Oral Health of Irish Adults 2000 - 2002

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A collaborative project involving:

Republic of Ireland
The Department of Health and Children
Health Services Executive, formerly the health boards:
East Coast Area
Midland Area
Mid Western Area
North Eastern Area
Northern Area
North Western Area
South Eastern Area
Southern Area
South Western Area
Western Area

Northern Ireland
The Department of Health Social Services and Public Safety
Eastern Board
Northern Board
Southern Board
Western Board

WHO Collaborating Centre for Oral Health Services Research
University College Cork

Final Report – April 2007

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Glossary

Dentate	Possessing (at least one) natural teeth
Edentulous	Possessing no natural teeth
$D_{3c}MFT$	Decayed, missing and filled teeth
Anterior $D_{3c}MFT$	Decayed, missing and filled anterior teeth, i.e. incisors and canines
$D_{3vc}MFT$	$D_{3c}MFT$ with visual caries
DT	Decayed teeth
FT	Filled teeth
MT	Missing teeth (in this study: teeth missing for any reason)
NT	Number of sound natural teeth
18+ SUNT	18 or more sound untreated, untraumatised natural teeth
ASA	American Society of Anaesthesiologists. The ASA classification system is used to categorise subjects' general health.
DDE Index	Developmental Defects of Enamel Index (grades deviations from the normal appearance of tooth enamel)
Deans Index	An index specifically designed to measure dental fluorosis on a graduated scale
CPITN	Community Periodontal Index of Treatment Need
IOTN	Index of Orthodontic Treatment Need
MHI	Modified Helkimo Index
TMJ	Temporo Mandibular Joint

Fluoridation Status:

Non	Subjects who have had less than one year exposure to domestic water fluoridation
Full	In the 16-24 year old group: subjects who have had a lifetime exposure to domestic water fluoridation; in the 35-44 year old and 65+ year old groups: subjects who have had at least 35 years exposure to domestic water fluoridation.
Part	All other subjects

Health Boards:

EHB	Eastern Health Board (1989/'90 data), comprising of counties Dublin, Wicklow and Kildare.
ERHA	Eastern Regional Health Authority (2000/'02 data), comprising of counties Dublin, Wicklow and Kildare.
MHB	Midlands Health Board
MWHB	Mid Western Health Board
NEHB	North Eastern Health Board
NWHB	North Western Health Board
SEHB	South Eastern Health Board
SHB	Southern Health Board
WHB	Western Health Board
OHB	Other Health Boards, comprising of the seven other health boards: Midland, Midwest, North Eastern, North Western, South Eastern, Southern, Western.

Eligibility for dental cover:

None	No cover - private payment for dental services
PRSI	Pay Related Social Insurance – eligibility for dental treatment through the Dental Treatment Benefit Scheme (DTBS).
MC	Medical Card – eligibility for dental treatment through the health board dental services or through the Dental Treatment Services Scheme (DTSS). The DTSS uses general dental practitioners for the delivery of state-funded dental care to those with medical cards.
Other	Employers' dental schemes, e.g. Gardaí, Armed Forces.

Chapter 1
Introduction and Aims

Publication of the strategy document 'Shaping a Healthier Future'[1] marked a major milestone in the development of the health care delivery system in Ireland. The strategy was underpinned by three key principles: equity, quality of service and accountability. It was emphasised that the benefit to be derived from the health services should be measured in terms of health gain and social gain. The central role of valid meaningful information was regarded as crucial to the proper implementation of the strategy. The more recent Health Strategy 'Quality and Fairness - A Health System for You'[2] added people-centredness as one of its key principles. The Dental Health Action Plan (1994)[3] again reiterated the need for meaningful information (including epidemiological data to measure oral health status) for prioritisation of preventive and treatment needs. Oral diseases, and in particular dental decay (caries) and gum disease, are among the most common chronic diseases affecting the population in Ireland. Most adults in Ireland have had contact with the dental services; indeed many have had extensive dental treatment both in childhood and in adulthood. Whilst it is possible to monitor activity within the state-funded dental services (by monitoring payment to dentists by the state for various oral treatments), such activity reporting tells only a small part of the story of oral health in Ireland. Periodic surveys of the oral health of the population are needed to track changes in the oral health of the whole population, not just those who use state-funded services. Survey data are essential to the evaluation of current services and to the planning of appropriate future services. The only previous national survey of adult oral health undertaken in Ireland was directed by the Oral Health Services Research Centre (OHSRC), University College Cork, and was carried out in 1989/'90[4]. The national survey of adult oral health described in this report was conducted between 2000 and 2002, also under the direction of the OHSRC. A team of 30 trained and calibrated health board dentists and 30 dental nurses conducted the fieldwork. The Eastern Regional Health Authority (ERHA), on behalf of the Department of Health and Children, commissioned the survey. The contract was awarded following a call for tenders advertised in the Journal of the European Commission. The health boards supported the survey in a number of ways, including the purchase of equipment and the deployment of staff to conduct the fieldwork.

An extensive consultation process was adopted for the development of the study protocol. Amongst those consulted were: the Chief Executive Officers of the health boards, the health board program managers group, nominated representatives of the health board dental service, officers of the Department of Health and Children, and the directors of the 1998 UK National Survey of Adult Oral Health[5]. Details of the project group, survey teams, and the nominated health board representatives are outlined in Appendices 1, 2 and 3 respectively.

1.1 Aims of the survey
The aims of the survey were:

(1)   To measure the levels of oral health among adults in Ireland.
(2)   To compare levels of dental caries among adults having varying degrees of exposure to fluoridated water supplies.
(3)   To compare levels of oral health within Ireland, and to make comparisons with the previous survey (1989/'90) and with other countries.
(4)   To establish whether the goals for adults' oral health set out in the Health Strategy 'Shaping a Healthier Future'[1] have been attained.
(5)   To estimate the need for dental treatment amongst adults in Ireland according to eligibility for dental services.
(6)   To measure changes in the oral health of medical card holders since the introduction of the Dental Treatment Services Scheme (DTSS).
(7)   To investigate the effects of sociological variables on levels of oral health.
(8)   To examine the relationship between oral health and quality of life.
(9)   To measure the availability, accessibility and acceptability of oral health services.
(10)   To examine the relationship between oral health and general health.

To achieve these aims, a thorough clinical oral examination was carried out and a detailed interview pertaining to oral and general health, perception of oral health services and oral health related quality of life was conducted on a random sample of a defined adult population in Ireland (Table 1.1).

Table 1.1 Number and percentage of adults examined according to age and gender
Base: Dentate and Edentulous

Age Group	Male		Female		Total
	n	%	n	%	n
16-24	511	42.7	685	57.3	1196
35-44	367	37.5	611	62.5	978
65+	331	46.4	383	53.6	714
Total	1209	41.9	1679	58.1	2888

1.1.1 Aims one to three

Aims one to three were: to measure the levels of oral health among adults in Ireland; to compare levels of dental caries among adults having varying degrees of exposure to fluoridated water supplies; to compare levels of oral health within Ireland, and to make comparisons with the previous survey (1989/'90) and with other countries.

Outcome indicators are well developed for oral health because of the existence of well-established measures of oral health status. The internationally standardised methods and indices used in this study of oral health facilitate the comparison of the results with other national and international surveys. Where possible, World Health Organisation (WHO) criteria were used[6]. All criteria and indices used are detailed within the report. The measures used are comparable with those used in the 1989/'90 survey in Ireland and with recent UK surveys.

The survey was designed to compare the differences in oral health of adults according to exposure to domestic water fluoridation. Following the passing of the Health (Fluoridation Water Supplies) Act 1960[7], water fluoridation was introduced to Ireland - firstly in the Dublin region in 1964, then in most other large urban areas between 1964 and 1969. Since that time, a dramatic decline in dental caries levels among children living in both fluoridated and non fluoridated areas has been reported[8]. However, caries levels are consistently lower among children with fluoridated domestic water supplies. In this survey, a large proportion of the 16-24 year-old group will have had a lifetime's exposure to domestic water fluoridation, and it is possible to compare their oral health with the same age group who did not have fluoride in their domestic water supplies. Adults born in the period 1964-1969 were 31-36 years old at the commencement of the fieldwork for this survey. There is therefore a growing cohort of adults in their thirties who also have had a lifetime's exposure to domestic water fluoridation. Many of this age group, particularly those in their thirties and those examined in the later stages of the fieldwork in 2002, would have had exposure to water fluoridation prior to the eruption of their permanent teeth. However, the older adults in the 35-44 year age group, examined in 2000, would have been 8-13 years old in 1964-1969. Hence, many of their permanent teeth would have been erupted for a number of years when their water supplies were fluoridated. This must be borne in mind when comparisons by fluoridation status are drawn for this age group. For the older age group (65+), fluoridation may have come too late to prevent the destruction of their teeth by caries. Therefore, the impact of fluoridation may not be as apparent in this age group. In 2002, it was estimated that 71% of the population of the Republic of Ireland had domestic water fluoridation[9].

1.1.2 Aim four

Aim four was to establish whether the goals for adults' oral health set out in the Health Strategy document 'Shaping a Healthier Future'[1] have been attained. The population goals for adult oral health set out in the Health Strategy were:
By the year 2000:

(1)   The average number of teeth present in 16-24 year-olds will be 27.7.
(2)   No more than 2% of 35-44 year-olds will have no natural teeth.
(3)   No more than 42% of people aged 65 and over will have no natural teeth.
The extent to which these goals have been achieved was measured by clinical examination of the survey sample.

1.1.3 Aim five

The fifth aim of the survey was to estimate the need for dental treatment amongst adults in Ireland according to eligibility for dental services. The 1989/'90 national survey of the oral health of Irish adults[4] included analysis of oral health according to eligibility for dental services: Medical card holders were found to have poorer oral health than those eligible for the Social Insurance (PRSI) Dental Treatment Benefit Scheme or those availing of privately funded treatment. To determine whether such differences continued to exist, this survey looked at the population according to their perceived eligibility for these services. Since equity is a cornerstone of the health strategy in Ireland, this was an important consideration.

1.1.4 Aim six

The sixth aim of the survey was to measure changes in the oral health of medical card holders since the introduction of the DTSS.

In response to the extensive unmet treatment need among medical card holders reported in the last national survey, the DTSS was introduced on a phased basis from 1994. This scheme provides for the delivery of state-funded treatment to those with medical cards. The vast majority of medical cards are provided to those found to have low income on the basis of means testing. The survey offered an opportunity to investigate whether the introduction of the DTSS scheme has had an impact on this inequality. The survey therefore represented an important tool for evaluating the effectiveness of the design of the DTSS.

1.1.5 Aims seven to ten

Aims seven to ten were: to investigate the effects of sociological variables on levels of oral health; to examine the relationship between oral health and quality of life; to measure the availability, accessibility and acceptability of oral health services; and to examine the relationship between oral health and general health.

In Ireland and in other countries, oral health is poorer among the less well off. This finding was reported in both the 1989-1990 report on the Oral Health of Irish Adults[4] and in the 2002 North South Survey of Children's Oral Health in Ireland[10]. Using medical card ownership as a surrogate, the impact of disadvantage on oral health was measured and changes over time were investigated to determine the course of the social divide in oral health.

Although improvements in oral health knowledge do not immediately lead to a change in oral health behaviour, it is an important first step in health promotion. The current status of oral health knowledge, attitudes and behaviour were therefore elucidated by means of a carefully designed and pre-piloted questionnaire, which also provided for comparisons of the variables with other surveys. The impact of attitudes and behaviours on oral health were also examined.

There is now widespread agreement on the need to include subjective measures of oral health when assessing oral health needs, since clinical measures alone provide little insight into the impact of oral health and disease on people's lives[11]. The measure of oral health related quality of life used in this survey was the United Kingdom Oral Health related Quality of Life measure (OHQoL-UK(W)©)[12]. The instrument was developed primarily as a descriptive epidemiological tool based on the WHO's revised conceptual model of health, which reflects both positive (functioning) and negative (disabling) aspects of health status[13]. This was the first time such a measure was incorporated into a national survey of oral health in Ireland.

The availability, accessibility and acceptability of services are of major concern in a people-centred health service. People centredness is an important consideration in the current health services in Ireland[2]. Accordingly, adults' perceptions of services were determined and are presented in this report.

Finally, general health was measured according to the classification system of the American Society of Anesthesiologists (ASA)[14]. The system was used to classify all adults into four categories. Adults are classified according to whether they are healthy without systemic disease (ASA 1), have mild to moderate systemic disease (ASA 2), have severe systemic disease but which is not incapacitating (ASA 3), or have severe systemic disease that limits activity and is a constant threat to life (ASA 4). The level of oral health according to general health status is presented in the report.

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Chapter 2
Methods

2.1 Background and funding

The importance of information gathering was recognised in the Health Strategy[1]. The need for detailed information, as described in this strategy, makes it imperative that health board dental surgeons and their supporting staff be trained in appropriate methods of data collection. In recognition of the importance of increasing self-sufficiency in the area of epidemiology of oral health amongst health board personnel, the survey incorporated up-skilling of health board dental staff in the area of epidemiology.

The Department of Health and Children and the health boards in Ireland funded the study. The protocol was approved by the ethics committee of the Cork teaching hospitals prior to the start of the study. The age groups chosen for inclusion in the study were 16-24, 35-44 and 65+ years: These age groups represented 40% of the whole population, or 52% of the adult population, according to the 2002 census of the population[2]. The rationale for this choice was to provide data for young, middle-aged and older adults. The inclusion of 25-34, 45-54 and 55-64 year-olds would have almost doubled the sample size and would not have yielded much additional information.

2.2 Sample

A stratified random sample of adults (persons aged 16 years and older on the date on which they are clinically examined) in Ireland was selected from households based on electoral lists. Sampling was carried out by the Economic and Social Research Institute (ESRI) using RANSAM, a computer based system for drawing national random samples developed by the ESRI[3]. The sample was designed to be representative of the country as a whole, and of the Eastern Regional Health Authority (ERHA), the Mid Western Health Board (MWHB), the North Eastern Health Board (NEHB) and the Southern Health Board (SHB) areas. Stratifying factors were age (16-24, 35-44 and 65+ age groups), gender and medical card status (possession of a medical card was used as a surrogate for disadvantage). The sample households were contacted by post and asked to reply if they would prefer no further contact (Appendix 7). They were then contacted by phone where possible or asked to reply with details of the members of the household of the appropriate age who were interested in participating in the study. Where phone numbers were not available, members of the dental team made contact by visiting the household in person. Appointments for a clinical examination were arranged at a time and place to suit the respondents. If the respondents were unable or unwilling to attend a dental clinic, they were offered an examination in their own home.

In the first instance, a sample of 1,500 households in each of the ERHA, MWHB, NEHB and SHB areas, and 250 households in each of the South Eastern Health Board (SEHB), Midlands Health Board (MHB), North Western Health Board (NWHB) and Western Health Board (WHB) areas were selected from the electoral register. The target sample size was 1,050 adults (350 per age group) where a representative sample was required, and 180 adults (60 per age group) where a health board was merely contributing to the national picture.

These addresses were used to invite participation in the survey of a sample of persons in three target age groups: 16-24 years, 35-44 years and 65+ years. There was no way of knowing how many adults per household fell into these three age categories.

The sample in each health board was a 2-stage clustered sample. At the first stage of sampling, the electoral register was clustered into District Electoral Divisions (DEDs) according to a pre-specified minimum cluster size of electors (say 1,500 electors per cluster). Once this cluster structure was determined, the first stage of sample selection - of the clusters or sampling points – took place. These were the Primary Sampling Units (PSUs). Once the PSUs were selected, the second stage of sampling involved the selection of the addresses from within each selected PSU. This latter stage of the process was undertaken on a systematic basis using a random start.

For the five samples of 1,500 target addresses, 50 clusters each of 30 addresses were selected. For the remaining three health boards, 25 clusters each of ten addresses were selected. At a national level, this meant that the aggregate sample consisted of 325 clusters. Due to a poor response rate, the sample was exhausted before the target cell size was reached for the less well off groups. Top-up samples

were drawn as needed: The size of the top-up was based on the response rate from the first sample to achieve the target sample sizes. In all cases, top-up samples were only required for lower social classes. The Small Area Health Research Unit (SAHRU) National Deprivation Index[4] was used to identify DEDs with a majority of low-income population, and the sample was drawn from these DEDs.

