutments, tooth roots, implants, or partially erupted teeth. (Coding rules for roots, implants and partially erupted teeth are described in Section 9 of this Manual: Tooth Presence).

A partial denture is defined as one that does not replace all teeth in the arch, and which therefore has gaps to accommodate natural teeth, whether or not those partial teeth are still present. *For example, if a partial denture was originally constructed to replace all*

*but the canine teeth, and both canine teeth had since been extracted without any addition to the denture, it would still be coded as Pd.*

Denture is marked as **F**ull or **P**artial if the subject wears such a denture at least daily: **Nf** or **Np** is marked when a full or partial denture is owned but is no longer worn on a regular basis. (Do not assess the clinical adequacy of dentures which are not worn). A denture is regarded as being worn if it is in place at the time of examination or the SP has removed it immediately prior to the examination.

Retention is marked as **unsatisfactory** if there is displacement of the denture from the alveolar mucosal ridge when the subject opens wide but without strain, or when denture fix is used.

Stability is marked as **unsatisfactory** if 3mm or more displacement can be achieved by rotation of the denture in the horizontal plane or if there is displacement of the denture from the ridge when moderate occlusal force is applied to the contralateral premolar area.

Occlusion is marked as **unsatisfactory** if, during light tapping by the subject, there is either: a lack of three-point contact (anterior, left and right) for full dentures; a lack of contact with groups of teeth replaced by partial dentures; or if there is displacement of the denture upon closing. If the opposing arch is edentulous, the occlusion is regarded as **satisfactory**.

Material inadequacies are marked as Yes or No for each of the following: **P**orosity or crazing covering more than one third of surface; **L**ining which is deficient or temporary; **S**taining or calculus which is extensive (covering one third or more of surface). Multiple marks can be made for one denture.

Defects of denture design or material are marked as: **S**mall where 1 or 2 teeth are missing or fractured, less than 1cm<sup>2</sup> of denture material is lost, cracks are less than 2cm or extension of the flanges is inadequate; **L**arge where 3 or more teeth are missing or fractured, more than 1cm<sup>2</sup> of denture material is lost, cracks are 2cm or greater, or the denture has no flanges; or **M**ultiple, where there is more than one large defect or total fracture of the denture.

### **Prosthetic treatment**

When deciding prosthetic treatment account should be taken of the health of the participant, their ability to function and their wishes. Appropriate treatment rather than 'ideal treatment' is to be recorded. A code of '1' (need for one-unit prosthesis) should only be scored on upper anterior teeth.

## 8. ORAL MUCOSAL TISSUES ASSESSMENT

### Clinical procedures

Using the mouth mirror and gauze to help retract tissues, visually examine the lips and intra-oral mucosa:

**Lips.** Should be examined with the mouth both closed and open. Note the colour, texture and any surface abnormalities of the vermilion border.

**Labial mucosa and sulcus.** Examine visually the mandibular and maxillary vestibule and frenum with the mouth partially open. Observe the colour and any swelling of vestibular mucosa and gingiva.

**Commissures, buccal mucosa and sulcus (upper and lower).** Using mouth mirror as retractor and with the mouth wide open, examine the entire buccal mucosa extending from the commissures and back to the anterior tonsillar pillar. Note any change in pigmentation, colour, texture and mobility of the mucosa, make sure that the commissures are examined carefully and are not covered by the mouth mirror during retraction of the cheeks.

**Alveolar ridges.** Check from all sides (buccally, palatally, lingually).

**Tongue.** With the tongue at rest and mouth partially open inspect the dorsum of the tongue for any swelling, ulceration, coating or variation in size, colour or texture. Also, note any change in the pattern of the papillae covering the surface of the tongue. The SP should then protrude the tongue and the examiner should note any abnormality of mobility. With the aid of mouth mirror, inspect the margins of the tongue. Then observe the ventral surface.

If adequate precautions can be taken by the examiner, the tongue can be examined more efficiently by grasping the tip with a piece of gauze to assist full protrusion and to aid examination of the margins.

**Floor of the mouth.** With the tongue still elevated, inspect the floor of the mouth for swelling or other abnormalities.

**Hard and soft palate.** With the mouth wide open and the SP's head tilted backward, gently depress the base of the tongue with a mouth mirror. First inspect the hard then the soft palate.

## Diagnostic codes

Call up to two codes for each participant. If a participant has no oral mucosal conditions, record "Nc" in both boxes on the computer.

Code	Condition	Code	Location
Nc	No abnormal condition	0	Vermilion border
Oc	Malignant tumour (oral cancer)	1	Commissures
Le	Leukoplakia	2	Lips
Lp	Lichen planus	3	Sulci
Ul	Ulceration (aphthous, herpetic, traumatic)	4	Buccal mucosa
An	Acute necrotising gingivitis	5	Floor of mouth
Cn	Candidiasis	6	Tongue
Ab	Abscess	7	Hard and/or soft palate
Ac	Angular cheilitis		
Dh	Denture hyperplasia		
Ot	Other condition (specify if possible)	8	Alveolar ridges/gingival
X	Unable to be recorded	9	Unable to be recorded

### Diagnostic criteria

#### **Code Nc: No abnormal condition**

#### **Code Oc: Suspected malignant tumour (carcinoma)**

This is only a provisional diagnosis. The carcinoma may develop in a white patch (an area of leukoplakia) or in a red area (an erythroplakia) but many carcinomas arise in an area of mucosa that previously appeared normal.

Except in some early and small lesions, there is usually induration – the tissue feels firm and thickened – either throughout the lesion, or at the margins if there is ulceration. Where the tumour occurs on a mobile part of the mucosa, there may be fixation and loss of mobility because the tumour has involved the deeper tissues.

The appearance of the surface of the tumour is very variable: it may be relatively smooth and white or red, but commonly the surface is nodular or ulcerated and the ulcer may have a raised rolled margin. In the later stages there may be a soft fungating mass that bleeds readily.

If this provisional diagnosis is made, refer SP for urgent dental care (see Reporting of serious pathology).

#### **Code Le: Leukoplakia**

For the purpose of this guide, leukoplakia is defined as a white patch, or plaque, that cannot be characterized clinically or pathologically as any other disease. These lesions are characterized by the presence of a white patch anywhere on the oral mucosa; they may vary from a quite small and circumscribed area to an extensive lesion involving a large area of mucosa. The appearance is variable; the surface may be smooth or wrinkled and sometimes smooth-surfaced lesions may be traversed by small cracks or fissures giving an appearance aptly likened to cracked mud. Lesions may be white, whitish-yellow or grey and some appear homogeneous, while others are nodular,



showing white areas intermingled with red zones; this is often called a nodular (speckled) leukoplakia. In those lesions in which there is much epithelial hyperplasia, the affected mucosa may lose some of its normal softness and flexibility

### **Code Lp: Lichen Planus**

This disease commonly affects the oral mucosa and lesions may occur in the mouth in the absence of skin lesions. Whilst a number of reports have referred to cancer arising in the oral lesions of lichen planus, especially of the erosive or atrophic types, there remains considerable uncertainty about the risk of this occurrence.

Oral mucosal lesions are usually multiple and often have a symmetrical distribution. They commonly take the form of minute white papules that gradually enlarge and coalesce to form a reticular, annular or plaque pattern. A characteristic feature is the presence of slender white lines (Wickham's striae) radiating from the papules. In the reticular form there is a lace-like network of slightly raised grey-white lines, often interspersed with papules or rings. The plaque form maybe difficult to distinguish from leukoplakia, but in lichen planus there is usually no change in the flexibility of the affected mucosa.

### **Code Ul: Ulceration (aphthous, herpetic, traumatic)**

Ulceration is defined as a break of the oral mucosa. The clinical appearance of ulcerations shows great variation. The most common form is minor aphthae. There are typically 1–4 ulcers in each attack. These are usually confined to the non-keratinised parts of the mucosa. The ulcers are shallow, but painful. Herpetic ulcers are characterised by a large number of small shallow ulcers occurring in any part of the mucosa. Although each individual ulcer may not exceed 2mm in diameter, groups of ulcers may coalesce to form compound ulcers with irregular outlines.

### **Code An: Necrotising ulcerative gingivitis (ANUG)**

The oral lesions are characterized by a necrosis at the tips of the interdental papillae and along the marginal gingivae. The ulcers are covered by a greyish-yellow pseudomembrane. The gingivae bleed very easily and are painful. There is a distinctive oral odour.

### **Code Cn: Candidiasis**

In several populations it has been found that about 50% of normal individuals are carriers of *Candida*. A variety of oral lesions are caused by the fungus *Candida albicans*. The term "candidiasis" is used when lesions are present. The disease is also known as "moniliasis" and "candidosis".

Acute candidiasis may be pseudomembranous or atrophic. The former, also known as thrush, consists of creamy, pearly-white, or bluish-white patches which can be removed by gentle scraping. Thrush may occur in all areas of the oral mucosa, although the sites of predilection are the buccal mucosa, palate and tongue. The atrophic variety, a red and painful lesion, may occur during treatment with antibiotics.

Chronic candidiasis may manifest itself in several forms: Asdenture stomatitis, as a median rhomboid glossitis like lesion and as a retrocommissural hyperplastic lesion. The latter may often resemble a leukoplakia.

**Code Ab: Abscess**

An abscess is a localized swelling with necrotic tissue (pus) usually surrounded by inflammation.

**Code Dh: Denture hyperplasia**

Denture hyperplasia is an overgrowth of tissue associated with chronic trauma from a denture. It usually occurs in labial or bucco-mucosal region, but is occasionally seen on the lingual of the lower arch.

**Code Ac: Angular cheilitis**

Inflammation at the commissures should be recorded.

**Code Ot: Any other mucosal conditions**

Such as erythroplakia, or warts.

Each observed lesion will be recorded by its location. There might be several lesions in one location or/and one lesion in several locations. The locations and their codes are:

Location	Code
Vermilion border	0
Commissures	1
Lips	2
Sulci	3
Buccal mucosa	4
Floor of mouth	5
Tongue	6
Hard and/or soft palate	7
Alveolar ridges	8
Unable to code	9

## 9. TOOTH PRESENCE

An extracted or otherwise absent tooth is recorded as missing. Dental implants, root fragments and deciduous teeth are coded separately and not counted as missing or absent teeth.

### Clinical procedures

Start from the SP's upper right quadrant at the position of tooth 18; pass through the maxilla to the position of tooth 28. Then continue onto the lower left quadrant at the position of tooth 38 continuing around the mandible to the position of tooth 48. Make one call for the status of each tooth position.

### Diagnostic codes (Call one code for a tooth in the following hierarchy)

For survey participants	
<b>MR</b>	<b>Missing</b> due to <u>any reason</u> and <b>Replaced</b> by a fixed prosthesis or a removable prosthesis that is worn to the examination.
<b>MD</b>	<b>Missing</b> due to any reason AND NOT REPLACED by a fixed or removable prosthesis.
<b>RD</b>	<b>Root</b> fragment that is <b>decayed</b> .
<b>RS</b>	Root fragment that is not decayed (e.g. sound or capped with a restorative material).
<b>IM</b>	<b>Implant</b> whether or not it has been restored or is serving as an abutment.
<b>PP</b>	<b>Present Permanent tooth:</b> a permanent tooth that is present in the mouth, and has none of the preceding conditions. <i>This includes teeth with full coronal restorations.</i>
<b>PD</b>	<b>Present deciduous tooth.</b>
<b>XX</b>	Unable to code.

### Diagnostic criteria


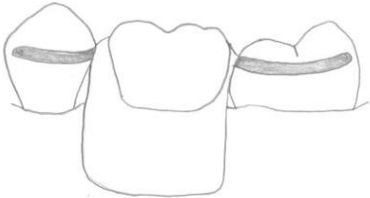
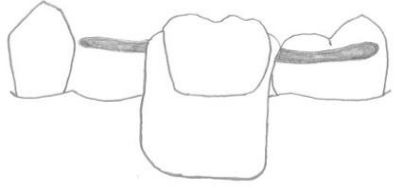
For subjects where it is likely that caries or periodontal disease was the reason for tooth removal, use the **MR** or **MD** code.

When evaluating teeth that have been replaced, you do not need to match each prosthetic tooth to a corresponding tooth position.

- Any part of a prosthesis (not necessarily an artificial tooth) that replaces a tooth position can be used to make a call of **MR**.
- If a prosthetic saddle replaces two or more teeth positions, call **MR** for all tooth positions in that saddle, even if there has been drifting of the abutment teeth, and there is insufficient space for the corresponding number of artificial teeth to replace those tooth positions.
- If a tooth has been extracted, and drifting of adjacent teeth has closed the gap, the extracted tooth must be coded as **MD**.

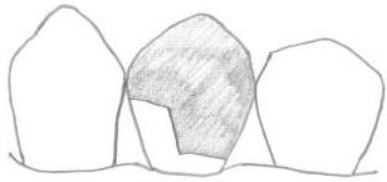


**MR** and **MD** codes can be called only for anatomical tooth positions: if a gap has opened due to a tooth drifting from its neighbour, do not call any codes for the gap that is left, even if the gap has a prosthetic replacement.

Figure 1: Examples of calls for replacement teeth – 50-year-old survey participant

		
37 has drifted mesially, 36 and 35 are missing. There is no prosthesis.	37 has drifted mesially, 36 and 35 are missing. A prosthesis has a single tooth for the saddle.	37 had drifted mesially and 36, 35 and 34 are missing. A prosthesis has a single tooth for the saddle but the prosthesis does not replace 34.
<b>37=PP, 36=MD, 35=MD, 34=PP</b>	<b>37=PP, 36=MR, 35=MR, 34=PP</b>	<b>37=PP, 36=MR, 35=MR, 34=MD, 33=PP</b>

A “root” is defined as a fragment where the natural and/or restored coronal tissues comprise less than one quarter of the original coronal structure.

**Figure 2: Examples of calls for root fragments**

		
34 has a large restoration but together the natural and restored structure replaces the entire crown.	33 has a root fragment that has been capped for an overlying denture, but the capping represents less than one quarter of the original coronal structure.	34 has caries that has left less than one quarter of the crown intact.
<b>Call 34 = PP</b>	<b>Call 33 = RS</b>	<b>Call 34 = RD</b>

Fused or geminated teeth should be recorded as a single tooth position. Supernumerary teeth should be omitted.

## 10. SIMPLIFIED ORAL HYGIENE INDEX AND MOBILITY

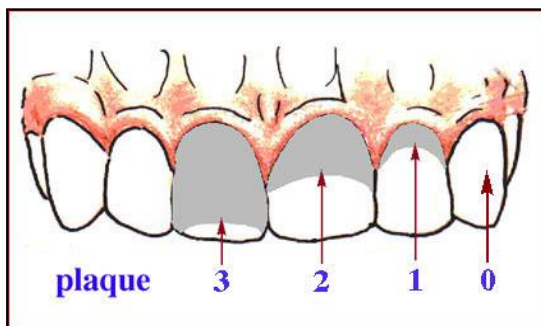
Plaque and calculus accumulation will be recorded using a modification of the Simplified Oral Hygiene Index (Greene and Vermillion 1964).

The six surfaces examined for the OHI-S are selected from four posterior and two anterior teeth:

- In the posterior portion of the dentition, the first fully erupted tooth distal to the second bicuspid (15), usually the first molar (16) but sometimes the second (17) or third molar (18), is examined. The buccal surfaces of the selected upper molars and the lingual surfaces of the selected lower molars are inspected
- In the anterior portion of the mouth, the labial surfaces of the upper right (11) and the lower left central incisors (31) are scored. In the absence of either of this anterior teeth, the central incisor (21 or 41 respectively) on the opposite side of the midline is substituted.

### Criteria for classifying debris

Codes	Criteria
0	No debris or stain present.
1	Soft debris covering not more than one third of the tooth surface, or presence of extrinsic stains without other debris regardless of surface area covered.
2	Soft debris covering more than one third, but not more than two thirds, of the exposed tooth surface.
3	Soft debris covering more than two thirds of the exposed tooth surface.
X	Unable to code.



### Criteria for classifying calculus

<b>Codes</b>	<b>Criteria</b>
0	No calculus present.
1	Supragingival calculus covering not more than third of the exposed tooth surface.
2	Supragingival calculus covering more than one third but not more than two thirds of the exposed tooth surface or the presence of individual flecks of subgingival calculus around the cervical portion of the tooth or both.
3	Supragingival calculus covering more than two third of the exposed tooth surface or a continuous heavy band of subgingival calculus around the cervical portion of the tooth or both.
X	Unable to code

### **Grace and Smales mobility index**

This index is to be applied to each index tooth.