Due to the sampling methodology, a weighting system was used to statistically adjust the effective (or completed) samples.

2.3 Weighting procedure

As regional estimates were required for the ERHA, NEHB, MWHB, and SHB, proportionately larger samples were taken from these regions. Within each health board region, adults from larger households had a greater chance of selection than those from smaller households. Mean $D_{3c}MFT$ was calculated according to household size, and no significant relationship was found. Therefore, no adjustment for household size was made.

Although the sample design was self-weighting with respect to all additional factors, the sample was weighted to adjust for non-response bias. Non-response bias occurs when survey respondents differ from survey non-respondents, resulting in a sample that is not representative of the population. For example, a proportionately larger number of females responded to the survey than males, meaning that males were under-represented in the sample. As it is known that such factors as gender, medical card status (an indicator of socio-economic status), and age significantly affect oral health, in addition to the health board adjustment, the sample was adjusted according to these factors so as to be representative of the population as a whole.

Estimates of Irish population totals for the 3rd quarter of 2001 were obtained from the Quarterly National Household Survey (QNHS) Health Microdata set, available from the Central Statistics Office (CSO). Regional categories in this data set did not correspond exactly to the health board divisions used in this sample; hence health boards were matched as closely as possible to the QNHS divisions. The QNHS Dublin and Mid-East divisions were matched with the ERHA, and the QNHS Border region was matched with the NEHB and NWHB. All other regional divisions were the same. The age groups also did not correspond exactly between the two data sets, with the youngest age group used in the QNHS data being 18-24 years, whereas in the Oral Health Survey data it was 16-24 years. Therefore, totals within the 18-24 year-old age category of the QNHS data set were proportionately increased to account for the additional two years necessary to correspond with the oral health survey data.

2.4 Informed consent

All respondents were fully informed regarding the nature of the study and the benefits of participating. Consenting participants were asked to sign an informed consent form.

2.5 Confidentiality and data protection act

All standard confidentiality procedures were followed. Access to the database on each laptop used for direct data entry was denied unless the appropriate password(s) was used.

Legislation covering data protection was adhered to when collecting, handling and reporting on data:

- Data Protection Act 1988
- Data Protection (Access Modification)(Health) Regulations, 1989 (S.I. No.82 of 1989)
- Data Protection (Access Modification)(Social Work) Regulations, 1989 (S.I. No.83 of 1989)
- Council Directive on the Protection of Individuals with Regard to Processing of Personal Data (Directive 95/46/EC)(W).

2.6 Respondents' expenses

Each adult presenting for clinical examination at a dental clinic received an expenses cheque for €12 towards the cost of travelling to the dental clinic. The cheques were issued by the Oral Health Services Research Centre, University College Cork. Participating adults were also included in a prize draw.

2.7 Fieldwork

Preliminary training for 30 teams (Appendix 2) took place in the University Dental School and Hospital, Cork, i.e. training in the clinical indices/criteria that was used in the clinical examination, training in interview skills and software. In addition, a calibration exercise took place on the last day of the training and again shortly before the fieldwork commenced. The fieldwork took place between October 2000 and August 2002.

2.7.1 Equipment

The standard dental operating light was used for the clinical examination. In the case of subjects examined in their own homes, a Daray lamp was used. The light intensity in both examination situations was similar.

The probe used was a CPI 'C' probe and the mirror had a standard (size 4, front) head. An overbite orthodontic ruler (Dentacurum, Morris Dental Cat. No. 04473000), modified IOTN ruler and a root (Brialt II, Henry Schein Cat. No 765611) probe were used for the measurement of certain conditions, i.e. IOTN, TMJ dysfunction and root caries.

Protective glasses were placed on each subject before the oral examination commenced. Alternatively, the subject could choose to retain his or her own spectacles. The protective glasses could be removed during the interview. These glasses were wiped with disinfectant between examinations.

2.7.2 Cross Infection control

A new set of sterile instruments were used for each subject. Gloves were changed before the examination on every subject; facemasks were changed every hour. A rigorous cross infection control protocol was followed both in the surgery setting and for domiciliary visits.

2.8 Data collection

Each community care area purchased a laptop, which allowed clinical data to be recorded by direct data entry. When the software development was complete, a standard operating procedure to handle, backup and transport the data was developed. Paper clinical record forms were carried at all times as backup.

2.9 Medical screening

Each subject who agreed to participate in the examination was asked to fill in a medical screening form (Appendix 9) prior to the examination. The examiner (dentist) checked this form prior to conducting the examination and questioned the subject, if necessary, regarding a history of rheumatic fever, heart murmur, endocarditis, valvular heart disease and the presence of any artificial joints (usually hip or knee). Any subject with a history of these conditions did not undergo the periodontal examination.

2.10 Guidelines for examiners and diagnostic criteria

Copies of the supporting documentation are contained within the Appendices: Clinical Record Form (Appendix 10), General Health Questionnaire (Appendix 11), General Questionnaire for Dentate Subjects (Appendix 12a), General Questionnaire for Edentulous Subjects (Appendix 12b), and Coding Sheet (Appendix 13). The clinical examination criteria are detailed in Appendix 14.

The subject's first and last name, address, date of birth and gender were recorded. Each subject who participated in the study was automatically given a unique identity number. This number comprised of ten digits, which were related to the individual subject and to the health board, county, DED and household where the subject resided. The date of the examination was also automatically recorded. The id number of the examining dentist and the recorder were recorded on each clinical and paper record.

2.10.1 General health measurement

The Modified ASA Health Questionnaire (Appendix 11) was used to measure general health status. The subject's health was classified into one of four categories based on a system developed by the American Society of Anesthesiologists (ASA)[5].
In this classification:

(1)   ASA 1 is a normal healthy patient without systemic disease.
(2)   ASA 2 is a patient with mild to moderate systemic disease.
(3)   ASA 3 is a patient with severe systemic disease that limits activity but is not incapacitating.
(4)   ASA 4 is a patient with severe systemic disease that limits activity and is a constant threat to life.

The examiner entered the appropriate ASA classification (codes 1-4) in the appropriate box on the subject's clinical record according to stated guidelines.

2.10.2 Trauma of permanent incisors
Upper and lower permanent incisors were examined for traumatic injury in the 16-24 year age group only.

2.10.3 Denture status
The possession and wearing of dentures, need for dentures and need for repairs or adjustment to dentures was recorded for each jaw. The soft tissues in the denture bearing areas were inspected to check whether the tissues were affected by the dentures.

2.10.4 Enamel opacities
Developmental Defects of Enamel (DDE) (16-24 year-olds only) was used to record the presence of any qualitative defect in the buccal or labial surface enamel of ten index teeth - the labial surfaces of the maxillary first pre-molar, canine and incisor teeth and the buccal surfaces of the mandibular first molars were examined. The teeth were examined wet, firstly under natural light and then under artificial dental lighting.

2.10.5 Fluorosis
Dean's Index[6] (16-24 year-olds only) was used to record the presence of fluorosis where the distribution pattern of any defects was, in the opinion of the examiner, typical of fluorosis. The two most severely affected teeth were identified, and a Dean's Index score recorded based on the condition of the second most severely affected tooth.

2.10.6 TMJ Dysfunction (dentate patients only)
The condition of the Temporo Mandibular Joint (TMJ) was assessed using the Modified Helkimo Index[7]. This index is expressed as a composite dysfunction score based on measurements of maximal opening, maximal protrusion or overjet, impaired function (e.g. clicking or crepitus, deviation, locking or luxation), muscle pain and TMJ pain.

2.10.7 Orthodontic treatment need (16-24 year-olds only)
Orthodontic treatment need was assessed using the Index of Orthodontic Treatment Need (IOTN). The IOTN consists of two separate components:

(1) **The Aesthetic Component** determines the level of need for orthodontic treatment on aesthetic grounds.
(2) **The Dental Health Component** determines the level of need for orthodontic treatment on dental health grounds.

2.10.8 Periodontal condition (all age groups)
A Modified Community Periodontal Examination (CPE) was used to evaluate the periodontal condition, the presence of calculus and loss of attachment. The following indicators of periodontal status were used for this assessment: (1) presence or absence of gingival bleeding on probing; (2) presence of supra or subgingival calculus; (3) presence of periodontal pockets - subdivided into shallow (4-5mm) and deep (6mm or more); and (4) extent of loss of attachment of the supporting structures of the tooth measured in mm as the distance from the cemento enamel junction to the base of the gingival sulcus or pocket.

2.10.9 Tooth wear/erosion (all age groups)
The index used to measure tooth wear and erosion was the same as that used in the 1998 UK Adult Dental Health Survey[8]. The twelve upper and lower anterior teeth were examined for wear. Each tooth was assessed by looking at each coronal surface. Scores were recorded on three surfaces per tooth for the six upper teeth - the buccal, incisal and palatal. For the lower teeth, only the worst surface score was recorded.

2.10.10 Lesions of the oral mucosa (all age groups)
A thorough and systematic screening examination of the oral mucosa and the hard and soft tissues in and around the mouth was carried out on every adult examined. Conditions or diseases of the oral mucosa were classified according to an adaptation of the WHO criteria[9].

2.10.11 Caries

Decayed, Missing and Filled Teeth (D_{3c}MFT) and Surfaces (D_{3c}MFS) indices, were measured and caries was scored at the dentinal level of involvement. WHO criteria[9] were used for recording caries at the level of cavitation into dentine (cavitation level). A ball tipped CPITN probe was used to remove plaque and to help confirm diagnosis of cavitation. These criteria allow historical comparison with the previous survey of adult oral health in the Republic of Ireland (RoI) conducted in 1989/'90. In this study, caries visible into dentine, which had not cavitated but appeared as a definite shadow under the enamel (visual caries), was coded differently to cavitated caries. This approach allows the data to be analysed either without visual caries (historical method used in earlier surveys) or with visual caries (method currently used in UK and NI[10]). In this report, the notation 'cavitated' (D_{3c}MFT) and 'visual' (D_{3vc}MFT) caries will be used to indicate the level at which the data are presented.

2.10.12 Treatment needs

This is treatment need as predicted by the clinical examiner using his/her own judgment.

2.10.13 Root caries

Whether roots were exposed and the presence of caries or restorations on roots was recorded. Need for treatment of exposed roots was also recorded.

2.10.14 General questionnaire

The general questionnaire was completed by the examiner or recorder (Appendix 12a and 12b). Questions were asked regarding oral health knowledge, attitudes and behaviour, and to ascertain the perceived availability, accessibility and acceptability of services. The subjects were asked the questions verbally and the relevant code(s) were recorded in the appropriate column of the questionnaire by the examiner/recorder. Separate questionnaires were used for dentate subjects (Appendix 12a) and edentulous subjects (Appendix 12b). The questionnaires incorporated a measure of oral health related quality of life (OHQol-UK(W)[©]).

2.10.15 Social class

On completion of the general questionnaire, the interviewer classified the subject's occupation using the standard Occupational Classification handbook of the Office of Population Censuses and Surveys, UK.

2.10.16 Years exposure to water fluoridation

This was calculated by determining the fluoridation status of the respondent's current and previous water supplies, and entering the number of years over which the respondent consumed fluoridated water in their domestic supply.

2.11 Data processing

All clinical data were either entered directly onto a computer at the time of examination or on paper. Data from the paper records and the questionnaires were double-entered and cross-checked for validity. The data were then analysed and weighted using SAS.

2.12 Response rate

The survey targeted three age groups: 16-24, 35-44 and 65+. From the 2002 census, 40% of the population was in these age groups. However, the national household age mix is an unknown factor, as is the expected proportion of households with at least one member in these age groups. It was up to households to respond if they wanted no further contact, otherwise telephone contact was attempted or, where a phone number could not be found, the team visited the address in person. The complexity of the approach renders the generation of a precise response rate difficult. Depending on the assumptions made, a conservative estimate of the response rate is between 27% and 39%. Thus the response rate was low, however the profile of the sample in terms of household size was similar to the general population and the sample was stratified according to age and medical card ownership. Subsequent weighting for gender and medical card ownership ensured the representativeness of the results as far as possible.

2.13 Description of sample examined

As described in Section 2.3, the sample was weighted to overcome non response bias and to ensure representativeness. The actual numbers examined according to age group and health board region (for those regions that examined a representative sample) are presented by gender in Table 2.1, by

medical card status in Table 2.2, by fluoridation status in Table 2.3 and by the American Society of Anesthesiologists' (ASA) health status classification in Table 2.4.

In total, 2,888 adults participated in the survey; more females (58.1%) than males (41.9%) were examined (Table 2.1). The greatest response was in the 16-24 year-old group. The pattern of response was similar in all health board regions.

Table 2.1 Number and percent of adults examined according to age, gender and health board
Base: Dentate and Edentulous

	Male		Female		Total
16-24 year-olds	**n**	**%**	**n**	**%**	**n**
National	511	42.7	685	57.3	1196
EHRA	114	40.7	166	59.3	280
MWHB	137	42.5	185	57.5	322
NEHB	92	45.3	111	54.7	203
SHB	78	43.8	100	56.2	178
35-44 year-olds	**n**	**%**	**n**	**%**	**n**
National	367	37.5	611	62.5	978
EHRA	97	39.4	149	60.6	246
MWHB	85	35.6	154	64.4	239
NEHB	55	38.7	87	61.3	142
SHB	60	40.3	89	59.7	149
65+ year-olds	**n**	**%**	**n**	**%**	**n**
National	331	46.4	383	53.6	714
EHRA	73	46.2	85	53.8	158
MWHB	59	45.4	71	54.6	130
NEHB	46	42.2	63	57.8	109
SHB	66	48.2	71	51.8	137
Total	**n**	**%**	**n**	**%**	**n**
National	1209	41.9	1679	58.1	2888
EHRA	284	41.5	400	58.5	684
MWHB	281	40.7	410	59.3	691
NEHB	193	42.5	261	57.5	454
SHB	204	44.0	260	56.0	464

Adults were asked whether they had a medical card. Of the total sample of 2,888 adults in the survey, medical card information was available for 2,839 (916 + 1,923) (Table 2.2). Of these, 32.3% had medical cards: 22.2% of 16-24 year-olds and 20.6% of 35-44 year-olds had medical cards, this increased to 65.3% for those aged 65 and over.

Table 2.2 Number and percent of adults examined according to age, medical card status and health board
Base: Dentate and Edentulous

	Medical Card Holders		Non Medical Card Holders	
16-24 year-olds	**n**	**%**	**n**	**%**
National	263	22.2	920	77.8
EHRA	56	20.1	222	79.9
MWHB	71	22.5	244	77.5
NEHB	54	26.6	149	73.4
SHB	21	11.9	156	88.1

	Medical Card Holders		Non Medical Card Holders	
35-44 year-olds	n	%	n	%
National	197	20.6	761	79.4
EHRA	51	20.8	194	79.2
MWHB	43	19.0	183	81.0
NEHB	22	15.5	120	84.5
SHB	26	17.8	120	82.2
65+ year-olds	n	%	n	%
National	456	65.3	242	34.7
EHRA	81	51.6	76	48.4
MWHB	79	65.8	41	34.2
NEHB	75	70.1	32	29.9
SHB	84	62.7	50	37.3
Total	n	%	n	%
National	916	32.3	1923	67.7
EHRA	188	27.6	492	72.4
MWHB	193	29.2	468	70.8
NEHB	151	33.4	301	66.6
SHB	131	28.7	326	71.3

Of the total sample of 2,888 adults, fluoridation status was available for 2,845 (632 + 1057 + 1156) (Table 2.3), of these 22.2% were classified as 'Non' fluoridated, 37.2% as 'Part' and 40.6% were classified as 'Full' Fluoridation Status. When the sample was broken down by age group and fluoridation status within health board, the numbers per cell were quite small. This may be explained by the difficulty in finding adults in the target age groups and fluoridation categories in some areas. For example, the vast majority of the EHRA region is fluoridated; hence it was very difficult to find adults in the region with no exposure to domestic water fluoridation.