<b>Codes</b>	<b>Criteria</b>
0	No apparent mobility.
1	Mobility is perceptible, but less than 1mm buccolingually.
2	Mobility is between 1–2mm.
3	Mobility exceeds 2mm buccolingually or vertically.
X	Unable to code.

# 11. CORONAL CARIES EXPERIENCE

## Clinical Procedures

This section describes assessments that are made for five coronal surfaces on all teeth coded as **Present**, including third molars.

- Implants, root fragments, are excluded from this assessment

Begin with the most posterior tooth in the upper right quadrant (i.e. tooth 18, if present) and progress through the maxillary arch to tooth 28. Move to the lower left quadrant at tooth 38 and continue around the mandibular arch to tooth 48.

Always clean and dry teeth before examination. Debris should be removed with gauze.

A periodontal probe, toothbrush or gauze may also be used to remove plaque and other debris. If used, it is important that the periodontal probe does not damage any incipient lesions.

- **The diagnosis of coronal caries is based entirely on visual criteria.**

Make one call for each of the five coronal surfaces:

- Surfaces on incisors and canines are called in the following order:
  - Incisal
  - Mesial
  - Buccal
  - Distal
  - Lingual

The incisal surface is defined as the area of 1mm or less around the incisal edge or canine cusp. If the incisal edge or canine cusp has worn down, the facet is considered as the incisal edge.

- Surfaces on premolars and molars are called in the following order:
  - Occlusal
  - Mesial
  - Buccal
  - Distal
  - Lingual

For adults, before moving on to the next tooth, assess the status of all four root surfaces (See Section 12 of this Manual: Root Caries Experience).

For rotated or drifted teeth call anatomical surfaces.

### **Diagnostic codes for coronal caries experience**

Call one code for a tooth surface in the following hierarchy

- D** Decay: cavitation of enamel or dentinal involvement or both are present
- R** Recurrent caries: visible caries that is contiguous with a restoration
- U** Filled **unsatisfactorily**: a filling placed for any reason in a surface that requires replacement but that has none of the above conditions
- C** Full crown
- F** Filling placed to treat **decay** in a surface that has none of the above conditions

Incisors and canines only
<b>O</b> Filling placed for reasons <b>other</b> than caries in a surface that has none of the above conditions.

- Z** Fissure sealant and none of the above conditions
- S** Sound is recorded when none of the above conditions are found
- X** Unable to code: participant not cooperative

### **Diagnostic criteria for coronal surfaces**

*Decay is called if there is cavitation of enamel OR dentinal involvement OR both.*

**Cavitation** is defined as a discontinuity of the enamel surface caused by the loss of tooth substance, due to caries:

- It must be distinguished from fractures, erosion and abrasion
- Lesions with dentinal involvement are coded D even if the lesion has hardened and appears to have “arrested”.

**Dentinal involvement** is judged separately for three categories of surfaces:

- For pits and fissures, the surface is coded as decayed when opacity or discolouration indicate caries of dentine that is undermining adjacent enamel
- For smooth surfaces on buccal and lingual surfaces: the surface is coded as decayed if the surface is etched or there is a white spot **and** if dentine seems to be involved as indicated by discolouration of dentine
- Proximal surfaces use the same criteria as smooth surfaces. In addition, any of the following conditions can be sufficient to call proximal decay:
  - If the marginal ridge shows darkening/shadowing as evidence of caries of dentine, the surface is decayed
  - Transillumination (for anterior teeth): caries in dentine may be visualised as a loss of transparency producing a shadow in a calculus free and stain free proximal surface.



When diagnosing decay on any coronal surface

- Staining and pigmentation are not, by themselves, sufficient evidence of caries.
- Erosion, abrasion, hypoplasia, attrition, fractures, mottled enamel and enamel opacities on exposed hard surfaces are not classified as carious.
- Suspected or apparent carious LESIONS IN ENAMEL ARE NOT TO BE PROBES TO DETERMINE THE “FEEL” OF THE ENAMEL. Tactile criteria are not used in the coronal caries assessment.
- If in doubt, ask yourself: “Am I sure it is into dentine?”

*There are four categories of fillings*

Recurrent caries is based on a finding of caries that adjoins a restoration on the surface

- Use the same criteria described for decay to determine presence of caries
- This call is made regardless of the reason for initial placement of the restoration
- If a surface has both a filling and caries that does not join the filling, it should be coded as **D**, not **R**.

Filled unsatisfactorily (**U**) is marked when a filled surface contains one or more of the following unacceptable defects which cannot be corrected:

- Surface which is flaking or fractured
- Dentine or base exposed
- Missing or fractured and mobile restoration
- Traumatic occlusion causing pain or damage to tissues
- Mal-contouring of embrasures
- Gross marginal discrepancy with potential for recurrent caries
- Overhang causing tissue damage
- Temporary fillings in Cavit or zinc oxide eugenol
- Fillings adjacent to fractured cusps or erosive areas
- Pins exposed and causing trauma.

Posterior teeth with full crowns in metal, porcelain or both which have been placed indirectly should be recorded as **C**. On incisors and canines with full coronal restorations, the examiner should make the determination of the reason for crown placement.

- If it can be determined that the anterior crown was placed solely for a reason other than caries (such as fracture, malformation or bridge abutment), all surfaces should be coded as **O**.

Filled due to decay (**F**) is recorded when the surface contains one or more permanent restorations placed to treat caries.

Filled for other (**O**) reasons such as restorations placed to treat wear, hypoplasia and trauma, or for aesthetic reasons.

The **F** and **O** categories include restorations which have the following acceptable deficiencies:

- Surface which is irregular, rough or discoloured
- Under-contouring, or faulty occlusal contact
- Mal-contouring of embrasures which can be corrected

- Minor marginal discrepancy
- Overhang which can be corrected
- Joined or repaired restorations.

*Additional notes for caries assessment*

A fissure sealant (**Z**) is defined as an adhesive material covering all or part of a fissure, in which a bur has not been used to cut tooth structure.

Sound includes surfaces with hypoplasia, fracture, and erosion.

Only one entry can be made for each tooth surface. In the event that a tooth has two or more conditions, call the condition that is **highest** on the list.

Nonvital teeth are scored in the same manner as vital teeth.

- If a restoration on a nonvital tooth was placed solely to seal a root canal that restoration is scored as **O**.

Coronal surfaces which are not visible should be regarded as sound, e.g. surfaces that are covered by calculus, orthodontic bands or brackets. The exception would be if the participant is uncooperative and thus a surface is not visible mark as 'X'.

Use the dental anatomical landmarks to define surfaces when a tooth is rotated.




- For example, if the mesial surface of a rotated tooth faces the palate, it is nevertheless recorded as mesial.

***Scoring multiple coronal surfaces affected by a single carious lesion or restoration:***

For incisors and canines, use the "ONE THIRD RULE" or the "ONE MILLIMETRE RULE" when determining if a single restoration involves both the interproximal and either buccal or lingual surfaces:

- The interproximal filling or shadowing must extend at least one third of the distance onto the buccal and lingual surface(s) to be included in the call (see Figure 3)
- Restoration or cavitation from incisal edges must extend at least one millimetre onto another surface for that surface to be included in the call (see Figure 3).
- Carious lesion from any surface must extend at least one millimetre onto another surface to be included in the call.




**Figure 3: Examples of the multi-surface scoring rule for incisors and canines**

		
Single filling of 21 involves mesial surface but less than one third of the horizontal distance across the lingual surface.	Single filling of 21 involves the mesial surface and more than one third of the horizontal distance across the lingual surface.	Single filling of a fractured incisal edge on 11 also involves more than 1mm of the vertical distance of the distal surface.
Mesial = F, lingual = S	Mesial = F, lingual = F	Incisal = O, distal = O

For molars and premolars, always use the “ONE MILLIMETRE RULE” when determining whether a single restoration or carious lesion involves more than one surface:

- A filling or lesion must extend more than one millimetre past the line angle before it is considered to involve an additional mesial, buccal, distal or lingual surface
- A filling or lesion on an occlusal surface must extend more than one millimetre over the cusp tip or marginal ridge before it is considered to involve an additional mesial, buccal, distal or lingual surface.

**Figure 4: Examples of the one millimetre rule for molars and premolars**

		
Single filling of 46 involves mesial and occlusal surfaces but extends less than 1mm beyond line angle onto buccal surface.	Single filling involves mesial surface and extends more than 1mm beyond line angle onto lingual surface.	Single filling involves the occlusal surface and extends more than 1mm over the distobuccal cusp onto the buccal surface
Occlusal=F, Mesial=F, Buccal=S	Occlusal=F, Mesial = F, Buccal = F	Occlusal = F, Buccal = F, Mesial=F

***Fractured cusps***

As an example, consider a posterior tooth where the occlusal surface is filled, the mesial surface is filled and the mesio-buccal cusp has fractured off. If the cusp had not fractured off, the code for both the occlusal and mesial surfaces would be F. With the fracture present the codes for the occlusal and mesial surfaces both move from F to U because the filling will have exposed dentine next to it. The buccal surface affected by the fracture is coded U also.

***Shadowing***

To determine which surface the decay actually affects consider this example: on a posterior tooth shadowing can be seen to be affecting the mesial surface when the tooth is viewed occlusally. There is no break in the occlusal enamel. In this example the occlusal surface would be coded as S and the mesial surface as D. If the shadow can be seen through the buccal surface but there is no alteration to the buccal surface then call the buccal surface S.

## 12. ROOT CARIES EXPERIENCE

### **Clinical procedures**

Diagnosis of root decay is different from that for coronal decay and requires the use of the periodontal probe, because textural changes are used in the diagnosis.

You will get some indication of the texture by dragging the probe across the root surface and gently feeling for any softness.

Do not try to push the tip hard into the dentine.

If caries or filling is evident sub-gingivally record the surface.

Start on the Mesial surface and then move on to the Buccal, Distal, Lingual surfaces.

### **Diagnostic codes (call one code for a root surface in the following hierarchy)**

Call one code per surface

- D**     **Decay:** a discrete, well-defined or discoloured lesion on the root surface that is soft to exploration using the periodontal probe.
- R**     **Recurrent caries:** detectable caries that is contiguous with a restoration.
- U**     **Filled unsatisfactorily:** a filling placed for any reason in a surface that has unacceptable defects but none of the above conditions.
- F**     **Filled root that contains one or more permanent restorations placed for any reason but none of the above conditions.**
- S**     **Sound root surface that is visible for at least 1mm and has none of the above conditions.**
- N**     **No visible root surface (i.e. <1mm).**
- X**     **Unable to be coded: participant not cooperative.**

### **Diagnostic criteria**

*Decay is called if there is a lesion that is soft to exploration using the periodontal probe.*

Normal cementum is softer than enamel, and frequently will yield to pressure from the tip of a probe. Areas of root caries, however, are softer than surrounding cementum; therefore, it is possible to differentiate sound cementum from carious cementum based on tactile sense.

In some incipient lesions the carious area of the root surface may merely be discoloured without cavitation, but the area will be soft to probing. Carious lesions in root surfaces may be yellow/orange, tan, light brown, or black.

Cavitation with jagged margins and a roughened, but soft floor or base usually occurs in advanced lesions.

Arrested lesions that are hardened on probing are coded as **Sound**, even if the lesion is cavitated.

A root surface must have at least 1mm of exposed root surface to be coded as S.

Root surfaces covered with calculus are to be scored as sound.

**Additional notes on assessment of coronal and root surface lesions:**

If both the coronal and root surfaces are affected by the same carious lesion or restoration, use the ONE MILLIMETRE RULE to determine the coding:

- If at least one millimetre of the lesion or restoration is coronal to the CEJ, it is coded for the coronal surface
- If at least one millimetre of the lesion or restoration is apical to the CEJ, it is coded for the root surface
- If the lesion or restoration extends at least one millimetre onto both coronal and root surfaces, code both surfaces.

If there is recurrent caries at the margin of a filling extending at least one millimetre onto coronal and root surfaces, code **R** for the surface with recurrent caries.

### 13. TREATMENT NEEDED

Following assessment of the coronal and root caries a single call should be made for the treatment needed for that tooth according to the following criteria. Treatment should be appropriate to the subject given the health of the survey participant, their ability to undergo treatment, the need for treatment as well as their wishes.

Code	Need
N	None
F	One-surface filling
T	Two- (or more) surface filling
C	Crown for any reason
V	Veneer or laminate
P	Pulp care and restoration
E	Extraction
O	Need for other care
A	Preventing caries – arresting care
X	Unable to be recorded
Z	Fissure sealant

## 14. PERIODONTAL DESTRUCTION AND GINGIVAL BLEEDING

**Attention:** Check the medical history to make sure the survey participant is suitable for periodontal probing. If the participant is NOT medically fit for periodontal probing, skip this section of the examination.

### Community Periodontal Index (CPI) (WHO TRS 621)

The Community Periodontal Index (CPI) will be used on index teeth (one score per sextant; those will be teeth 16 and 17, 11, 26 and 27, 36 and 37, 31, and 46 and 47) to collect data on periodontal status. The worst score for each index tooth will be recorded, using the following hierarchy: healthy (scoring 0); bleeding (1); calculus (2); 4–5mm pocket (3); and 6+mm pocket (4). Where a sextant is excluded because of insufficient teeth, the code 'X' will be recorded.

Assess on buccal and lingual surfaces of index teeth or all remaining teeth in sextant when index teeth absent.

Examine index teeth and record each separately. If both molars are present in a sextant record the worst score obtained. If index teeth are absent, examine all remaining teeth and record a score into any of boxes of the sextant

1. Indicators: Three indicators are used: gingival bleeding on gentle probing, calculus and periodontal pocket depth.

A special lightweight CPI probe with a 0.5mm tip is used, with a black band between 3.5 and 5.5mm and rings at 8.5 and 11.5mm from the tip.

2. Sextants: The mouth is divided into sextants defined by tooth number: 18–14, 13–23, 24–28, 38–34, 33–43 and 44–48. A sextant should be examined only if there are two or more teeth present which are not indicated for extraction.
3. Index Teeth:

Six teeth are to be examined:

16 and 17	11	26 and 27
46 and 47	31	36 and 37

The molars in each posterior sextant are paired for recording, if one missing there is no replacement. If no index teeth present in sextant, all the remaining teeth in the sextant are examined and the highest score is recorded as the score for sextant. Score each index tooth separately and record in box for each tooth.



4. Sensing Pockets and Calculus: An index tooth should be probed by CPI probe. The sensing force should not be more than 20 grams. Probing force is tested by placing the probe point under the thumb nail and pressing until blanching occurs.

The probe tip should be inserted gently following the anatomical configuration of the surface into the bottom of the gingival sulcus or pocket. The probe is placed in the pocket at the distal point, keeping the probe parallel to the long axis of the tooth. The probe is then moved gently, with short upward and downward movement along the sulcus or pocket to the mesial surface of the tooth.

5. Examination and Recording: The index teeth, or all remaining teeth in a sextant where there is no index tooth, should be probed and the **highest** score recorded in the appropriate box. The codes are:

Code 0- Healthy

Code 1- Bleeding observed after probing

Code 2- Calculus detected during probing but all of the black band on the probe visible.

Code 3- Pocket 4–5mm (gingival margin within the black band)

Code 4- Pocket 6mm or more (black band not visible)

Code 9- Excluded sextant (less than two teeth present)

Code X- Unable to code

Calculus (WHO TRS 621): During probing the tooth, as soon as calculus is felt, a score of 2 is recorded for the tooth. Not necessary to measure the quantity of calculus found. If calculus is not visible the subgingival surface is probed for calculus. Following the anatomical configuration of the root of the tooth surface, the end of the periodontal probe is gently inserted between the tooth and the gingiva until the resistance of the supra-alveolar fibres is felt. As soon as an obvious calculus deposit is felt, a score of 2 is recorded for the tooth.

Pocket Depth (WHO TRS 621): The probe should be placed into pocket to the full extent of pocket. The pocket depth is read on the calibrated tip of the probe. If pocket depth is 4–5mm (gingival margin within the black band, a score of 3 is recorded for the tooth. If pocket depth is 6+mm (the black band not visible), a score of 4 is recorded for the tooth.

Bleeding (WHO TRS 621): When all index teeth have been probed for calculus and pockets, the same teeth are re-examined in the same sequence to observe bleeding from the gingival sulcus or pockets.