Table 2.3 Number and percent of adults examined according to age, fluoridation status and health board
Base: Dentate and Edentulous

	Non		Part		Full	
16-24 year-olds	n	%	n	%	n	%
National	314	26.5	265	22.4	605	51.1
EHRA	4	1.4	47	16.9	227	81.7
MWHB	140	44.6	67	21.3	107	34.1
NEHB	70	34.5	66	32.5	67	33.0
SHB	32	18.1	19	10.7	126	71.2
35-44 year-olds	n	%	n	%	n	%
National	176	18.3	492	51.0	296	30.7
EHRA	1	0.4	71	29.1	172	70.5
MWHB	70	30.8	109	48.0	48	21.1
NEHB	33	23.2	102	71.8	7	4.9
SHB	13	8.7	79	53.0	57	38.3
65+ year-olds	n	%	n	%	n	%
National	142	20.4	300	43.0	255	36.6
EHRA	1	0.6	40	25.6	115	73.7
MWHB	40	33.6	33	27.7	46	38.7
NEHB	45	42.1	58	54.2	4	3.7
SHB	16	11.8	62	45.6	58	42.6

Total	n	%	n	%	n	%
National	632	22.2	1057	37.2	1156	40.6
EHRA	6	0.9	158	23.3	514	75.8
MWHB	250	37.9	209	31.7	201	30.5
NEHB	148	32.7	226	50.0	78	17.3
SHB	61	13.2	160	34.6	241	52.2

The majority of adults examined were classified as having good general health (ASA 1) (Table 2.4). This percentage was highest in the 16-24 year-old group at 95.3%, followed by the 35-44 year-old group with 93.7% healthy. Among the over 65s, just 65.0% were classified as ASA 1 or 'Healthy'. Just one person in the sample had a life-threatening disease (ASA 4); this was an older adult examined in the SHB region. Overall, the Mid-Western region had the highest proportion of adults who had mild or moderate systemic disease.

Table 2.4 Number and percent of adults examined according to age, general health status (ASA classification) and health board
Base: Dentate and Edentulous

	Healthy (ASA 1)		Mild to Moderate Disease (ASA 2)		Severe Disease (ASA 3)		Life - Threatening Disease (ASA 4)	
16-24 year-olds	n	%	n	%	n	%	n	%
National	1140	95.3	51	4.3	5	0.4	0	0.0
EHRA	267	95.4	13	4.6	0	0.0	0	0.0
MWHB	296	91.9	22	6.8	4	1.2	0	0.0
NEHB	200	98.5	3	1.5	0	0.0	0	0.0
SHB	175	98.3	3	1.7	0	0.0	0	0.0
35-44 year-olds	n	%	n	%	n	%	n	%
National	916	93.7	57	5.8	5	0.5	0	0.0
EHRA	223	90.7	19	7.7	4	1.6	0	0.0
MWHB	219	91.6	19	7.9	1	0.4	0	0.0
NEHB	138	97.2	4	2.8	0	0.0	0	0.0
SHB	145	97.3	4	2.7	0	0.0	0	0.0
65+ year-olds	n	%	n	%	n	%	n	%
National	464	65.0	206	28.9	43	6.0	1	0.1
EHRA	107	67.7	40	25.3	11	7.0	0	0.0
MWHB	68	52.3	54	41.5	8	6.2	0	0.0
NEHB	67	61.5	37	33.9	5	4.6	0	0.0
SHB	90	65.7	41	29.9	5	3.6	1	0.7
Total	n	%	n	%	n	%	n	%
National	2520	87.3	314	10.9	53	1.8	1	0.0
EHRA	597	87.3	72	10.5	15	2.2	0	0.0
MWHB	583	84.4	95	13.7	13	1.9	0	0.0
NEHB	405	89.2	44	9.7	5	1.1	0	0.0
SHB	410	88.4	48	10.3	5	1.1	1	0.2

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Chapter 3
Tooth Loss, Number of Natural Teeth Present and Denture Wearing

3.1 Summary

- The goals for the year 2000, set by the Dental Health Action Plan[1] in 1994, have been reached at the national level for all adult age groups.
- Edentulousness has fallen dramatically since 1979. The decline was slower between 1989/'90 and 2000/'02 than between 1979 and 1989/'90.
- One percent of 35-44 year-olds were edentulous in 2000/'02.
- In 2000/'02, more women than men aged 65+ were edentulous, but this gender difference had almost disappeared in the 16-24 and 35-44 year-old groups between 1989/'90 and 2000/'02.
- Gender differences in number of teeth present decreased both for the less well off (medical card holders) and the rest of the population.
- Adults with systemic disease had higher levels of edentulousness and fewer teeth than those without systemic disease.
- There was an increase in the number of teeth retained by all age groups between 1989/'90 and 2000/'02.
- Age and gender had a statistically significant impact on number of teeth present for all age groups; older adults had fewer teeth, and women had fewer teeth than men.
- Ownership of a medical card was statistically significantly associated with fewer teeth among 35-44 year-olds and 65+ year-olds.
- Exposure to domestic water fluoridation had a statistically significant impact on the number of teeth present among 35-44 year-olds in 2000/'02. Those in the part fluoride and full fluoride groups were more likely to have more teeth than those in the non fluoridated groups.
- Retention of more than 20 natural teeth is equated with a reasonable level of oral health. The percentage of 35-44 year-olds with more than 20 natural teeth increased substantially between 1989/'90 and 2000/'02, from 68.2% to 90.7% for males and from 58.3% to 88.8% for females.
- Water fluoridation had an important positive effect on the percentage of adults with 18 or more sound untreated natural teeth (18+ SUNT): 25.2% of 35-44 year-olds in the non fluoridated group and 47.0% of the full fluoridated group had 18+ SUNT.
- Comparing the Republic of Ireland (RoI) with England, Scotland, Wales and Northern Ireland[2], adults aged 65 and over in England had the most teeth (17.6), and those in Ireland had the least (14.3).
- More dentate adults aged 16-24 and 35-44 in England and in RoI had 18+ SUNT than in the other UK countries.
- The wearing of all types of dentures has decreased for 35-44 year-olds. In 2000/'02, 83.6% of 35-44 year-olds did not wear a denture compared to 68.0% in 1989/'90.
- Wearing full dentures in either or both arches has changed little amongst the 65+ age group.
- More older adults were wearing dentures in 2000/'02: The increase is due to an increase in the number wearing partial dentures; also, more edentulous adults were wearing dentures in 2000/'02 than in 1989/'90.
- Amongst those aged 65 years and over with no natural teeth, 6.0% had no dentures in 2000/'02; this was an improvement over 1989/'90 when 21.4% had no dentures.
- Some 47.7% of older edentulous adults were wearing dentures that were too old (i.e. at least 10 years old).
- A high proportion of adults aged 65+ (40.8%) were dissatisfied with their dentures.
- Clinical examination revealed that, of those wearing partial dentures, the dentures were adversely affecting the surrounding tissues in over one third of wearers. The source of partial denture trauma to oral soft tissues warrants investigation to enable improvement of this situation.

3.2 Introduction

The Dental Health Action Plan[1], which was published following the launch of the Irish health strategy in 1994, set out goals for oral health for the year 2000. The goals for adults were:

(1) For those aged 65 years and over, no more than 42% should have no natural teeth.

(2) No more than 2% of 35-44 year-olds should have no natural teeth.

(3) For 16-24 year-olds, the average number of teeth present should be at least 27.7.

Increased retention of teeth, and reduction in the levels of total tooth loss, are important goals for the population because of the role of natural teeth in basic functions of daily living such as eating, speaking, laughing and smiling. Research suggests that where teeth are lost, there may be a significant effect on diet, nutrition, general well-being[3] and quality of life[4].

In this chapter, the levels of three dental parameters amongst Irish adults are presented:

(1) total loss of natural teeth (edentulousness);

(2) number of natural teeth present, as measured by
- the percentage frequency distribution of number of natural teeth
- the mean number of natural teeth
- the percentage of adults in possession of more than 20 natural teeth
- the percentage of adults in possession of 18 or more sound, untreated, untraumatised natural teeth;

(3) wearing of dentures, as measured by
- the percentage of dentate and edentulous (toothless) adults wearing any full or partial denture according to denture type
- the proportion of those wearing partial dentures whose denture is adversely affecting the oral mucosa.

The results are weighted for gender, fluoridation status, medical card status and health board as these are factors which may affect the mean values presented. Each of the conditions will be presented for the country as a whole and for each of the four health board regions where the sample size was sufficient to allow for reporting at health board level. Larger samples were drawn for the following health board regions: the then Eastern Health Board region (EHB), MWHB, NEHB and SHB. The results will be presented according to age group and will be broken down by gender, possession of a medical card, fluoridation status, geographic location and general health status. The findings will be compared with those of the previous national survey of adult oral health, which was conducted in 1989/'90[5], and from which oral health data are available for the country as a whole and the EHB region. The results will also be compared with the results of an interview survey carried out in 1979, where reported levels of edentulousness were recorded[6]. International comparisons will be made where appropriate.

3.3 Total loss of natural teeth - edentulousness

The percentage of adults who were edentulous (that is, who had no natural teeth present) in 2000/'02 increased with age in both males and females (Table 3.1). Overall, 40.9% of the 65+ age group were edentulous. The 1994 Dental Health Action Plan set a goal that no more than 42% of those aged 65 years and over would have no natural teeth by the year 2000. However, more females than males were edentulous in the 65+ age group (45.6% vs. 34.6%). Thus, although the figure for males was within the goal, the figure for females was higher than the target. In the 16-24 age group the percentage of adults found to be edentulous was zero, and in the 35-44 age group it was 0.9%. Overall the goal for 35-44 year-olds of "no more than 2% should have no natural teeth" was achieved.

Table 3.1 Percentage of adults who were edentulous by age group, gender, year of examination and health board

Base: Dentate and Edentulous

16-24 year-olds	Male	Female	Total
National 2000/'02	0.0	0.0	0.0
National 1989/'90	0	0	0
National 1979	0	0	0
ERHA 2000/'02	0.0	0.0	0.0
MWHB 2000/'02	0.0	0.0	0.0

16-24 year-olds	Male	Female	Total
NEHB 2000/'02	0.0	0.0	0.0
SHB 2000/'02	0.0	0.0	0.0
EHB 1989/'90	0.0	0.0	0.0

35-44 year-olds	Male	Female	Total
National 2000/'02	1.0	0.9	0.9
National 1989/'90	3	5	4
National 1979	10	15	12
ERHA 2000/'02	0.0	1.2	0.6
MWHB 2000/'02	1.3	1.3	1.3
NEHB 2000/'02	2.3	0.0	1.2
SHB 2000/'02	0.0	0.0	0.0
EHB 1989/'90	4.4	2.4	3.3

65+ year-olds	Male	Female	Total
National 2000/'02	34.6	45.6	40.9
National 1989/'90	33	61	48
National 1979	64	79	72
ERHA 2000/'02	38.7	49.8	45.2
MWHB 2000/'02	37.8	44.0	41.3
NEHB 2000/'02	34.8	51.6	44.7
SHB 2000/'02	37.6	54.5	47.1
EHB 1989/'90	24.1	44.4	35.4

Comparing these figures with those reported in 1979[6] and 1989/'90[5], it can be seen that overall there has been a considerable decline in levels of edentulousness. Levels of edentulousness were similarly low for 35-44 year-old males (1.0%) and females (0.9%) in 2000/'02. This contrasts with the findings of the 1989/'90 survey when 3% of males and 5% of females in this age group were found to be edentulous. In those aged 65 years and over, the percentage of adults who were edentulous declined from 72% to 48% between 1979 and 1989/'90 and had fallen to 40.9% by 2000/'02. Edentulousness was still higher for females than males aged 65 years and over (45.6% vs. 34.6%). The difference in reported levels of edentulousness between females and males in the 65+ age group was 15% in 1979. In 1989/'90, the difference, based on clinical exam, between females and males was 28%. In 2000/'02, this difference had decreased to 11%. Thus, the gender gap in terms of edentulousness has decreased in the 65+ age group.

There was little regional variation in levels of edentulousness among 35-44 year-olds. For those aged 65 years and over, the MWHB region had the lowest (41.3%) and the SHB region had the highest (47.1%) levels of edentulousness. The levels of edentulousness for this age group in the EHB region increased between 1989/'90 and 2000/'02 from 35.4% to 45.2%. The figures for this age group reported for the EHB region were markedly different to those reported for the country as a whole in 1989/'90, whereas the 2000/'02 figures were in line with national data. No such anomalies appeared in the data for the younger age group. The levels of edentulousness in the ERHA (45.2%), NEHB (44.7%) and SHB (47.1%) regions were still greater than the national goal set for 2000 in the Dental Health Action Plan (42%).

3.3.1 Percentage of adults who were edentulous by gender and medical card status

Table 3.2 presents the percentage of adults who were edentulous according to age, gender and medical card status in 1989/'90 and in 2000/'02.

Table 3.2 Percentage of adults who were edentulous by age group, gender and medical card status in 1989/'90 and in 2000/'02

Base: Dentate and Edentulous

	Medical Card Holders					
	Male		Female		Total	
	1989/'90	2000/'02	1989/'90	2000/'02	1989/'90	2000/'02
16-24 year-olds	0.0	0.0	0.0	0.0	0.0	0.0
35-44 year-olds	3.2	1.2	7.8	1.5	6.3	1.4
65+ year-olds	48.2	40.1	72.2	49.2	62.2	45.6

	Non Medical Card Holders					
	Male		Female		Total	
	1989/'90	2000/'02	1989/'90	2000/'02	1989/'90	2000/'02
16-24 year-olds	0.0	0.0	0.0	0.0	0.0	0.0
35-44 year-olds	2.7	0.1	3.4	0.7	3.4	0.4
65+ year-olds	17.0	23.9	42.9	35.2	30.8	29.4

In 2000/'02, the percentage of adults who were edentulous was considerably higher among medical card holders, for both males and females. In the 35-44 year-old group, 1.2% of male and 1.5% of female medical card holders were edentulous compared with 0.1% of male and 0.7% of female non medical card holders (Table 3.2).

In the 65+ age group, the difference due to medical card status seems to be more pronounced. For example, 40.1% of male and 49.2% of female medical card holders were edentulous compared to 23.9% of male and 35.2% of female non medical card holders.

Looking at the change in levels of tooth loss among those aged 65 years and over, the levels of edentulousness among male and female medical card holders and female non medical card holders in 2000/'02 is lower than that in 1989/'90. However, the level of edentulousness reported for male non medical card holders is higher in 2000/'02 (23.9%) than in 1989/'90 (17.0%). It should be remembered that due to changes in the Irish economy between the times of the two surveys, the profile of adults without a medical card might have altered.

Medical card ownership is used as a surrogate for disadvantage in this study. However, in the 65+ age group its use is of questionable validity since everybody aged 70 years and over have been eligible for a medical card on application to their local health board since July 1st 2001. The clinical examinations of 84 adults aged 70 years and over (comprising 12% of the entire elderly sample and 20% of the 70+ sample) took place after this date (Table 3.3). Whilst before July 1st 2001, 70.0% of those aged 70 years and over examined held medical cards, after this date 96.4% held medical cards. This must be kept in mind when interpreting the results for the 65+ age group.

Table 3.3 Number and percentage of adults aged 70+ examined before and after 1st July 2001 by medical card ownership and gender

	Examined *before* 1st July 2001			Examined *after* 1st July 2001		
	Male	Female	Total	Male	Female	Total
Medical Card Holder	97	120	**217**	32	49	**81**
	63.4%	76.4%	**70.0%**	94.1%	98.0%	**96.4%**
Non Medical Card Holder	56	37	**93**	2	1	**3**
	36.6%	23.6%	**30.0%**	5.9%	2.0%	**3.6%**
Total	153	157	**310**	34	50	**84**
	100%	100%	**100%**	100%	100%	**100%**

3.3.2 Percentage of adults who were edentulous by fluoridation status

In the non fluoridated group, adults had less than one year exposure to domestic water fluoridation. In the part fluoridated group, they had more than one year but less than 35 years exposure. In the full fluoridated group, 16-24 year-olds had a lifetime exposure to fluoridation, and 35-44 year-olds and 65+ year-olds had at least 35 years exposure. Water fluoridation commenced in Dublin in 1964, 36 years

before the fieldwork commenced in 2000. Table 3.4 presents the percentage of adults examined in the survey who had no natural teeth according to their exposure to water fluoridation.