If bleeding observed score is 1.

If no bleeding score is 0.

## 15. TRAUMA

### Clinical Procedures

Teeth 13–23 will be evaluated, if present.

Ask the SP being examined or proxy if there has been any injury to the front teeth?  
If the SP or proxy indicates that one or more injuries have occurred, ask the following question:

“Can you point to the area of the mouth where the trauma occurred?”

The upper six **permanent** anterior teeth should be examined carefully for evidence of traumatic injury. The teeth should be examined in the same sequence as for the caries examination. A positive history of trauma is required for codes “1” through “5”. One of the following scores is to be assigned for each permanent incisor tooth:

### Diagnostic codes

- 0 No trauma
- 1 Treated trauma, any size or involvement (usually with composite)
- 2 Trauma limited to enamel and not treated
- 3 Trauma involving at least dentine (treatment required, but not yet treated)
- 4 Tooth discoloured after trauma (verified by interview)
- 5 Avulsed, luxated because of trauma (verified by interview)
- 9 Unable to code

### Diagnostic criteria

Where there is a positive history of trauma and the tooth has sustained a vertical crack (imbrication line), the tooth is coded as 2.

## 16. DIFFICULTY AND LOCATION OF EXAMINATION

### Difficulty of examination

Score	Criteria	
4	Very difficult	Unable to complete most of the examination
3	Difficult	Examination difficult, some parts not completed
2	A few aspects difficult	Some parts of the examination were challenging for participant, but examination completed
1	Manageable	Needed to be mindful of need for breaks, but participant cooperative
0	Easy	Cooperative participant, easy to complete examination

Please use comments box to explain reasons for your assessment.

### Location of examination

RC	Portable dental chair – reclined
UC	Portable dental chair – upright
BD	Bed
DC	Dining chair
LC	Lounge chair – reclining or ‘La-Z-Boy’ type
WC	Wheel chair
OT	Other

## 17. COMPLETING THE EXAMINATION AND DISCHARGING THE STUDY PARTICIPANT

Following the examination, the dentist must:

- Inform the participant or proxy of the findings from the survey
- Offer and provide participants with the information about access to dental services within their locality.

### **Informing study participants of the findings from the survey**

After completing the survey examination, you must advise each study participant verbally and in writing of the findings.

#### *Participants requiring urgent diagnosis or treatment*

Participants must be referred immediately for care if they have any of the following potentially life-threatening conditions:

- A suspected malignant or pre-cancerous lesion
- Signs of systemic infection or a spreading local infection
- Other life threatening conditions, based on the clinical judgement of the examiner.

In these situations, advise the participant that you recommend they obtain immediate attention. Professor Murray Thomson (text/phone 0064 21 279 7116) is the first contact to report serious pathology. Professor Murray Thomson will then liaise with Dr. Robyn Haisman-Welsh for the appropriate and immediate referral of the participant.

#### *Participants not requiring urgent diagnosis or treatment*

For all other participants, your advice should take three forms:

1. Completion and explanation of the 'Dental Survey Summary Report' form (see Section 23 of this Manual). Tick at least one box in the form, either that no conditions were found or that one of the conditions specified was found. Note that you can advise participants to seek care immediately, even if they do not have a life threatening condition – for example, if you find a tooth likely to develop pulpitis. In addition to ticking relevant boxes, provide additional explanation to the participant (e.g. explain the "dental caries" means decay/cavity).
2. Discussion of any additional findings that you believe are relevant to the participant, but that are not contained on the 'Dental Survey Summary Report' form. For example, if the participant asks about prosthodontic replacement of missing teeth, you should endeavour to discuss their query. This does not mean that you need to make any additional diagnoses, or even provide a specific recommendation if you believe you do not have sufficient information. For example, your discussion may explain that a decision about treatment needs would need to be made after undergoing a more detailed dental assessment and discussing treatment options with a dentist.
3. Explanation of the limitations inherent in the survey examination. It is very important to emphasise to participants the limitations of a survey examination, including:

- The possibility that you have not detected disease that is present (e.g. interproximal caries), and conversely
- The possibility that a condition that you have noted does not require treatment (e.g. caries that a dentist may choose to control by prevention rather than fill. This is explained briefly in the paragraph above the space for the name and signature of the examining dentist, and should be reiterated verbally.

#### *Additional discussions regarding treatment*

Examiners are at liberty to discuss general aspects of oral health care and prevention of oral disease with survey participants. However, survey participants are not patients of the examining dentist, and therefore survey dentists do not have the same “duty of care” that applies to a dentist-patient relationship. Consequently, there are several areas of discussion that survey dentists must specifically avoid:

- In general, avoid making specific treatment recommendations e.g. advise participants to seek care for decay rather than telling them to get a crown on a specific tooth
- Do not give the impression that you have made a definitive diagnosis.
- Do not tell participants that they should forego treatment that reportedly has been recommended by another dentist
- Do not advise participants to change dentists or to seek care from a specifically-named dentist.

In addition to the guidelines shown above, developed from the Australian Adult Survey of Oral Health 2004–06 (accessible at [aihw.gov.au](http://aihw.gov.au)), the 2012 OPOHS will also follow the guidelines of the 1998 UK Adult Dental Survey (accessible at [xelobookwe.com](http://xelobookwe.com)): ‘Conduct of the examination and clinical criteria used for the assessments’ which are:

‘If the participant asks about their dental treatment need, or if questions related to the standard of previous dental care arise, the response will be that the survey is not designed to collect the sort of information upon which a treatment can be planned, and that visiting a general dental practitioner is the best way of ensuring a thorough dental check-up. This is not only a way of deflecting difficult questions, it is also absolutely true.

However, the dentist is permitted to say, when recruiting participants for the oral examination that as a dentist you may be able to offer them some advice on the best way of looking after their mouth or teeth. If after the examination the participant wishes to know about their mouth you can give an indication of whether there is room for improvement in terms of general oral hygiene/cleanliness and/or a general statement along the lines of:

*‘The best way of getting information about any treatment you might need is by seeking advice from your dentist.’*

If you are asked to comment on specific aspects of oral hygiene, we would suggest that you respond, if appropriate, by identifying areas for improvement but say that they will need more specific advice from a dentist or dental hygienist since there are many ways

of achieving this. It is important that you are not too prescriptive and that you adhere to general principles as there should be no scope for oral hygiene advice being given which conflicts with previous hygiene advice. You could preface this by saying: *'What I usually tell people...'*

If you are asked to comment on specific aspects of past treatment, you need to say: *'This survey is limited and you need to see your (or a) dentist for specific advice and/or treatment.'*

The only exception to this protocol is if the examining dentist notices a lesion which he/she considers may be serious and potentially life threatening (such as a suspected malignancy). Examiners are very unlikely to encounter such potentially serious pathology and the incidence of these lesions is very low, however, it is possible that such a lesion may be noticed and, as the implications are serious, it is important that the protocol to deal with this eventuality is adhered to (See Section 18 of this Manual: Reporting of Serious Pathology and Medical Emergencies).

For participants who complete in-home examinations, participants will be given a toothbrush, and toothpaste. Oral healthcare products for participants who complete in-home examinations will be supplied to dental survey examiners by CBG Health Research.

#### **Recording final outcome of examination**

Record on the appointment schedule the outcome of the examination. If you do not complete all sections of the examination for which the survey participant consented mark as incomplete.

## 18. REPORTING OF SERIOUS PATHOLOGY AND MEDICAL EMERGENCIES

### Need for immediate care and referral

The 2012 OPOHS will follow the guidelines of WHO Oral Health Surveys: Basic Methods (4th edition), World Health Organization, 1997 '*Need for immediate care and referral*' which are:

'It is the responsibility of the examiner or team leader to ensure that referral to an appropriate care facility is made if needed. There is need for immediate care if pain, infection or serious illness will result unless treatment is provided within a certain period of time. This period may vary from a few days to a month depending on the availability of oral health services. Examples of conditions that require immediate attention include periapical abscess and acute necrotizing ulcerative gingivitis. Gross caries and chronic alveolar abscess may also be recorded'.

### Reporting of serious pathology

The 2012 OPOHS will follow the guidelines of the WHO and of the Australian Research Centre for Population Oral Health at the University of Adelaide for the National Survey of Adult Oral Health 2004–06 (accessible at [aihw.gov.au](http://aihw.gov.au)).