Table 3.4 Percentage of adults who were edentulous by age group and fluoridation status in 1989/'90 and in 2000/'02

Base: Dentate and Edentulous

	Fluoridation status					
	Non		Part		Full	
	1989/'90	2000/'02	1989/'90	2000/'02	1989/'90	2000/'02
16-24 year-olds	0.0	0.0	0.0	0.0	0.0	0.0
35-44 year-olds	6.1	1.2	4.5	1.3	2.4	0.3
65+ year-olds	54.2	41.5	45.6	39.2	42.3	41.8

The secular decline in edentulousness is seen in the decrease in the prevalence of edentulousness among those in the non fluoridated and full fluoridated 35-44 and 65+ age groups. Among the non fluoridated groups, edentulousness decreased from 6.1% to 1.2% among 35-44 year-olds and from 54.2% to 41.5% among the 65+ age group between 1989/'90 and 2000/'02. The decline among the part fluoridated 65+ age group was less (from 45.6% to 39.2%), although this group continues to have lower levels of edentulousness than the non fluoridated group. Among the 35-44 year-old full fluoridated group, edentulousness declined from 2.4% to 0.3%. Interestingly, there appeared to be little decline in levels of edentulousness amongst those in the 65+ full fluoridated group (from 42.3% to 41.8%), whilst levels of edentulousness in the non fluoridated group brought them into line with those with 35 years exposure to domestic water fluoridation. This finding is unexpected and warrants further investigation given that the levels of edentulousness continued to decline in the full fluoridated groups in the other age groups.

As almost half of the population of Ireland reside in the ERHA region, changes in edentulousness in that region have a major impact on national figures. Data for the EHB region are presented alongside those for the other health boards (OHB) for 2000/'02 and 1989/'90 in Table 3.5.

Table 3.5 Number of adults examined, and percent edentulous by age group and fluoridation status in the EHB region and other health boards (OHB) in 1989/'90 and 2000/'02

Base: Dentate and Edentulous

		Non				Part				Full			
		EHB		OHB		EHB		OHB		EHB		OHB	
		n	%	n	%	n	%	n	%	n	%	n	%
1989/'90	16-24	2	*	99	0.0	9	*	63	0.0	136	0.0	91	0.0
	35-44	1	*	97	6.2	10	*	147	4.1	140	2.9	24	*
	65+	4	*	103	54.4	2	*	55	47.3	59	35.6	19	*
2000/'02	16-24	4	*	310	0.0	47	0.0	218	0.0	227	0.0	378	0.0
	35-44	1	*	175	1.2	71	1.2	419	1.4	172	0.4	124	0.0
	65+	1	*	141	42.0	40	48.7	260	36.8	115	44.2	140	38.0

* n < 30

When the change in edentulousness over time is reviewed separately for the EHB region and the rest of the country (OHB), it is clear that the level of edentulousness among adults in the OHB decreased between 1989/'90 and 2000/'02. Given the general increase in tooth retention, this pattern of change is as expected. Also, in the OHB regions in 2000/'02, the level of edentulousness is lower among the full fluoride 35-44 and 65+ age groups when compared with those in the non fluoride groups. For 65+ year-olds in the EHB region, there appears to have been an increase from 35.6% to 44.2% edentulous in the full fluoride group. This change is difficult to explain, but must be viewed in the context of the national picture and the reduction from 2.9% to 0.4% edentulous in the 35-44 year-old EHB fully fluoridated region.

When looking at differences according to fluoridation status for the 65+ age group, it is important to remember that in 2000/'02 this age group would have been more than 27 years old when water fluoridation commenced in 1964. Thus, much of their decay and tooth loss may have already taken place prior to the introduction of fluoridation. Those adults in the 65+ age group who were examined

in 1989/'90 were at least 40 years old when fluoridation commenced in 1964. Clearly, in that era of very high levels of caries and tooth loss, it is likely that a high proportion of adults in the 65+ age group would have been edentulous or nearly edentulous prior to the introduction of water fluoridation. In 1961/'63, the average 15-year-old had on average eight decayed, missing or filled teeth. Thus, data for this 65+ age group is of limited use when determining the impact of water fluoridation. Future monitoring of the difference in oral health between adults who have been lifetime recipients of water fluoridation and those with no water fluoridation will be important to quantify the benefit of fluoride to the oral health of older adults. At the time of this survey, fluoridation had been in place for 36-38 years in those areas that were fluoridated in 1964.

3.3.3 Percentage of adults who were edentulous by general health status

Table 3.6 Number of adults, and the percentage who were edentulous, by age group and general health status (ASA)

Base: Dentate and Edentulous

Age Group	ASA 1		ASA 2		ASA 3		ASA 4		Total	
	n	% Edent	n	% Edent	n	% Edent	n	% Edent	n	% Edent
16-24	1139	0.0	50	0.0	5	*	0	*	1194	0.0
35-44	914	0.8	57	2.9	5	*	0	*	976	0.9
65+	464	35.1	206	53.8	43	47.7	1	*	714	40.9

* n < 30

Oral health is part of general health and the association between oral health and general health is of interest. In those adults aged 65+ classified as healthy without systemic disease (ASA 1), the percentage edentulous was 35.1%. In the same age group, the percentage of adults with no natural teeth was higher at 53.8% among those having mild to moderate systemic disease (ASA 2) and it was 47.7% in those classified as having severe systemic disease that limits activity but is not incapacitating (ASA 3) (Table 3.6). A similar trend was seen in the 35-44 year-old group. Thus, adults with systemic disease have higher levels of edentulousness than those without systemic disease. The information presented would support the inclusion of oral health promotion in integrated care plans for those with systemic disease.

3.4 Distribution of adults according to the number of natural teeth present

The prevalence of edentulousness is described in the previous section; this section focuses on the number of teeth present. Adults may have up to 32 teeth and the number of teeth present is an indicator of the integrity of the dentition. Those with less than 32 teeth may have congenitally missing teeth, the third molars or wisdom teeth are the most commonly missing. Alternatively, they may have had teeth extracted because of overcrowding or impaction. If the third molars were missing they could have a perfectly healthy dentition with 28 teeth. If four teeth were extracted for orthodontic reasons, they could also have a healthy dentition with 28 teeth. In the event of having both orthodontic extractions and missing third molars (a less likely scenario) adults would be expected to have 24 teeth. Thus, the presence of 28-32 teeth suggests an intact dentition. Whilst those with fewer teeth may have an intact dentition, the presence of less than 28 teeth is in many cases associated with undesirable tooth loss. The presence of 20 teeth in functional occlusion (i.e. biting against or in contact with opposing teeth) is thought to be sufficient to enable good oral function. In the tables that follow, the percentage frequency distribution of adults according to the number of natural teeth in their mouths is given for 0-32 teeth for the national sample and for each of the four health boards where the sample size allows. Figures illustrating the percentage frequency distributions show the national data according to fluoridation status. The numbers of teeth present are clustered in these figures: For all age groups, the percentage with 0-5, 6-10, 11-20, 21-24, 25-28 and 29-32 teeth are shown.

3.4.1 Percentage frequency distribution of adults according to the number of natural teeth present by age group, gender and health board region

Tooth loss is less common among 16-24 year-olds as seen in the percentage frequency distributions of adults by the number of teeth present. Nobody in this age group had less than 18 teeth. Almost all (99.8%) had more than 20 teeth. The modal number of teeth present was 28 (41.3%) (Table 3.7a). Just 8.8% had all 32 teeth in this age group, however over three quarters (75.2%) of 16-24 year-olds had 28 teeth or more. There was a tendency for males to have more teeth than females, for example 78.7% of males and 71.7% of females had at least 28 teeth. There was a similar pattern in the health board regions for this age group (Tables 3.7b to 3.7e). Comparing between health board regions, 16-

24 year-olds in the SHB region had more teeth than 16-24 year-olds in the other three healthboards: 81.1% had at least 28 teeth. In contrast to the national trend and the trend in the other health board regions, more females than males in the SHB region had at least 28 teeth (83.5% vs. 79.0%). The gender differences in this age group were greatest in the NEHB region, where 78.0% of males and 65.6% of females had 28 teeth or more.

Numbers of teeth present were lower among the 35-44 year-old group: the modal number of teeth present was 28 (17.4%). Forty percent had 28 or more teeth. One in ten (10.2%) had less than 20 teeth. Among the health board regions, the percentages of 35-44 year-olds with 28 teeth or more in the ERHA, MWHB, NEHB and SHB regions respectively were 50.3%, 31.8%, 42.3% and 33.0%. Thus, one in two 35-44 year-olds in the ERHA region had almost the full complement of teeth compared with less than one in three in the MWHB region. At the lower end of the spectrum, there was also wide variation in the proportion with less than 20 teeth: In the ERHA, MWHB, NEHB and SHB regions, the percentages were 5.6%, 10.9%, 5.8% and 15.1% respectively, with the ERHA region having the lowest percentage and the SHB region the highest. There were gender differences in the proportion of 35-44 year-olds with less than 20 teeth, and it was more common for females to have less teeth. The greatest difference was found in the MWHB region, where 5.5% of males and 16.8% of females had less than 20 teeth.

Within the 65+ age group, the most common number of teeth is 0 (41.0%). There is wide variation in the percent of this age group with one or more teeth; more males had higher numbers of teeth than females. Only 2.5% of this age group had 28 or more teeth; 83.3% had less than 20 teeth. The pattern of the distribution of adults by number of teeth was similar amongst the health board regions for this age group.

Table 3.7a Percentage frequency distribution of adults according to the number of teeth present by age group and gender – National data 2000/'02

Base: Dentate and Edentulous

National	16-24 year-olds			35-44 year-olds			65+ year-olds*		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
0	0.0	0.0	0.0	1.0	0.9	0.9	34.7	45.8	41.0
1	0.0	0.0	0.0	0.0	0.3	0.1	1.8	1.2	1.5
2	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.8	1.1
3	0.0	0.0	0.0	0.1	0.0	0.1	0.7	1.1	0.9
4	0.0	0.0	0.0	0.0	0.1	0.0	2.0	1.9	1.9
5	0.0	0.0	0.0	0.2	0.0	0.1	2.2	1.4	1.7
6	0.0	0.0	0.0	0.5	0.4	0.5	3.2	4.4	3.9
7	0.0	0.0	0.0	0.7	0.0	0.3	2.2	3.2	2.8
8	0.0	0.0	0.0	0.0	0.1	0.0	1.1	2.6	1.9
9	0.0	0.0	0.0	0.3	0.4	0.3	1.2	4.7	3.2
10	0.0	0.0	0.0	0.0	0.8	0.4	3.7	1.2	2.3
11	0.0	0.0	0.0	0.0	0.2	0.1	0.8	2.2	1.6
12	0.0	0.0	0.0	0.3	0.1	0.2	2.6	1.2	1.8
13	0.0	0.0	0.0	1.0	0.0	0.5	3.1	1.3	2.1
14	0.0	0.0	0.0	0.7	1.4	1.0	2.2	2.1	2.1
15	0.0	0.0	0.0	0.0	0.9	0.5	2.2	2.7	2.5
16	0.0	0.0	0.0	0.6	0.4	0.5	4.0	1.3	2.5
17	0.0	0.0	0.0	1.1	1.7	1.4	4.6	3.0	3.7
18	0.0	0.3	0.2	2.2	1.6	1.9	3.5	2.3	2.8
19	0.0	0.0	0.0	0.8	1.9	1.4	1.9	2.2	2.0
20	0.0	0.0	0.0	3.3	1.8	2.6	5.4	1.8	3.4
21	0.0	0.4	0.2	4.9	2.4	3.7	2.9	2.0	2.4
22	1.1	0.5	0.8	3.0	5.3	4.2	0.9	1.9	1.5
23	0.6	0.6	0.6	3.5	3.2	3.4	2.8	1.6	2.1
24	1.5	6.1	3.8	8.8	8.2	8.5	2.0	3.2	2.7
25	2.7	3.2	2.9	6.9	6.5	6.7	1.3	0.4	0.8
26	5.0	9.1	7.0	8.4	11.4	9.9	1.3	0.1	0.6
27	10.4	8.2	9.3	8.7	13.3	11.1	1.2	0.2	0.7

National	16-24 year-olds			35-44 year-olds			65+ year-olds*		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
28	42.0	40.5	41.3	18.7	16.0	17.4	1.1	2.2	1.7
29	9.6	13.6	11.6	10.9	7.4	9.1	0.0	0.0	0.0
30	11.2	7.1	9.1	5.7	6.0	5.8	1.5	0.0	0.6
31	4.8	4.1	4.4	4.8	3.5	4.2	0.0	0.0	0.0
32	11.1	6.4	8.8	3.0	3.9	3.5	0.4	0.0	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Data for two subjects missing

Table 3.7b Percentage frequency distribution of adults according to the number of teeth present by age group and gender - ERHA data 2000/'02
Base: Dentate and Edentulous

ERHA	16-24 year-olds			35-44 year-olds			65+ year-olds*		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
0	0.0	0.0	0.0	0.0	1.2	0.6	38.7	50.2	45.5
1	0.0	0.0	0.0	0.0	0.5	0.3	1.7	2.3	2.1
2	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.9
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	1.7	2.3	2.1
5	0.0	0.0	0.0	0.0	0.0	0.0	2.2	1.4	1.7
6	0.0	0.0	0.0	1.2	0.0	0.6	1.7	6.4	4.5
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.8
8	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.7
9	0.0	0.0	0.0	0.0	0.0	0.0	1.7	7.9	5.4
10	0.0	0.0	0.0	0.0	0.7	0.4	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.8
12	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	1.2
13	0.0	0.0	0.0	0.0	0.0	0.0	2.2	1.9	2.0
14	0.0	0.0	0.0	0.5	0.5	0.5	1.7	0.0	0.7
15	0.0	0.0	0.0	0.0	0.0	0.0	1.1	2.3	1.8
16	0.0	0.0	0.0	0.0	0.0	0.0	9.0	0.0	3.7
17	0.0	0.0	0.0	0.5	1.2	0.9	5.6	2.7	3.9
18	0.0	0.6	0.3	1.2	1.4	1.3	6.7	3.7	4.9
19	0.0	0.0	0.0	0.0	1.9	1.0	1.7	4.2	3.2
20	0.0	0.0	0.0	1.7	0.0	0.8	5.4	1.0	2.8
21	0.0	0.0	0.0	2.3	2.2	2.2	1.1	2.3	1.8
22	0.0	0.6	0.3	4.0	6.7	5.4	1.1	1.0	1.0
23	0.0	0.0	0.0	0.0	3.6	1.9	2.8	1.0	1.7
24	0.0	6.1	3.1	10.8	7.7	9.2	1.1	4.6	3.2
25	3.8	2.9	3.3	4.3	5.8	5.1	0.0	0.0	0.0
26	6.6	10.1	8.3	6.3	11.0	8.7	1.1	0.0	0.4
27	11.3	9.3	10.3	8.7	13.0	10.9	2.8	0.0	1.2
28	33.6	41.8	37.7	24.6	19.4	21.9	0.0	1.9	1.1
29	14.3	13.6	13.9	15.5	7.9	11.6	0.0	0.0	0.0
30	11.1	5.3	8.2	5.8	6.5	6.2	2.2	0.0	0.9
31	7.1	2.9	5.0	7.3	4.8	6.1	0.0	0.0	0.0
32	12.4	6.7	9.6	5.2	3.9	4.5	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Data for one subject missing

Table 3.7c Percentage frequency distribution of adults according to the number of teeth present by age group and gender – MWHB data 2000/'02
Base: Dentate and Edentulous