'Participants must be referred immediately for care if they have any of the following potentially life-threatening conditions:

- A suspected malignant or pre-cancerous lesion
- Signs of a systemic infection or a spreading local infection
- Other life-threatening conditions, based on the clinical judgment of the examiner.
- 

Serious pathology must be reported immediately to Professor Murray Thomson.

### Medical Emergencies

Dental Council of New Zealand requires that survey dentists hold current New Zealand Resuscitation Council Core Level 4 certification.

#### *In residential examinations*

After arriving at the dental facility and introducing yourself to the practice manager or dentist, ask to be familiarised with the location and content of the medical emergency equipment. The risk of a medical emergency occurring is very low, however, as registered dentists, all survey examiners are required to be able to use appropriate equipment and techniques to provide airway management and resuscitation in the event of adult or child collapse.

In the event of a medical emergency, ensure the emergency services are called, enlist the help of other dental surgery staff if they are present and provide the appropriate care until the emergency services arrive and take over the care of the participant.

Notify Prof. Murray Thomson of the event as soon as is practically possible, and copy Dr. Robyn Haisman-Welsh into all correspondence.

*In home survey examinations*

Dental Council of New Zealand was consulted about medical emergency equipment for in home examinations. Council's decision was that examiners are not required to take resuscitation equipment to in home examinations. In the event of a medical emergency in the participant's home, immediately call the emergency services.



## 19. GENERAL RULES FOR RECORDING CLINICAL DATA

1. Each surface can receive a maximum of only one code. When two or more conditions are observed on the same surface, code using the most severe condition. The six codes have the following ranking of severity (“<” means less severe):

S < Z < O < F < Fu < R < D

E.g. Two separate pits on occlusal surface, one F and one D. Score surface as D.

When in doubt, code conservatively. “Conservatively” means use the less severe category. For example, if you are not sure whether a lesion is S or D, code it as S.

2. When a filling or a lesion on a posterior tooth or a caries lesion on an anterior tooth extends 1mm beyond the line angle onto another surface, then the other surface is also scored as affected.

However, a proximal filling on an anterior tooth is not considered to involve the adjacent labial or lingual surface unless it extends at least one third of the distance towards the opposite proximal surface.

3. If both deciduous and permanent teeth present, call the permanent tooth.
4. In case of supernumerary teeth, only one tooth is called or the tooth space. Examiner must decide which tooth is the ‘legitimate’ occupant of the space.
5. A tooth is considered to be erupted when any part of its crown projects through the gum.

The surface is coded Z when; any part of the surface has a detectable pit/fissure sealant and when there is no evidence of decay or fillings. A fissure sealant is defined as an adhesive material covering all of a fissure, in which a bur has not been used to cut tooth structure. A preventive resin restoration, when a bur was used, is to be recorded as Filled because of decay (F).

6. When a filled surface has caries adjacent to a filling, the surface is coded R. The filling may have been placed for caries or for other reasons.

## 20. SUMMARY OF CODES AND ORDER OF EXAMINATION

### 1. EXTRA-ORAL ASSESSMENT

Code	Extra-oral findings
0	Normal extra-oral appearance
1	Ulceration, sores, erosions, fissures (head, neck, limbs)
2	Ulceration, sores, erosions, fissures (nose, cheeks, chin)
3	Ulceration, sores, erosions, fissures (commissures)
4	Ulceration, sores, erosions, fissures (Vermillion border)
5	Cancrum oris
6	Abnormalities of upper and lower lips
7	Enlarged lymph nodes (head, neck)
8	Other swellings of face and jaws
9	Unable to code

### 2. DENTURE: Call one code for each arch

Code	Prosthetic Status	Code	Prosthetic Need
No	No prosthesis	0	No prosthetic treatment needed
Br	Bridge	1	Need for one-unit prosthesis
Bb	More than one bridge	2	Need for multi-unit prosthesis
Pd	Partial denture	3	Need for a combination of one- and/or multi-unit prostheses
Bp	Both bridge(s) and partial denture(s)	4	Need for full prosthesis (replacement of all teeth)
Fd	Full removable denture	5	Repair
Np	Partial denture owned not worn	6	Reline/rebase
Nf	Full denture owned not worn	7	Adjustment
		8	Denture cleaning
S or U	Retention	9	Unable to record
S or U	Stability		
S or U	Occlusion		
P, L, S	Material inadequacies		
S, M, L	Defects		
X	Unable to code		

### 3. ORAL MUCOSAL TISSUE ASSESSMENT

Code	Condition	Code	Location
Nc	No abnormal condition	0	Vermilion border
Oc	Malignant tumour (oral cancer)	1	Commissures
Le	Leukoplakia	2	Lips
Lp	Lichen planus	3	Sulci
Ul	Ulceration (aphthous, herpetic, traumatic)	4	Buccal mucosa
An	Acute necrotising gingivitis	5	Floor of mouth
Cn	Candidiasis	6	Tongue
Ab	Abscess	7	Hard and/or soft palate
Ac	Angular cheilitis		

Dh	Denture hyperplasia		
Ot	Other condition (specify if possible)	8	Alveolar ridges/gingival
X	Unable to record	9	Unable to record

#### 4. TOOTH PRESENCE

<b>MR</b>	Missing due to any reason <u>and</u> replaced
<b>MD</b>	Missing due to any reason <u>and not</u> replaced
<b>RD</b>	Root fragment that is decayed
<b>RS</b>	Root fragment that is not decayed
<b>IM</b>	Implant
<b>PP</b>	Present permanent tooth
<b>DP</b>	Deciduous tooth
<b>XX</b>	Unable to record

#### 5. DEBRIS AND CALCULUS SCORE

Code	Criteria
0	No debris or stain present.
1	Soft debris covering not more than one third of the tooth surface, or presence of extrinsic stains without other debris regardless of surface area covered.
2	Soft debris covering more than one third, but not more than two thirds, of the exposed tooth surface.
3	Soft debris covering more than two thirds of the exposed tooth surface.
X	Unable to code.

Code	Criteria
0	No calculus present.
1	Supragingival calculus covering not more than third of the exposed tooth surface.
2	Supragingival calculus covering more than one third but not more than two thirds of the exposed tooth surface or the presence of individual flecks of subgingival calculus around the cervical portion of the tooth or both.
3	Supragingival calculus covering more than two third of the exposed tooth surface or a continuous heavy band of subgingival calculus around the cervical portion of the tooth or both.
X	Unable to code.

## GRACE AND SMALES MOBILITY INDEX

Code	Criteria
0	No apparent mobility.
1	Mobility is perceptible, but less than 1mm buccolingually.
2	Mobility is between 1–2mm.
3	Mobility exceeds 2mm buccolingually or vertically.
X	Unable to code.

### 6. CORONAL CARIES EXPERIENCE

- D** Decay: cavitation or dentinal involvement or both
- R** Recurrent caries contiguous with a restoration
- U** Filled **u**nsatisfactorily
- C** Full **C**rown
- F** Filling placed to treat **d**ecay
- O** Filling placed for reasons **o**ther than caries
- Z** Fissure **s**ealant
- S** **S**ound
- X** Unable to code

### 7. ROOT CARIES EXPERIENCE

- D** Decay that is soft to periodontal probe
- R** Recurrent caries contiguous with a restoration
- U** Filled **u**nsatisfactorily
- F** Filled root for any reason
- S** **S**ound root surface that is visible
- N** **N**o visible root surface
- X** Unable to code

### 8. PERIODONTAL ASSESSMENT

- 0** No bleeding on probing
- 1** Bleeding on probing
- 2** Calculus
- 3** 4–5mm pocket
- 4** 6+mm pocket
- X** Unable to code

### 9. TRAUMA

- 0** No trauma
- 1** Treated trauma, any size or involvement (usually with composite)
- 2** Trauma limited to enamel and not treated
- 3** Trauma involving at least dentine (treatment required, but not yet treated)
- 4** Tooth discoloured after trauma (verified by interview)
- 5** Avulsed, luxated because of trauma (verified by interview)
- 9** Unable to be coded

#### 10. DIFFICULTY OF EXAMINATION

Score	Criteria	
4	Very difficult	Unable to complete most of the examination.
3	Difficult	Examination difficult, some parts not completed.
2	A few aspects difficult	Some parts of the examination were challenging for participant, but examination completed.
1	Manageable	Needed to be mindful of need for breaks, but participant cooperative.
0	Easy	Cooperative participant, easy to complete examination.