MWHB	16-24 year-olds			35-44 year-olds			65+ year-olds		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
0	0.0	0.0	0.0	1.3	1.3	1.3	37.8	44.0	41.3
1	0.0	0.0	0.0	0.0	0.6	0.3	6.3	2.1	3.9
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	1.3	0.0	0.6	2.1	3.2	2.7
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MWHB	16-24 year-olds			35-44 year-olds			65+ year-olds		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
5	0.0	0.0	0.0	0.0	0.0	0.0	5.4	0.0	2.4
6	0.0	0.0	0.0	0.0	0.0	0.0	2.1	3.2	2.7
7	0.0	0.0	0.0	0.8	0.0	0.4	2.1	5.8	4.2
8	0.0	0.0	0.0	0.0	0.6	0.3	3.3	3.7	3.5
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4	4.1
10	0.0	0.0	0.0	0.0	1.5	0.7	2.5	1.0	1.7
11	0.0	0.0	0.0	0.0	1.4	0.7	0.0	3.7	2.0
12	0.0	0.0	0.0	0.0	0.0	0.0	4.2	1.6	2.7
13	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	1.5
14	0.0	0.0	0.0	1.3	2.0	1.6	2.5	2.6	2.6
15	0.0	0.0	0.0	0.0	1.4	0.7	4.5	4.2	4.4
16	0.0	0.0	0.0	0.0	0.6	0.3	1.2	3.2	2.3
17	0.0	0.0	0.0	0.0	3.5	1.7	0.0	3.2	1.8
18	0.0	0.0	0.0	0.0	2.0	1.0	3.3	0.0	1.5
19	0.0	0.0	0.0	0.8	1.9	1.3	0.0	1.0	0.6
20	0.0	0.0	0.0	3.8	2.1	3.0	1.2	3.7	2.6
21	0.0	0.0	0.0	1.3	3.4	2.3	2.5	0.0	1.1
22	0.0	0.5	0.2	4.6	5.5	5.0	2.5	0.0	1.1
23	0.5	0.6	0.5	6.7	3.2	5.0	2.1	1.0	1.5
24	4.5	6.5	5.4	14.0	7.0	10.6	2.1	3.2	2.7
25	1.6	2.2	1.9	8.4	10.2	9.3	5.8	0.0	2.6
26	5.7	9.3	7.4	12.5	10.5	11.5	0.0	1.0	0.6
27	8.2	9.4	8.8	10.5	10.4	10.4	1.2	0.0	0.5
28	46.7	40.7	43.9	10.5	15.0	12.7	0.0	1.0	0.6
29	6.3	5.8	6.1	15.6	8.9	12.3	0.0	0.0	0.0
30	12.3	10.0	11.2	3.8	4.5	4.1	2.1	0.0	0.9
31	4.0	6.5	5.2	0.8	0.6	0.7	0.0	0.0	0.0
32	10.2	8.5	9.4	2.1	1.9	2.0	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 3.7d Percentage frequency distribution of adults according to the number of teeth present by age group and gender – NEHB data 2000/'02
Base: Dentate and Edentulous

NEHB	16-24 year-olds			35-44 year-olds			65+ year-olds*		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
0	0.0	0.0	0.0	2.3	0.0	1.2	35.5	51.6	45.1
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	2.2	1.8	2.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.9
5	0.0	0.0	0.0	2.3	0.0	1.2	4.4	0.0	1.8
6	0.0	0.0	0.0	0.0	0.0	0.0	2.2	1.8	2.0
7	0.0	0.0	0.0	0.0	0.0	0.0	6.7	3.6	4.9
8	0.0	0.0	0.0	0.0	0.0	0.0	2.2	5.8	4.3
9	0.0	0.0	0.0	0.0	0.0	0.0	2.2	1.1	1.5
10	0.0	0.0	0.0	0.0	0.0	0.0	2.2	1.8	2.0
11	0.0	0.0	0.0	0.0	1.1	0.5	4.4	4.0	4.2
12	0.0	0.0	0.0	0.0	0.0	0.0	4.4	1.8	2.9
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	1.4	0.7	2.2	3.6	3.0
15	0.0	0.0	0.0	0.0	1.1	0.5	0.0	1.8	1.1
16	0.0	0.0	0.0	0.0	1.1	0.5	0.0	1.8	1.1
17	0.0	0.0	0.0	0.0	2.5	1.2	2.2	4.7	3.7
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

* Data for one subject missing

NEHB	16-24 year-olds			35-44 year-olds			65+ year-olds*		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	1.1
20	0.0	0.0	0.0	1.8	1.1	1.4	4.4	4.7	4.6
21	0.0	0.9	0.4	7.0	4.1	5.6	2.2	0.0	0.9
22	0.0	0.0	0.0	1.8	0.0	0.9	0.0	1.1	0.6
23	1.3	0.9	1.1	9.3	4.4	6.9	4.5	1.1	2.5
24	4.4	9.9	6.9	1.8	6.9	4.3	4.4	3.3	3.7
25	4.9	5.5	5.2	5.3	9.4	7.3	0.0	1.8	1.1
26	5.8	8.3	7.0	14.5	13.5	14.0	2.2	0.0	0.9
27	5.7	9.0	7.2	7.0	16.2	11.5	2.2	1.1	1.5
28	38.6	34.1	36.5	15.0	15.7	15.4	2.2	0.0	0.9
29	16.1	10.8	13.6	15.8	5.5	10.7	0.0	0.0	0.0
30	9.1	9.0	9.0	11.0	8.3	9.7	4.4	0.0	1.8
31	10.1	7.2	8.7	1.8	5.5	3.6	0.0	0.0	0.0
32	4.1	4.5	4.3	3.5	2.2	2.9	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Data for one subject missing

Table 3.7e Percentage frequency distribution of adults according to the number of teeth present by age group and gender – SHB data 2000/'02
Base: Dentate and Edentulous

SHB	16-24 year-olds			35-44 year-olds			65+ year-olds		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
0	0.0	0.0	0.0	0.0	0.0	0.0	37.6	54.5	47.1
1	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.8
2	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.5
3	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.6	2.2
4	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	1.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	1.4
6	0.0	0.0	0.0	0.0	1.1	0.5	1.8	5.9	4.1
7	0.0	0.0	0.0	1.7	0.0	0.9	3.6	1.6	2.5
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	1.9
9	0.0	0.0	0.0	1.7	2.6	2.1	1.8	3.3	2.6
10	0.0	0.0	0.0	0.0	1.1	0.5	4.8	5.9	5.4
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.5
12	0.0	0.0	0.0	1.7	0.0	0.9	5.9	1.6	3.5
13	0.0	0.0	0.0	1.7	0.0	0.9	1.8	0.9	1.3
14	0.0	0.0	0.0	0.0	2.6	1.3	1.2	0.9	1.0
15	0.0	0.0	0.0	0.0	2.6	1.3	1.8	0.9	1.3
16	0.0	0.0	0.0	2.6	0.0	1.3	1.2	0.0	0.5
17	0.0	0.0	0.0	1.3	1.1	1.2	5.4	0.9	2.9
18	0.0	0.0	0.0	3.1	2.6	2.8	1.2	1.6	1.4
19	0.0	0.0	0.0	1.7	1.1	1.4	1.8	0.9	1.3
20	0.0	0.0	0.0	1.7	2.6	2.1	5.9	1.6	3.5
21	0.0	0.0	0.0	3.5	1.1	2.3	3.5	1.6	2.5
22	0.0	1.7	0.8	1.7	3.2	2.5	2.3	2.6	2.5
23	1.3	0.0	0.7	4.8	1.1	2.9	3.0	3.3	3.2
24	3.0	5.0	4.0	7.0	6.8	6.9	3.0	0.9	1.8
25	2.5	0.8	1.7	4.8	2.6	3.7	0.0	0.0	0.0
26	6.7	4.8	5.8	16.1	15.1	15.6	0.0	0.0	0.0
27	7.5	4.2	5.9	12.2	19.6	15.9	0.0	0.9	0.5
28	46.1	54.6	50.2	14.0	14.9	14.4	3.0	1.6	2.2
29	5.0	14.3	9.5	6.5	4.3	5.4	0.0	0.0	0.0
30	9.0	7.0	8.0	6.5	6.2	6.4	1.2	0.0	0.5
31	3.8	1.7	2.8	5.2	1.1	3.2	0.0	0.0	0.0
32	15.1	5.9	10.6	0.0	7.2	3.6	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

3.4.2 Percentage frequency distribution of adults according to the number of natural teeth present by age group and medical card status

Using ownership of a medical card as a surrogate for disadvantage, there was little difference in the distribution of adults according to the number of teeth present in the 16-24 age group. In the 35-44 and 65+ age groups, there was a clear difference according to disadvantage in the proportion of adults with higher numbers of teeth. For example, among 35-44 year-olds, 47.9% of non medical card holders had 25-28 teeth compared with 31.8% of medical card holders. These figures were 23.8% and 19.0% respectively for 29-32 teeth: Medical card holders had fewer teeth. The pattern for those aged 65+ was similar.

Table 3.8 Percentage frequency distribution of adults according to the number of teeth present (0-5, 6-10, 11-20, 21-24, 25-28 and 29-32 teeth) by age group and medical card status - National data 2000/'02

Base: Dentate and Edentulous

Number of teeth	16-24 year-olds		35-44 year-olds		65+ year-olds	
	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No
0-5	0.0	0.0	2.5	0.4	52.6	37.1
6-10	0.0	0.0	1.2	1.4	15.6	10.6
11-20	0.2	0.2	18.8	8.4	22.1	30.6
21-24	4.3	5.7	26.8	18.5	6.8	13.2
25-28	62.8	59.9	31.8	47.9	2.3	7.0
29-32	32.7	34.3	19.0	23.8	0.5	1.6

3.4.3 Percentage frequency distribution of adults according to the number of natural teeth present by age group and fluoridation status

There was little difference in the distribution of 16-24 year-olds according to the number of teeth present by fluoridation status (Figure 3.1a): Tooth retention levels were very high in both fluoridated and non fluoridated groups. Many of the teeth lost in this age group may have been extracted for orthodontic reasons, or they may have been congenitally missing or unerupted third molar teeth.

Figure 3.1a Percentage frequency distribution of 16-24 year-olds according to the number of natural teeth present by fluoridation status

Base: Dentate and Edentulous
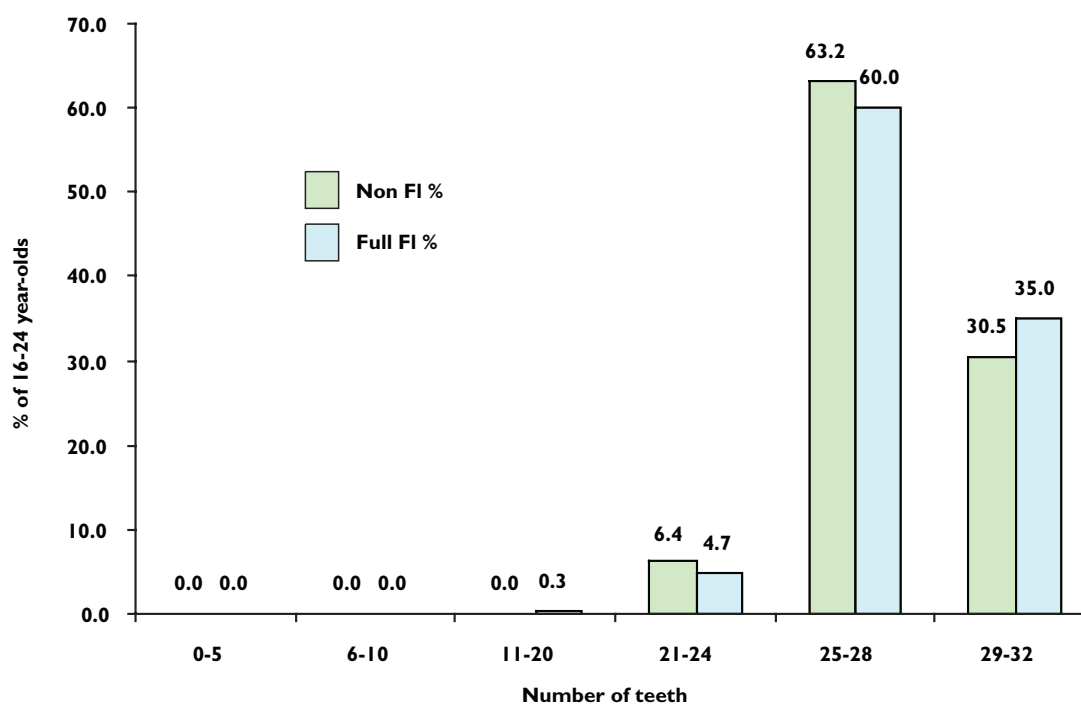
For the 35-44 year-old group (Figure 3.1b), those with water fluoridation had higher percentages with 25-28 teeth (45.7%) and 29-32 teeth (27.8%) than those in the non fluoridated group (31.9% and 17.6% respectively). Conversely, there were fewer adults in the fluoridated group who had less than 24 teeth.

Figure 3.1b Percentage frequency distribution of 35-44 year-olds according to the number of natural teeth present by fluoridation status

Base: Dentate and Edentulous
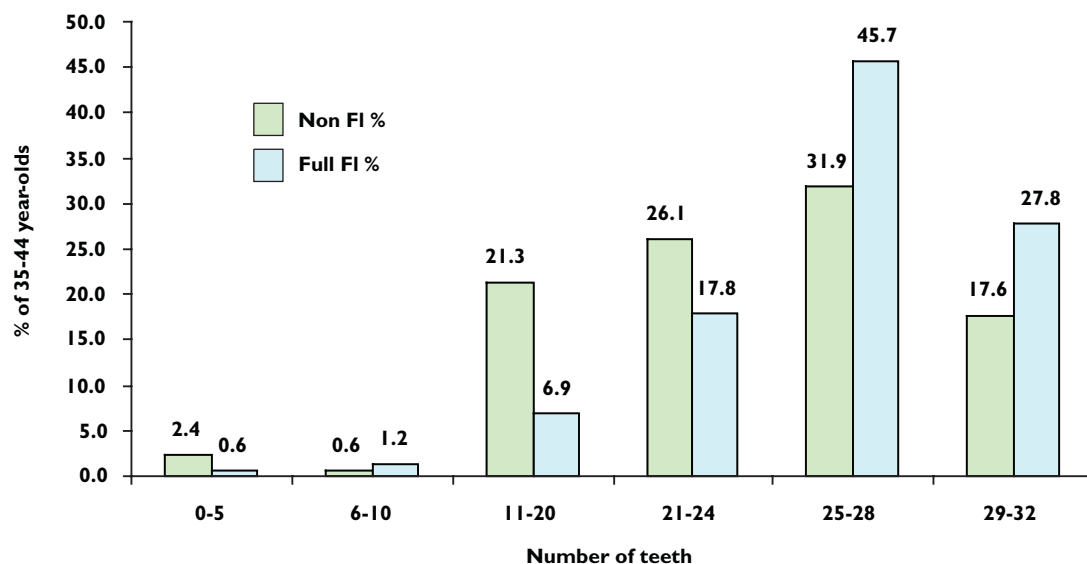
Although less obvious, the positive effects of water fluoridation were also seen in the 65+ age group (Figure 3.1c). Fewer adults in the 65+ fluoridated group had 0-5 teeth (49.1%) than the non fluoridated group (55.7%). In the fluoridated group, 35.2% had more than ten teeth compared with 28.5% in the non fluoridated group.

Figure 3.1c Percentage frequency distribution of 65+ year-olds according to the number of natural teeth present by fluoridation status

Base: Dentate and Edentulous
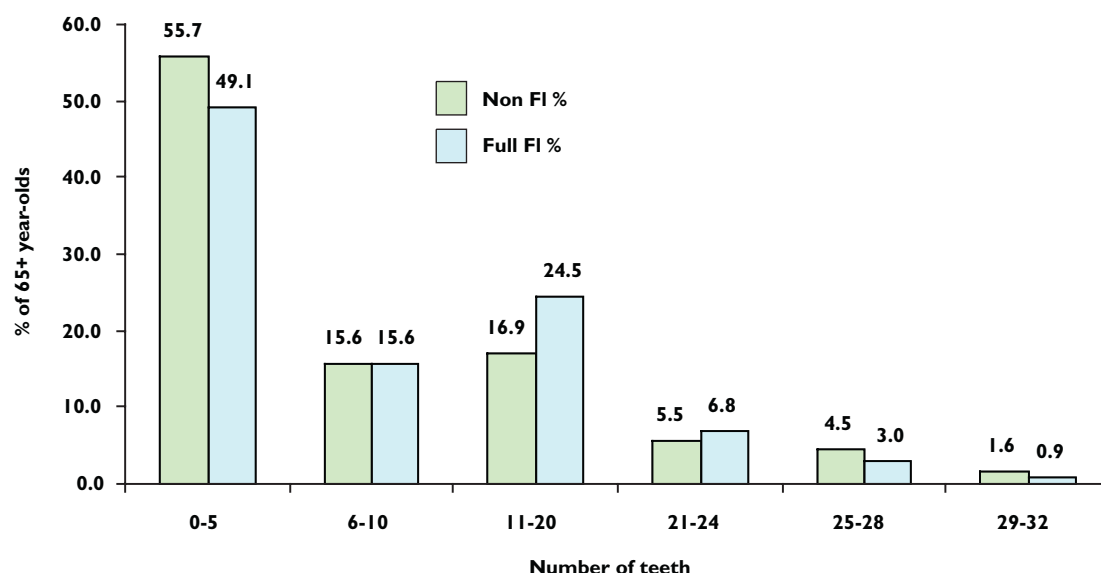
3.4.4 Percentage frequency distribution of adults according to the number of natural teeth present by age group and general health status (ASA)

For each age group, a greater percentage of adults classified as 'Healthy' (ASA 1) had more than 28 teeth. This difference was largest in the 16-24 year-old group where 34.5% of 'Healthy' adults had 29-32 teeth compared with 19.3% of those with 'mild systemic disease' (ASA 2). These percentages were 22.9% and 14.3% respectively in the 35-44 year-old group, and 1.2% and 0.0% respectively in the 65+ group. Over the remainder of the range of numbers of teeth present, 'Healthy' adults were more likely to have greater numbers of teeth than their less healthy peers.

Table 3.9 Percentage frequency distribution of adults according to the number of teeth present by general health status (ASA) and age group - in 2000/'02
Base: Dentate and Edentulous

Number of teeth	16-24 year-olds			35-44 year-olds			65+ year-olds			
	ASA I (n=1139)	ASA 2 (n=50)	ASA 3 (n=5)	ASA I (n=914)	ASA 2 (n=57)	ASA 3 (n=5)	ASA I (n=464)	ASA 2 (n=205)	ASA 3 (n=42)	ASA 4 (n=1)
0-5	0.0	0.0	.	1.1	2.9	.	43.5	58.7	52.6	.
6-10	0.0	0.0	.	1.4	3.9	.	14.1	12.0	20.9	.
11-20	0.2	0.0	.	10.0	10.5	.	26.9	18.7	23.9	.
21-24	5.1	10.4	.	18.9	30.0	.	10.2	6.6	2.5	.
25-28	60.2	70.2	.	45.7	38.5	.	4.2	3.7	0.0	.
29-32	34.5	19.3	.	22.9	14.3	.	1.2	0.0	0.0	.

3.5 Mean number of natural teeth present

Figure 3.2 Mean number of natural teeth present by age group and year of examination
Base: Dentate and Edentulous
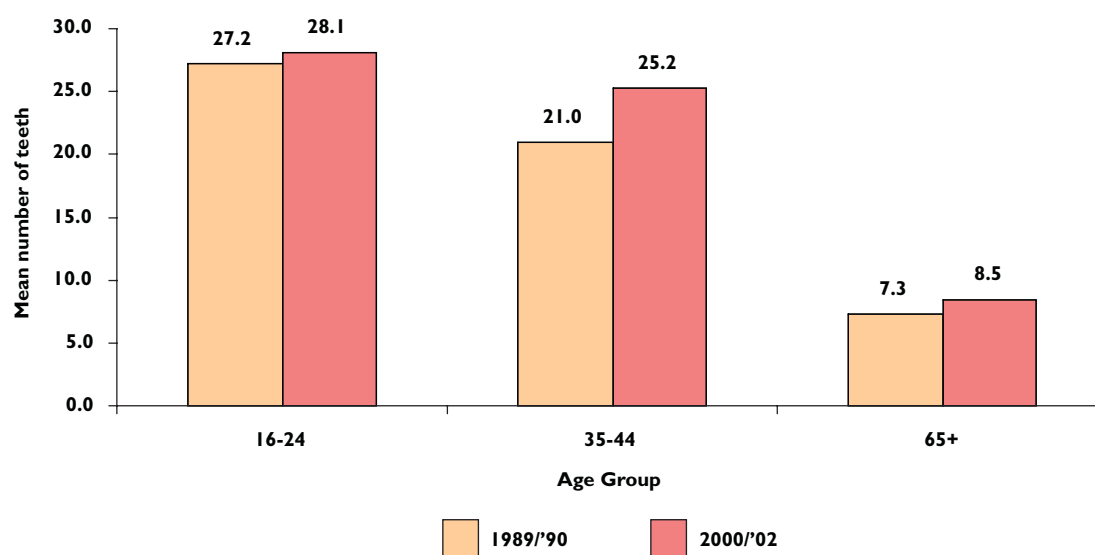
Table 3.10 Mean number and standard error of natural teeth present by age group, gender, year of examination and health board
Base: Dentate and Edentulous

16-24 year-olds	Male		Female		Total	
	mean	SE	mean	SE	mean	SE
National 2000/'02	28.4	0.2	27.9	0.1	28.1	0.2
National 1989/'90	27.6	0.2	26.9	0.2	27.2	0.1
ERHA 2000/'02	28.5	0.3	27.9	0.2	28.2	0.4
MWHB 2000/'02	28.4	0.2	28.1	0.2	28.3	0.2
NEHB 2000/'02	28.3	0.2	27.8	0.2	28.0	0.3
SHB 2000/'02	28.5	0.2	27.9	0.3	28.2	0.4
EHB 1989/'90	27.8	0.2	27.2	0.2	27.4	0.2

35-44 year-olds	Male		Female		Total	
	mean	SE	mean	SE	mean	SE
National 2000/'02	25.3	0.3	25.1	0.2	25.2	0.4
National 1989/'90	22.1	0.5	20.2	0.5	21.0	0.4
ERHA 2000/'02	26.9	0.5	25.8	0.4	26.3	0.6
MWHB 2000/'02	25.1	0.6	23.9	0.5	24.5	0.8

35-44 year-olds	Male		Female		Total	
	mean	SE	mean	SE	mean	SE
NEHB 2000/'02	25.6	1.0	26.0	0.4	25.8	1.1
SHB 2000/'02	24.6	0.6	24.8	0.7	24.7	0.9
EHB 1989/'90	23.0	0.9	22.6	0.7	22.8	0.5

65+ year-olds	Male		Female		Total	
	mean	SE	mean	SE	mean	SE
National 2000/'02	9.9	0.6	7.4	0.7	8.5	0.9
National 1989/'90	10.1	0.8	4.9	0.7	7.3	0.6
ERHA 2000/'02	9.7	1.4	6.8	1.2	8.0	1.9
MWHB 2000/'02	8.6	1.0	6.9	0.8	7.7	1.3
NEHB 2000/'02	9.6	1.6	7.0	1.0	8.1	1.9
SHB 2000/'02	9.3	1.2	6.0	0.9	7.4	1.5
EHB 1989/'90	13.8	1.9	8.1	1.6	10.6	1.3

The full complement of natural teeth in the mouth is taken to be 32. However, this includes four wisdom teeth, which are not present in many people. Thus, for many, the possession of 28 natural teeth represents the full complement. The mean number of natural teeth present for 16-24 year-olds was 28.1, thus meeting the Dental Health Action Plan goal (27.7) for this age group. The mean number of natural teeth present decreased from 28.1 in those aged 16-24, to 25.2 in 35-44 year-olds and to 8.5 in those aged 65 years and older (Table 3.10 and Figure 3.2).

3.5.1 Mean number of natural teeth present by gender
As expected from the figures on tooth loss, among those aged 65 years and older, males tended to possess more natural teeth than females. In the case of dentate adults only, the number of natural teeth present is also lower amongst females than amongst males. The overall lower mean number of natural teeth present among females aged 65 years and over is not fully explained by their higher level of edentulousness: Among dentate adults aged 65 years and over, the mean number of natural teeth present is 15.2 for males and 13.6 for females.

Two obvious changes which have taken place since 1989/'90 are an increase in the number of teeth for all age groups (Figure 3.2) and a reduction in the difference in the number of natural teeth present by gender (Table 3.7). In 1989/'90, 16-24 year-old males and females had, on average, 27.6 and 26.9 natural teeth respectively (Table 3.10). In 2000/'02, the mean number of teeth present was 28.4 for males and 27.9 for females. Amongst 35-44 year-olds in 1989/'90, the figures were 22.1 teeth for males and 20.2 teeth for females; in the 2000/'02 survey, the mean number of natural teeth present had risen to 25.3 for males and 25.1 for females. In 1989/'90, males and females aged 65 years and over had, on average, 10.1 and 4.9 teeth respectively; in 2000/'02, they had 9.9 and 7.4 teeth respectively. Therefore, males experienced little (0.2) increase in the number of natural teeth present since 1989/'90, whereas females in this age group had an average increase of 2.5 natural teeth present.

There was no regional variation in the number of teeth present for the 16-24 year-old group (Table 3.10 and Figure 3.3). The variation amongst health board regions for the 35-44 year-old group was small. The mean number of teeth present for 35-44 year-olds in the ERHA, MWHB, NEHB and SHB regions was 26.3, 24.5, 25.8 and 24.7 respectively. The regional variation was also small amongst those aged 65 years and over. For example, the mean number of teeth present for this age group was 8.0, 7.7, 8.1 and 7.4 in the ERHA, MWHB, NEHB and SHB regions respectively.

Figure 3.3 Mean number of teeth present by age group and geographic location
Base: Dentate and Edentulous
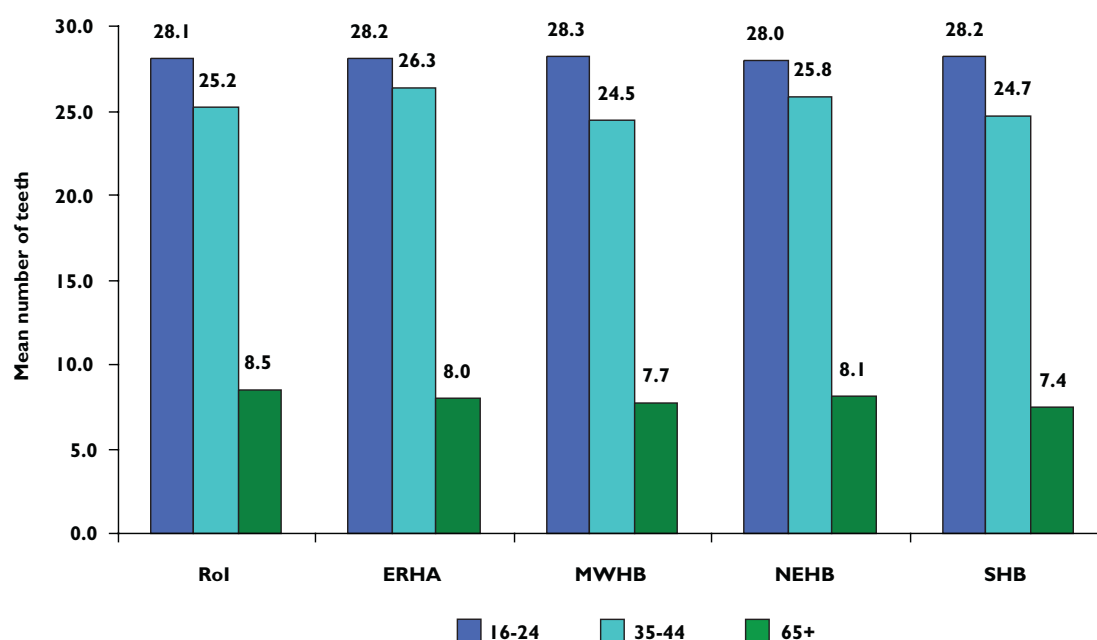
The gender differences within health boards among those aged 65 years and over are more marked than in the younger age groups (Table 3.10).

3.5.2 Mean number of natural teeth present by age group, gender and medical card status

Table 3.11 Mean number and standard error of natural teeth present by age group, gender and medical card status in 1989/'90 and in 2000/'02
Base: Dentate and Edentulous

| | | Medical Card Holders | | | | | |
| | | Male | | Female | | Total | |
		1989/'90	2000/'02	1989/'90	2000/'02	1989/'90	2000/'02
16-24	mean	27.3	28.0	26.9	28.1	27.0	28.1
	SE	0.3	0.2	0.4	0.2	0.3	0.3
35-44	mean	22.4	23.2	20.1	23.5	20.9	23.4
	SE	1.0	0.6	1.1	0.6	0.8	0.9
65+	mean	8.3	8.1	3.1	6.6	5.3	7.2
	SE	1.2	0.7	0.7	0.8	0.7	1.1

| | | Non Medical Card Holders | | | | | |
| | | Male | | Female | | Total | |
		1989/'90	2000/'02	1989/'90	2000/'02	1989/'90	2000/'02
16-24	mean	27.7	28.6	26.8	27.8	27.2	28.2
	SE	0.2	0.2	0.2	0.1	0.1	0.2
35-44	mean	22.0	25.9	20.3	25.7	21.1	25.8
	SE	0.6	0.3	0.5	0.2	0.4	0.4
65+	mean	11.9	13.3	7.7	9.8	9.9	11.6
	SE	1.1	1.0	1.3	1.1	0.9	1.4

Male and female adults in possession of medical cards tended to have fewer natural teeth present than those who did not possess a medical card (Table 3.11 and Figures 3.4a and 3.4b). This difference was greatest in the 65+ age group. These data indicate that gender differences have decreased both for the less well off (medical card holders) and the rest of the population, particularly in those aged 65+.