#### 11. LOCATION OF EXAMINATION

RC	Portable dental chair – reclined
UC	Portable dental chair – upright
BD	Bed
DC	Dining chair
LC	Lounge chair – reclining or ‘La-Z-Boy’ type
WC	Wheel chair
OT	Other

# 21. PAPER EXAMINATION FORM

## USE OF PAPER FORM

If it is not possible to record the examination systematically as outlined in the protocol and set up on the computer, it may be necessary to record the examination on a paper form. If this is necessary, please check the document carefully and immediately after discharging the survey participant, enter the data into the computer.

## 2012 New Zealand Older People's Oral Health Survey Examination Form

Study participant's name \_\_\_\_\_

ID \_\_\_\_\_

Birth date \_\_\_\_/\_\_\_\_/\_\_\_\_

Exam date \_\_\_\_/\_\_\_\_/\_\_\_\_

Age 


  
 Clinic 


  
 Examiner 


Written Informed Consent   
 Medical History Form  Periodontal probing Contraindicated

**Extra oral assessment**  

--	--

### Denture Assessment

	Upper	Lower
Denture type		
Stability		
Retention		
Occlusion		
Material inadequacies		
Defects		
Treatment need		

### Oral Mucosal Tissue Assessment

Oral Mucosal lesions #1  Site .....

Oral Mucosal lesions #2  Site.....

Oral Mucosal lesions #3  Site.....

None of the above

### Oral debris and calculus and mobility

	Right	Mid	Left
<b>Debris upper</b>			
<b>Debris lower</b>			
<b>Calculus upper</b>			
<b>Calculus lower</b>			

<b>Mobility upper</b>			
<b>Mobility lower</b>			

**Tooth Presence, Caries, Restorations and Trauma**

		Upper Right Quadrant							Upper Left Quadrant							
START HERE		1	1	1	1	1	1	1	2	2	2	2	2	2	2	
		7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
<b>Tooth presence</b>																
<b>Coronal</b>	Occlusal															
	Mesial															
	Buccal															
	Distal															
	Lingual															
<b>Trauma (13-23)</b>																
<b>Root</b>	Mesial															
	Buccal															
	Distal															
	Lingual															
<b>Treatment need</b>																

		Lower Right Quadrant							Lower Left Quadrant							
		4	4	4	4	4	4	4	3	3	3	3	3	3	3	
		7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
<b>Tooth presence</b>																
<b>Coronal</b>	Occlusal															
	Mesial															
	Buccal															
	Distal															
	Lingual															
<b>Root</b>	Mesial															
	Buccal															
	Distal															
	Lingual															
<b>Treatment need</b>																

**Periodontal Assessment**

Site	Right	Mid	Left
Upper			
Lower			

**Difficulty of examination**

<b>Comment</b>
----------------

## **22. CARD FOR DENTAL EXAMINERS – EXPLANATION OF SURVEY DENTAL EXAM**

- The survey dental examination is designed to collect information about the health of older New Zealanders' teeth, gums and mouths. To do this we count the number of teeth and record the condition of each of the surfaces of those teeth. The condition of the gum is also recorded. No treatment will be provided and no x-rays will be taken.
- The survey examinations will be performed by qualified and registered dentists; this is normal practice throughout the world for oral health surveys.
- We are grateful for the cooperation of the participants; they are not being judged, and they should not feel embarrassed about the condition of their mouths and teeth.
- We have information about dental services/support local to each participant's area, which may be helpful to them if they are having difficulty seeking dental care.
- We value their participation in this survey, because the information they provide, combined with information collected from other participants, provides a valuable set of much-needed information for planning oral health care.
- The participants may withdraw from the examination at any time, and this will not affect their rights to future health care.



# 23. DENTAL SURVEY SUMMARY REPORT

## Older People’s Oral Health Survey

### Dental Survey Summary report

Name: \_\_\_\_\_

Thank you for taking part in the dental survey today. The information which you have provided will be very useful in helping us to understand older people’s oral health.

Please note that we have not performed a full dental examination. Although our survey was thorough enough for the purposes of the Study, it is not a substitute for a check-up with your own dentist. For example, in studies like this, we do not use air to dry the teeth, or x-rays to see inside the teeth, so it is possible (for example) that we may have missed early cavities, even if we noted that nothing was found. We recommend that you have regular check-ups with your own dentist to monitor the health of your mouth.

**Survey findings:**

- No abnormal conditions found

Ticks in the following boxes indicate the survey dentist is of the opinion that the conditions noted below should be discussed further with your own dentist:

- Cavities or tooth decay
- Gum disease (periodontal disease or gingivitis)
- Tartar or calculus
- Other:
- Soon                       In the next few months                       In the next year or so

Dentist’s name: \_\_\_\_\_

Signed: \_\_\_\_\_

Date: \_\_\_\_\_

## 24. CONSENT FORM FOR DENTAL EXAMINATION

### I agree to take part in the DENTAL EXAMINATION for the Older People's Oral Health Study

Please read each bullet point carefully before signing below:

- I have read and understand the information pamphlet on the dental examination for the Older People's Oral Health Study.
- I understand that a qualified and registered dentist will examine my teeth.
- The dental examination has been fully explained to me by the dentist and I have been able to ask questions.
- I agree to answer the questions on the Medical History Form.
- I know that I can stop the examination at any time. There is no disadvantage to me if I don't want to take part or if I stop at any time.
- I know that my participation in the Older People's Oral Health Survey is confidential and any information that could identify me will never be used in any reports on this study. All my answers are protected by the privacy Act 1993.

Name of participant (please print):	
Signed:	(Participant/Legal Guardian [delete one])
Name of legal guardian (please print):	
Date:	

<b>Office use only</b>	
Dentist's signature:	Participant ID:
Sampled home:	

## 25. MEDICAL HISTORY FORM

Please answer the following questions about your medical history

1. Do you have any of your own teeth?			
	<input type="checkbox"/> Yes (Go to Q2)	<input type="checkbox"/> No (Go to Q5)	
2. Has a doctor or dentist ever told you that you must ALWAYS take antibiotics (e.g. penicillin) before you get a dental check-up or care?			
	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
3. Do you have a joint replacement (hip or knee) that has been inserted in the last six months?			
	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
4. Have you ever had rheumatic fever?			
	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
5. Has a doctor ever told you that you have a heart problem?			
	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
6. Was your heart problem due to one of these conditions?			
<input type="checkbox"/> Congenital or acquired heart murmur	<input type="checkbox"/> Heart valve problems	<input type="checkbox"/> Congenital heart disease	
<input type="checkbox"/> Bacterial endocarditis	<input type="checkbox"/> Congestive heart failure	<input type="checkbox"/> Heart attack (myocardial infarction or coronary)	
7. Do you have any of the following conditions?			
<input type="checkbox"/> Parkinson's	<input type="checkbox"/> Arthritis	<input type="checkbox"/> Dementia	<input type="checkbox"/> Stroke
<input type="checkbox"/> Hepatitis B or C	<input type="checkbox"/> Epilepsy	<input type="checkbox"/> Bleeding disorder	
<input type="checkbox"/> Other:			
8. Do you have any dental implants?			
	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
9. Are you immune-suppressed or are you on immune-suppression therapy? (e.g. chemotherapy, steroid)			
	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
10. Do you take any medications? If yes, please tell the dentist what these medications are.			
	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
List:			
11. Do you have any allergies? If yes, what are they?			
	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
List:			

## 26. GLOSSARY OF TERMS

Bridge	A prosthesis used to replace a tooth or teeth which is cemented on to a natural tooth or teeth nearby and which is not intended for removal by the participant. Two types of bridges are used: conventional (which usually relies on adjacent teeth being cut down for crowns to which the replacement tooth is attached), and adhesive (which is attached to the adjacent teeth using adhesive techniques and which does not require the tooth to be extensively prepared).
Calibration	A procedure to promote standardization between examiners performing the oral examinations.
CEJ	Cemento-Enamel Junction.
Coronal surfaces	The surfaces of the crown of the tooth.
Crown	The part of the tooth which, on a natural sound tooth, is covered in dental enamel.
Dental Caries/decay	A disease process that results in the demineralisation of the hard tissues of the tooth by microbial activity. The terms dental caries/dental decay are used interchangeably. The hard tissues of the tooth by microbial activity.
Dentate	Having one or more natural teeth.
Dentine	The calcified tissue which forms the major part of the tooth. It encloses the dental pulp, but is covered by enamel on the coronal surface.
Denture	A removable dental prosthesis that substitutes for missing natural teeth and adjacent structures.
DMFT	Abbreviation of Decayed Missing and Filled Teeth. This is the sum of all natural permanent teeth in an individual mouth which are either decayed, missing or filled.
Edentulous	Not having a natural tooth.
Enamel	Hard white mineralized tissue covering the crown of a tooth.
Epidemiology	The study of the distribution and causes of health and disease in populations.
Examination protocol	Methods and guidelines for conducting standardized oral examinations conducted in a survey.
Examiner	A dentist who undergoes special training and calibration to perform oral examinations in the study.
FGM	Free Gingival Margin.
Gingival recession	The shrinkage of gum tissue away from the tooth resulting in exposure of dental roots and creating the appearance of being 'long in the tooth.'

Mandible	Lower jaw.
Maxilla	Upper jaw.
Missing teeth	Teeth which were not present or visible in the mouth at the time of examination. Missing teeth include those which had been extracted and those which were unerupted.
Natural teeth	Refers to a person's own teeth as opposed to artificial teeth.
Periodontal Disease	A disease of the tissue which invest and support the teeth (gum disease).
Permanent teeth	Adult teeth (secondary teeth).
Recorder	An individual who undergoes special training to record collected data.
Restoration	The material end result of operative procedures that restore the form, function and appearance of a tooth. In surveys, restorations can be defined as fillings or artificial crowns.
Root	The part of the tooth not covered by enamel, which is below the level of the gum, in a mouth of a person with good oral health. It may become exposed due to the recession of the gums associated with the loss of periodontal attachment, particularly with increasing age.
SP	Survey participant.

# Appendix F: Older People's Oral Health Survey Pamphlet and Dental Examination Information Sheet

## What is the Older People's Oral Health Survey?

The study collects information about the health of New Zealanders' teeth, gums and mouths and the oral health services older people in New Zealand use. The last oral health survey in New Zealand was conducted in 2009 and revealed that older people were more likely to suffer poor oral health, however not all parts of the older community were represented. Information from the current study will supplement those findings and provide a better insight into the oral health of older people. The survey has two parts: an interview and a simple dental examination. The most information will be gained if participants complete both parts of the survey. The Ministry of Health expects about 2000 older people to take part in this survey.

## Who is carrying out the survey?

The Ministry of Health has contracted CBG Health Research Ltd to interview people for the Older People's Oral Health Survey Issues. Registered dentists will do the dental examination.

## Why have I been invited to participate?

You have been identified by the Ministry of Health as eligible to take part either because you currently live in a residential care setting or are living at home, and receiving home-based support services. The Ministry needs information from people who have good teeth, from people who have problems with their teeth and from people who have lost all of their teeth. This information will help the Ministry to get a clear picture of the oral health of all people living in New Zealand.

## Where can I find the survey findings?

The Ministry of Health will publish the findings of the Older People's Oral Health Survey on its website in 2013. You will be able to get a free copy from the Ministry's website [www.health.govt.nz](http://www.health.govt.nz) or by phoning (04) 496 2277. The Older People's Oral Health Survey has been approved by the Multi-region Ethics Committee.

## Questions about the survey

For more information, including any questions or problems associated with the practical aspects of participation in the project, or if you wish to raise a concern phone CBG Health Research Ltd 0800 478 783.

If you have any questions or concerns about your rights as a participant in this research study you can contact an independent health and disability advocate. This is a free service provided under the Health and Disability Commissioner Act. Telephone: (NZ wide) 0800 555 050 Free Fax (NZ wide): 0800 2787 7678 (0800 2 SUPPORT) Email (NZ wide): [advocacy@hdc.org.nz](mailto:advocacy@hdc.org.nz)



  
Older People's  
Oral Health Survey  
Participant Information



### **What questions will I be asked?**

The Older People's Oral Health Survey will collect information about:

- the problems you may have with your teeth and mouth
- how your teeth look and work
- how you use oral health services
- the things that affect your oral health.

You can tell the interviewer if you don't want to answer a question, and they will move to the next question.



### **What happens after the interview?**

At the end of your interview, the interviewer will ask if you would like to take part in the simple dental examination. If you agree to take part, the examination will be arranged for a few days after the interview at a date and time to suit you. The dental information collected in study is designed to measure such things as dental decay and gum disease. This information is then used to get an overall indication of the oral health of older people in New Zealand.

### **What happens at the simple dental examination?**

The dental examinations for the Older People's Oral Health Survey are less extensive than the usual examinations a dentist does. The examination is a routine one where no x-rays will be taken, and no dental treatment or medications will be provided. The examination will take place in your place of residence in a position that is most comfortable for you. The dental examination will be done free of charge by qualified and registered dentists who will be specially trained to collect the specific information for the Study. The dentist will explain the examination to you, and you can tell them if you decide not to have the examination. During the dental examination, the dentist will record whether or not you have any natural teeth. The health of your gums and information about any false teeth you may have will also be recorded. If you have natural teeth, the dentist will count and record the condition of those teeth.



### **What will the information be used for?**

The Ministry of Health will use the information from the Older People's Oral Health Survey to:

- assess the oral health of older people
- monitor the use of oral health services
- develop oral health policies, programmes and services that will better meet the needs of older people in New Zealand.
- focus additional oral health research.

Health researchers outside of the Ministry of Health may apply to use the data from the Older People's Oral Health Survey. These data will not contain any information that could identify you (in accordance with the Health Act 1956).

### **How is my privacy protected?**

The information you provide to the interviewer is confidential and protected by the Privacy Act 1993. The interviewer will not discuss your information with anyone else and no one will be able to find out whether you took part in this survey. The answers you give will be added to other people's answers to create group statistics. Personal information will not be given to other government departments or researchers.

### **How long will the interview and examination take?**

The interview will take about 30 minutes.

The interview will be done at a date and time that suits you.

The simple dental examination will take about 30 minutes.

## Dental examination information sheet

### *What information is collected in the examination?*

The dental examination will measure levels of dental health such as tooth loss, dental decay and gum disease and record information about teeth damaged in accidents. It will also record the presence and condition of any dentures.

When researchers combine the information from the interviews with the measurements collected in the dental examination better information about the overall dental health of older people living in New Zealand is obtained.

### *What are the benefits of taking part?*

A qualified and registered dentist will examine your mouth and any teeth or dentures you may have.

The examining dentist will give you a short written report on what he or she saw during the survey examination, whether you may require dental treatment and how to access dental care in your area.

The information from the survey will help the Ministry of Health to plan dental programmes and services that will best meet the needs of older people in New Zealand. Your participation will help to make a difference in the future.

It is important to note that the dental survey examination does not replace a regular dental check-up. The dentist will not provide treatment or take x-rays. Problems that would be seen only on x-rays will not show up during the survey examination

### *What is involved?*

The examination will involve the dentist recording whether you have any natural teeth or not. The health of your gums and information about any false teeth you may have will also be recorded. If you have natural teeth, the dentist will count the number of teeth you have and record the condition of those teeth.

The dental examiner will use procedures similar to those for a standard dental examination, including taking a brief medical history and following standard infection control guidelines. People with certain medical conditions will not have their gum health measured.



### *Are there any risks?*

There are no known risks to your teeth, gums or dental health from the examination procedures. Some people may experience slight discomfort when their gums are examined.

### *May I withdraw from the examination?*

You may withdraw from the examination at any time. Withdrawal will not affect your entitlements for future dental care.

### *Where will the examination take place?*

The exam will be conducted in your place of residence in a position that is most comfortable for you. You are welcome to have someone with you during the examination. The dentist will answer any questions about the examination.

### *Will the information about me be confidential?*

Only researchers for the Older People's Oral Health Survey will have access to your examination results. Published results from the survey will not include your name or information that could identify you.

### *Questions about the survey*

For more information, including any questions or problems associated with the practical aspects of your participation in the project, or if you wish to raise a concern about the project phone CBG Health Research Ltd 0800 478 783.

If you have any questions or concerns about your rights as a participant in this research study you can contact an independent health and disability advocate. This is a free service provided under the Health and Disability Commissioner Act.

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