Figure 3.4a Mean number of natural teeth present in males by medical card status (MC Yes, MC No)
Base: Dentate and Edentulous
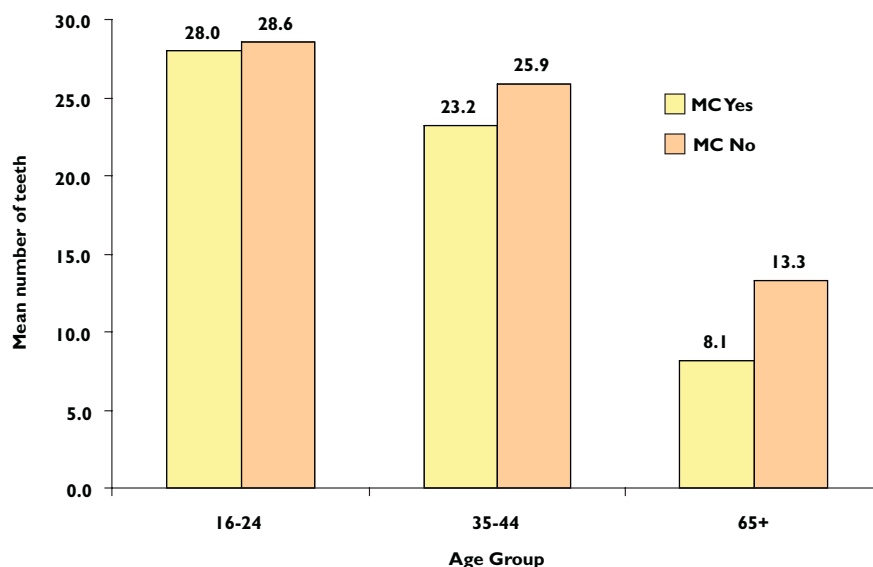
Figure 3.4b Mean number of natural teeth present in females by medical card status (MC Yes, MC No)
Base: Dentate and Edentulous
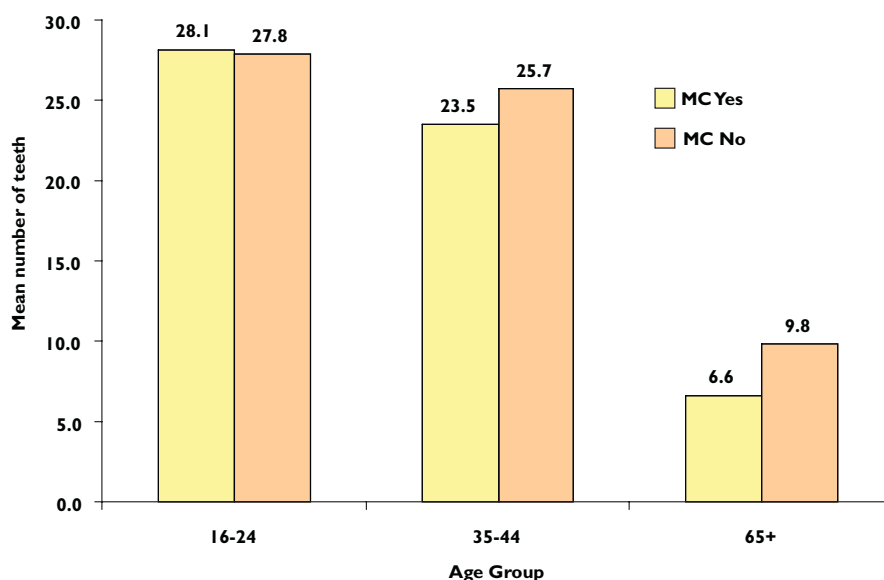
3.5.3 Number of natural teeth present by fluoridation status

As mentioned previously, water fluoridation commenced in 1964, 36-38 years prior to the 2000/'02 survey. At the time of the fieldwork, fluoride toothpastes had been widely available for approximately 25 years. Fluoridation status is classified only on the basis of the subject's domestic water fluoridation status. Adults in the 35-44 and 65+ age groups who had resided in a fluoridated community for at least 35 years (full group) or for one or more years (part group) had more natural teeth present compared to the non fluoridated group. In the 16-24 year-old age group, all three fluoridation groups had similar numbers (almost the full compliment) of teeth present (Table 3.12, Figure 3.5). On average, 35-44 year-olds with at least 35 years exposure to water fluoridation had 2.6 more teeth (mean number of teeth present = 26.2) than those who never had domestic water fluoridation (mean number of teeth present = 23.6). It is worth noting that when the 1961/'63 pre fluoridation surveys of oral health were carried out, the 65+ age group were in their mid twenties, and the mean D_{3c}MFT of 15-year-olds at that time was 8[7]. This illustrates that, prior to the introduction of water fluoridation in 1964, caries already had a major impact on the dentition for this age group.

Table 3.12 Mean number of natural teeth present by age group and fluoridation status in 1989/'90 and 2000/'02

Base: Dentate and Edentulous

Age Group		Fluoridation Status					
		Non		Part		Full	
		1989/'90	2000/'02	1989/'90	2000/'02	1989/'90	2000/'02
16-24	mean	27.2	28.2	27.4	28.1	27.1	28.3
	SE	0.3	0.2	0.2	0.2	0.2	0.1
35-44	mean	19.0	23.6	20.7	24.9	22.5	26.2
	SE	0.8	0.4	0.6	0.4	0.5	0.3
65+	mean	5.9	7.2	7.3	9.4	9.2	8.1
	SE	0.8	1.3	1.1	0.8	1.1	0.7

Figure 3.5 Mean number of natural teeth present by age group and fluoridation status

Base: Dentate and Edentulous
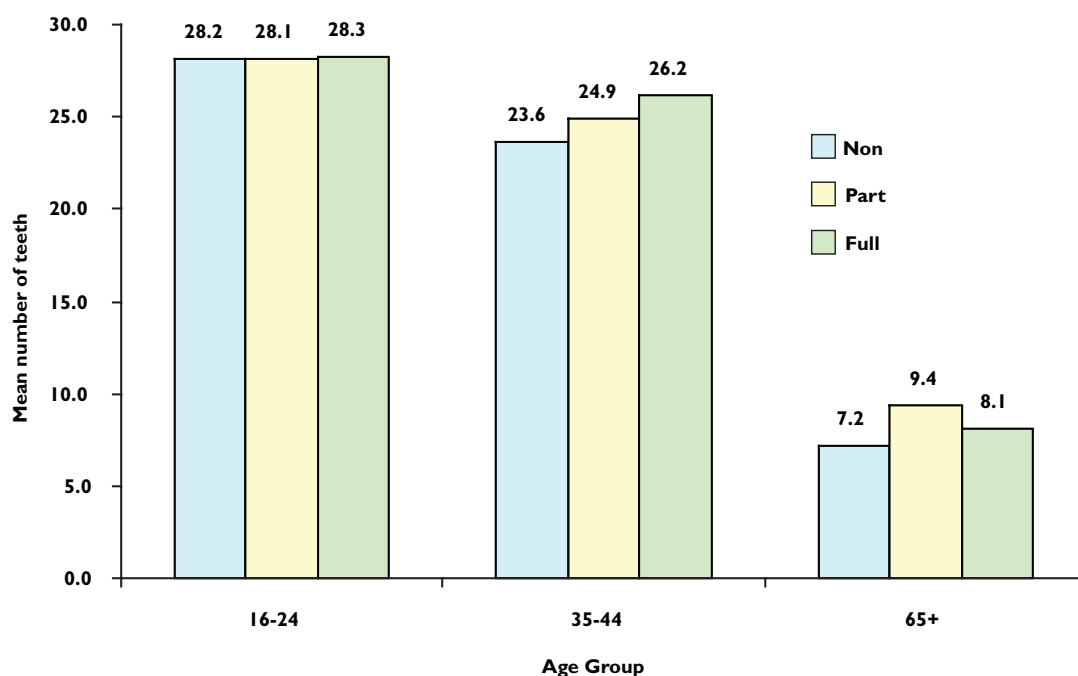
As with edentulousness (Section 3.3.2), it is useful to review changes in number of teeth present according to fluoridation status for the EHB region and the other health boards (OHB) separately.

Table 3.13 Mean number of natural teeth present by age group and fluoridation status in the EHB region and other health boards (OHB) in 1989/'90 and in 2000/'02

Base: Dentate and Edentulous

		Non				Part				Full			
		EHB		OHB		EHB		OHB		EHB		OHB	
		n	%	n	%	n	%	n	%	n	%	n	%
1989/'90	16-24	2	*	99	27.2	9	*	63	27.4	136	27.5	91	26.6
	35-44	1	*	97	18.9	10	*	147	20.6	140	22.8	24	*
	65+	4	*	103	5.7	2	*	55	6.8	59	10.2	19	*
2000/'02	16-24	4	*	310	28.2	47	28.4	218	27.9	227	28.3	378	28.2
	35-44	1	*	175	23.6	71	26.1	421	24.5	172	26.4	124	25.6
	65+	1	*	141	7.3	40	8.7	260	9.6	115	7.9	140	8.4

* n < 30

In 1989/'90, most of the full fluoride sample came from the EHB region and most of the non fluoride sample came from the OHB (Table 3.13). Thus, for the 35-44 and 65+ age groups, the full and non

fluoride group comparison is between the full fluoride group in the EHB region and the non fluoride group in the OHB in 1989/'90. The sample sizes were bigger in 2000/'02 and this issue with the sample did not occur.

In 1989/'90, there was little difference in the mean number of teeth present between the full fluoride group in the EHB region (27.5) and the OHB non fluoridated group (27.2). However, for those in the 35-44 age group, the mean number of teeth in the full fluoride group in the EHB region is 22.8, whereas in the OHB non fluoride group it is 18.9. Again in the 65+ age group, EHB full fluoride group (10.2) is greater than the OHB non fluoride group (5.7) (Table 3.13). The findings for 2000/'02 are similar: There is little difference in the mean number of teeth present according to fluoridation status for 16-24 year-olds. Those in the 35-44 year-old OHB full fluoride group have, on average, 2.0 more teeth than those in the OHB non fluoride group (25.6 vs. 23.6). The sample size in the non fluoride EHB group was too small to allow comparison for the EHB region. Adults aged 65+ in the full fluoride OHB areas had, on average, 1.1 more teeth (8.4) than those in the non fluoride group (7.3).

For all age groups and for all fluoridation categories, there was an increase in the mean number of teeth present between 1989/'90 and 2000/'02, except in the case of those aged 65+ where the mean number of teeth decreased from 10.2 in 1989/'90 to 7.9 in 2000/'02 (Table 3.13). This unexpected finding mirrors the increase in the percentage edentulous in the EHB region since 1989/'90 (Table 3.5).

3.5.4 Number of natural teeth present by general health status (ASA)
Table 3.14 presents the mean number and standard error of natural teeth present according to general health status (ASA) by age group. As with edentulousness, those with no systemic disease (ASA 1) generally had more teeth than those with systemic disease (ASA 2 and ASA 3).

Table 3.14 Mean number and standard error of natural teeth present according to general health status (ASA) by age group

Base: Dentate and Edentulous

Age Group		ASA 1	ASA 2	ASA 3	ASA 4	Total
16-24	mean	28.2	26.1	*	*	28.1
	SE	0.1	1.5	*	*	1.0
35-44	mean	25.3	23.3	*	*	25.2
	SE	0.2	0.9	*	*	1.0
65+	mean	9.5	6.6	6.0	*	8.5
	SE	0.5	0.8	1.3	*	2.0

* n<30

3.6 Impact of age, gender, medical card status and fluoridation status on number of teeth – multivariate analysis
The data in this chapter have been presented according to age group, gender, medical card status, fluoridation status and health board. A multivariate analysis was conducted to look at the impact of each of these variables on the number of natural teeth remaining in the mouth whilst controlling for the effect of the other variables.

Number of sound natural teeth (NT) values were categorized as 'High', 'Medium', or 'Low', with divisions roughly corresponding to the 25th and 75th percentiles (Table 3.15). Note that for the 65+ age group, over 40% of adults were in the 'Low' category for NT. These categories correspond roughly to the edentulous portion of the 65+ age group.

As NT categorisation was age dependant, each age group was analysed individually. Proportional polytomous and dichotomous logistic regressions were used to assess the risk of lower levels of NT. The two dichotomous logistic regression models considered were:
> (1) Low/Medium vs. High
> (2) Low vs. Medium/High

The proportional polytomous regression requires the assumption that these odds are proportional, essentially assuming that all possible dichotomisations of the response variable are equivalent. The validity of this assumption is tested using the standard score test. The statistical significance of interactions was evaluated using a backwards step-wise procedure with the likelihood ratio test.

Table 3.15 Number and percentage of adults by categorisation of number of teeth and age group

Age Group	High n (%)	Medium n (%)	Low n (%)
16-24 year-olds	NT ≥ 30 264 (22.4%)	28 ≤ NT ≤ 29 605 (51.3%)	NT ≤ 27 311 (26.4%)
35-44 year-olds	NT ≥ 29 208 (21.8%)	24 ≤ NT ≤ 28 515 (53.9%)	NT ≤ 23 232 (24.3%)
65+ year-olds	NT ≥ 17 177 (25.5%)	1 ≤ NT ≤ 16 234 (33.7%)	NT = 0 283 (40.8%)

The variables: age within age group, health board, gender, medical card status, and fluoridation status were included in the model. Coefficients from the two dichotomous models were quite different and the score test for the proportional odds assumption did not hold for the two younger age groups. Therefore, results from the dichotomous logistic regression are presented here. Significance of predictors was assessed using the Wald test statistic. Pairwise comparisons of health boards used the Wald statistic with the Bonferroni correction.

Tables 3.16a (16-24 year-olds), 3.16b (35-44 year-olds) and 3.16c (65+ year-olds) present results from the dichotomous logistic regression. The results presented are: number and percentage of adults with poor, moderate and good numbers of natural teeth remaining in their mouths (NT); adjusted odds ratio of having Low/Medium vs. High number of teeth (model 1) and Low vs. Medium/High number of teeth (model 2); 95% CI and significance (p-value) according to the independent variables tested by age group.

For the 16-24 year-old age group, age and gender were significantly associated with NT for both dichotomous models (Table 3.16a). Surprisingly, within this age group, age was actually positively associated with NT (adjusted odds ratio 0.74, p<0.0001 for model 1), thus younger adults had lower odds of having greater numbers of teeth. Being female was negatively associated with NT. This may possibly be related to greater numbers of orthodontic extractions among younger adults in this age group who have benefited from the recent growth in orthodontic services in recent years. Alternatively it may be related to the timing of eruption of third permanent molars; those in their twenties may have more third molars than the younger adults in this age grouping.

Table 3.16a Results from the dichotomous logistic regression for 16-24 year-olds

Characteristic (16-24 year-olds)	High	Medium	Low	Model	Adjusted odds ratio	95% CI	P-value
Age				1	0.74	0.70-0.79	<0.0001
				2	0.97	0.92-1.02	0.2472
Health Board:							
ERHA	60 (21.7%)	146 (52.7%)	71 (25.6%)	1 2	1 1		
MWHB	81 (25.9%)	155 (49.5%)	77 (24.6%)	1 2	0.58 0.89	0.37-0.91 0.59-1.33	0.0162 0.5634
NEHB	44 (21.7%)	99 (48.8%)	60 (29.6%)	1 2	0.76 1.14	0.46-1.24 0.74-1.77	0.2656 0.5456
SHB	36 (20.3%)	107 (60.5%)	34 (19.2%)	1 2	0.81 0.69	0.50-1.34 0.43-1.10	0.4150 0.1145
OHB	43 (20.5%)	98 (46.7%)	69 (32.9%)	1 2	0.78 1.31	0.48-1.27 0.86-2.01	0.3169 0.2048

				Model	Adjusted odds ratio	95% CI	P-value
Gender:							
Male	137	254	115	1	1		
	(27.1%)	(50.2%)	(22.7%)	2	1		
Female	127	351	196	1	1.75	1.31-2.35	0.0002
	(18.8%)	(52.1%)	(29.1%)	2	1.39	1.06-1.82	0.0165
Medical Card Status:							
Yes	58	119	85	1	0.78	0.55-1.11	0.1724
	(22.1%)	(45.4%)	(32.4%)	2	1.35	0.99-1.83	0.0568
No	206	486	226	1	1		
	(22.4%)	(52.9%)	(24.6%)	2	1		
Fluoridation Status:							
Non	70	155	89	1	1		
	(22.3%)	(49.4%)	(28.3%)	2	1		
Part	59	134	71	1	1.07	0.70-1.64	0.7457
	(22.3%)	(50.8%)	(26.9%)	2	0.93	0.64-1.36	0.6995
Full	135	316	151	1	0.89	0.60-1.30	0.5374
	(22.4%)	(52.5%)	(25.1%)	2	0.91	0.64-1.28	0.5744

For the 35-44 year-old age group, age and fluoridation status were significantly associated with NT for both models. Older adults had significantly greater odds of having less teeth (adjusted odds ratio 1.10, p=0,0008 for model 1, adjusted odds ratio 1.24, p<0.0001 for model 2). However, gender was only significantly associated with NT for 'model 1' and medical card status was only significantly associated with NT for 'model 2' (Table 3.16b).

Exposure to domestic water fluoridation had a statistically significant impact on the number of teeth present among 35-44 year-olds. Using those with no water fluoridation as a reference (adjusted odds ratio = 1), those in the part fluoridated and full fluoridated groups were more likely to be in the group with more teeth as seen by the lower adjusted odds ratios for both models and both fluoridation groups.

Table 3.16b Results from the dichotomous logistic regression for 35-44 year-olds

Characteristic (35-44 year-olds)	Number (%) by level of number of teeth (NT) (unadjusted)			Model	Adjusted odds ratio	95% CI	P-value
	High	**Medium**	**Low**				
Age				1	1.10	1.04-1.17	0.0008
				2	1.24	1.16-1.31	<0.0001
Health Board:							
ERHA	68	133	43	1	1		
	(27.9%)	(54.5%)	(17.6%)	2	1		
MWHB	44	121	61	1	1.23	0.76-1.99	0.4071
	(19.5%)	(53.5%)	(27.0%)	2	1.42	0.84-2.41	0.1882
NEHB	37	78)	27	1	0.86	0.50-1.48	0.5811
	(26.1%)	(54.9%	(19.0%)	2	1.01	0.53-1.90	0.9860
SHB	26	84	35	1	1.65	0.97-2.79	0.0642
	(17.9%)	(57.9%)	(24.1%)	2	1.6	0.93-2.76	0.0916
OHB	33	99	66	1	1.36	0.79-2.33	0.2671
	(16.7%)	(50.0%)	(33.3%)	2	1.75	1.00-3.05	0.0497
Gender:							
Male	90	184	85	1	1		
	(25.1%)	(51.3%)	(23.7%)	2	1		
Female	118	331	147	1	1.42	1.03-1.95	0.0341
	(19.8%)	(55.5%)	(24.7%)	2	1.11	0.80-1.55	0.5328
Medical Card Status:							
Yes	35	82	79	1	1.33	0.88-2.02	0.1714
	(17.9%)	(41.8%)	(40.3%)	2	2.68	1.87-3.84	<0.0001
No	173	433	153	1	1		
	(22.8%)	(57.0%)	(20.2%)	2	1		

	Number (%) by level of number of teeth (NT) (unadjusted)						
Fluoridation Status:							
Non	24	83	67	1	1		
	(13.8%)	(47.7%)	(38.5%)	2	1		
Part	105	276	105	1	0.59	0.36-0.97	0.0367
	(21.6%)	(56.8%)	(21.6%)	2	0.48	0.32-0.72	0.0004
Full	79	156	60	1	0.44	0.24-0.78	0.0055
	(26.8%)	(52.9%)	(20.3%)	2	0.44	0.26-0.76	0.0029

For the 65+ age group, gender and medical card status were significantly associated with NT for both models, whereas age was only significant for 'model 2' (Table 3.16c).

Table 3.16c Results from the dichotomous logistic regression for 65+ year-olds

Characteristic (65+ year-olds)	Number (%) by level of number of teeth (NT) (unadjusted)			Model	Adjusted odds ratio	95% CI	P-value
	High	**Medium**	**Low**				
Age				1	1.03	1.00-1.06	0.0979
				2	1.06	1.03-1.09	0.0001
Health Board:							
ERHA	45	44	67	1	1		
	(28.8%)	(28.2%)	(42.9%)	2	1		
MWHB	22	49	48	1	1.45	0.78-2.69	0.2415
	(18.5%)	(41.2%)	(40.3%)	2	0.73	0.43-1.25	0.2559
NEHB	27	34	45	1	0.78	0.41-1.51	0.4692
	(25.5%)	(32.1%)	(42.5%)	2	0.64	0.35-1.15	0.1331
SHB	32	42	60	1	1.13	0.64-1.97	0.6762
	(23.9%)	(31.3%)	(44.8%)	2	0.92	0.56-1.51	0.7380
OHB	51	65	63	1	0.72	0.41-1.25	0.2436
	(28.5%)	(36.3%)	(35.2%)	2	0.52	0.31-0.86	0.0116
Gender:							
Male	97	111	114	1	1		
	(30.1%)	(34.5%)	(35.4%)	2	1		
Female	80	123	169	1	1.50	1.05-2.14	0.0261
	(21.5%)	(33.1%)	(45.4%)	2	1.48	1.07-2.03	0.0166
Medical Card Status:							
Yes	85	157	212	1	2.48	1.70-3.62	<0.0001
	(18.7%)	(34.6%)	(46.7%)	2	1.83	1.28-2.62	0.0009
No	92	77	71	1	1		
	(38.3%)	(32.1%)	(29.6%)	2	1		
Fluoridation Status:							
Non	27	51	63	1	1		
	(19.1%)	(36.2%)	(44.7%)	2	1		
Part	80	97	122	1	0.72	0.43-1.21	0.2097
	(26.8%)	(32.4%)	(40.8%)	2	0.82	0.53-1.27	0.3797
Full	70	86	98	1	0.66	0.37-1.18	0.1626
	(27.6%)	(33.9%)	(38.6%)	2	0.66	0.40-1.08	0.0943

For the 35-44 and 65+ age groups, ownership of a medical card was associated with lower levels of teeth, indicating the statistical significance of the impact of disadvantage on number of teeth remaining in these two groups.

In summary, over 75% of 16-24 year-olds have 28 or more teeth; there is less variation in the number of teeth present than in the older age groups. The reasons for variation in tooth numbers among this age group are difficult to elucidate because of the impact of orthodontic extractions and the variable rate of eruption of third molar teeth. For the 35-44 and 65+ age groups, the multivariate analysis shows that

whilst controlling for the effect of confounding among age (within age group), health board of residence, gender, medical card status and fluoridation status, the factors which had a statistically significant impact on number of teeth present were gender and age: Women had fewer teeth than men and older adults within each age group had fewer teeth.

3.7 Possession of more than 20 natural teeth

The WHO set retention of more than 20 natural teeth (i.e. 21 or more teeth) out of a maximum of 32 as a goal for oral health in 1982. Although the possession of more than 20 teeth has been arbitrarily equated with a reasonable level of oral health[8], subsequent research suggests that where there are more than 20 natural teeth, the functional, dietary and aesthetic needs of most people are met without the need for a partial denture[3].

3.7.1 Possession of more than 20 natural teeth by gender

Table 3.17 presents the percentage of adults with more than 20 natural teeth present by age, gender, year of examination and health board. Females fare worse than males using this measure. In the 65+ age group, 20.8% of males possessed more than 20 natural teeth compared with 13.5% of females (Table 3.17). These percentages increased from 15.3% for males and 6.9% for females between 1989/'90 and 2000/'02. There was also an increase in the percentage of 35-44 year-olds with more than 20 natural teeth present between 1989/'90 and 2000/'02, from 68.2% to 90.7% for males and 58.3% to 88.8% for females. The reduction of the gender difference in levels of oral health over time is also apparent in Table 3.17. These changes represent encouraging improvements in oral health.

Table 3.17 Percentage of adults with more than 20 natural teeth present by age group, gender, year of examination and health board

Base: Dentate and Edentulous

16-24 year-olds	Male	Female	Total
National 2000/'02	99.6	99.6	99.6
National 1989/'90	100.0	97.8	98.8
ERHA 2000/'02	99.1	99.4	99.2
MWHB 2000/'02	100.0	100.0	100.0
NEHB 2000/'02	100.0	100.0	100.0
SHB 2000/'02	100.0	99.2	99.6
EHB 1989/'90	100.0	100.0	100.0
35-44 year-olds	**Male**	**Female**	**Total**
National 2000/'02	90.7	88.8	89.7
National 1989/'90	68.2	58.3	62.5
ERHA 2000/'02	96.7	92.5	94.5
MWHB 2000/'02	94.6	82.7	88.7
NEHB 2000/'02	95.5	92.8	94.2
SHB 2000/'02	84.3	84.6	84.5
EHB 1989/'90	75.0	72.3	73.5
65+ year-olds	**Male**	**Female**	**Total**
National 2000/'02	20.8	13.5	16.7
National 1989/'90	15.3	6.9	10.7
ERHA 2000/'02	17.5	11.7	14.1
MWHB 2000/'02	19.4	10.0	14.2
NEHB 2000/'02	26.1	13.0	18.4
SHB 2000/'02	21.9	12.6	16.6
EHB 1989/'90	34.5	13.9	23.1

Comparing the health boards, only 84.5% of 35-44 year-olds in the SHB region had retained more than 20 teeth compared with 94.5% in the ERHA region. The 1984 national survey of children's dental health[7] reported that the SHB region was a 'black spot' for caries at that time. The 35-44 year-old group in the 2000/'02 survey would have been teenagers in 1984; hence the pattern of poorer oral health is consistent with the earlier survey of a younger age group.

3.7.2 Percentage of adults with more than 20 natural teeth by gender and medical card status

Table 3.18 Percentage of adults with more than 20 natural teeth present by age group, gender and medical card status in 1989/'90 and in 2000/'02
Base: Dentate and Edentulous

| | Medical Card Holders | | | | | |
| | Male | | Female | | Total | |
Age Group	1989/'90	2000/'02	1989/'90	2000/'02	1989/'90	2000/'02
16-24	100.0	100.0	98.7	99.7	99.2	99.8
35-44	77.4	80.7	65.6	79.0	69.5	79.7
65+	10.7	12.4	1.3	10.7	5.2	11.4

| | Non Medical Card Holders | | | | | |
| | Male | | Female | | Total | |
Age Group	1989/'90	2000/'02	1989/'90	2000/'02	1989/'90	2000/'02
16-24	100.0	100.0	97.4	99.7	98.6	99.8
35-44	67.1	93.3	56.0	91.8	60.5	92.5
65+	20.8	36.4	16.3	21.9	17.8	29.3

In the 1989/'90 survey, the percentage of males and females with more than 20 natural teeth was lower for medical card holders than for non medical card holders in the 65+ age group (Table 3.18).

In the 2000/'02 survey, for the 35-44 age group, a lower percentage of medical card holders (79.7%) had more than 20 natural teeth compared with non medical card holders (92.5%). There were similar findings for those aged 65+, with 11.4% of medical card holders and 29.3% of non medical card holders having more than 20 natural teeth. For those aged 65+, 3.4 times as many male non medical card holders had more than 20 teeth than medical card holders (36.4% vs. 12.4%). For females, twice as many non medical card holders had more than 20 teeth than medical card holders (21.9% vs. 10.7%).

3.7.3 Percentage of adults with more than 20 natural teeth by fluoridation status

Table 3.19 Percentage of adults with more than 20 natural teeth present by age group and fluoridation status in 1989/'90 and in 2000/'02
Base: Dentate and Edentulous

| | Fluoridation Status | | | | | |
| | Non | | Part | | Full | |
Age Group	1989/'90	2000/'02	1989/'90	2000/'02	1989/'90	2000/'02
16-24	98.0	100.0	100.0	100.0	98.7	99.7
35-44	53.1	83.2	59.2	89.6	71.3	92.4
65+	7.5	13.3	8.8	20.7	16.7	13.8

Across all age groups, the percentage of adults with more than 20 natural teeth present was higher in the part fluoride and full fluoride groups than in the non fluoride group (Table 3.19). It is also apparent that for 35-44 year-olds, the full fluoride group fare better in this regard than the part fluoride group (92.4% vs. 89.6%). The situation is not as clear for those in the 65+ age group. However, as previously explained, adults in this age group were in their late twenties by the time water fluoridation was introduced - too late in many cases to prevent considerable tooth loss due to caries.

3.7.4 Percentage of adults with more than 20 natural teeth by general health status (ASA)

Table 3.20 Percentage of adults with more than 20 natural teeth present by general health status (ASA) and age group
Base: Dentate and Edentulous

Age Group	ASA 1	ASA 2	ASA 3	ASA 4	Total
16-24	99.8	94.8	*	*	99.6
35-44	90.0	83.4	*	*	89.7
65+	19.4	13.1	4.6	*	16.7

* n < 30

Possession of more than 20 natural teeth appears to be associated with general health status (Table 3.20). In all three age groups, fewer adults with systemic disease had more than 20 teeth.

3.8 Possession of 18 or more sound untreated natural teeth

A reasonable objective in oral health is the retention of a high proportion of natural teeth that have not decayed, been filled or traumatised. The number of teeth that were not decayed, filled, otherwise restored or traumatised on their coronal surfaces was counted. Taking 18 such teeth as an arbitrary measure (18+ SUNT), it is clear that only a small proportion of the adult population of Ireland achieve this level of oral health (Table 3.21). However, the situation has improved since 1989/'90: The percentage of 16-24 year-olds with 18+ SUNT increased from 79.3% to 90.0%, for 35-44 year-olds the increase was from 16.2% to 36.8% and for those aged 65+ the increase was from 2.1% to 3.3%.

3.8.1 Possession of 18+ SUNT by gender

Table 3.21 Percentage of adults with 18 or more sound, untreated natural teeth (18+ SUNT) present, by age group, gender, year of examination and health board
Base: Dentate and Edentulous

16-24 year-olds	Male	Female	Total
National 2000/'02	90.9	89.1	90.0
National 1989/'90	82.9	76.5	79.3
ERHA 2000/'02	90.7	92.1	91.4
MWHB 2000/'02	90.5	82.3	86.6
NEHB 2000/'02	89.4	87.3	88.4
SHB 2000/'02	84.7	86.1	85.4
EHB 1989/'90	81.0	81.0	81.0

35-44 year-olds	Male	Female	Total
National 2000/'02	38.9	34.7	36.8
National 1989/'90	21.8	12.1	16.2
ERHA 2000/'02	48.4	43.6	46.0
MWHB 2000/'02	41.0	28.4	34.8
NEHB 2000/'02	40.1	36.6	38.4
SHB 2000/'02	31.9	28.0	29.9
EHB 1989/'90	19.0	13.0	15.9

65+ year-olds	Male	Female	Total
National 2000/'02	5.6	1.6	3.3
National 1989/'90	4.5	0.0	2.1
ERHA 2000/'02	2.8	0.0	1.1
MWHB 2000/'02	6.6	1.6	3.8
NEHB 2000/'02	4.3	1.1	2.4
SHB 2000/'02	8.3	1.6	4.5
EHB 1989/'90	7.0	0.0	3.1

In all age groups, the percentage of females with 18+ SUNT tended to be lower than males. However, as with the other parameters measured, the gender difference was less in 2000/'02 than it was in 1989/'90.

For the two younger age groups, the ERHA region had the highest proportion with 18+ SUNT and the SHB region had the lowest. It must be stressed that teeth counted as sound (no disease) in a survey may have caries, visible only with a full clinical examination and the use of radiographs to aid diagnosis. Dental surveys underscore the true level of caries in the population; hence the proportion of adults with 18+SUNT is an overestimate. Although the estimate of decay levels provided by the survey examination is an underestimate, the survey examination system has the important advantage of being very reliable and reproducible. These features are essential to allow valid comparisons of changes in disease levels over time. Because the same examination system is widely used internationally, it permits meaningful international comparisons of disease levels.

3.8.2 Percentage of adults with 18+ SUNT by medical card status

Table 3.22 Percentage of adults with 18 or more sound, untreated natural teeth (18+ SUNT) present by age group, gender and medical card status in 1989/'90 and in 2000/'02
Base: Dentate and Edentulous

| Age Group | Medical Card Holders | | | | | |
| | Male | | Female | | Total | |
	1989/'90	2000/'02	1989/'90	2000/'02	1989/'90	2000/'02
16-24	80.0	92.7	76.3	87.9	77.7	89.6
35-44	32.3	31.8	18.8	43.6	23.3	38.7
65+	7.1	4.8	0.0	1.7	3.0	2.9

| Age Group | Non Medical Card Holders | | | | | |
| | Male | | Female | | Total | |
	1989/'90	2000/'02	1989/'90	2000/'02	1989/'90	2000/'02
16-24	83.9	91.0	76.5	89.5	79.9	90.3
35-44	19.9	40.2	9.7	32.3	14.2	36.4
65+	1.9	7.2	0.0	1.5	0.9	4.4

The presence of 18+ SUNT was not consistently related to disadvantage in the different age groups, as measured by possession of a medical card (Table 3.22).

3.8.3 Percentage of adults with 18+ SUNT by fluoridation status

Table 3.23 Percentage of adults with 18 or more sound, untreated natural teeth (18+ SUNT) present by age group, gender and fluoridation status in 1989/'90 and in 2000/'02
Base: Dentate and Edentulous

| Age Group | Fluoridation Status | | | | | |
| | Non | | Part | | Full | |
	1989/'90	2000/'02	1989/'90	2000/'02	1989/'90	2000/'02
16-24	79.2	87.0	75.0	85.8	80.6	92.7
35-44	18.4	25.2	16.6	32.2	14.6	47.0
65+	3.7	3.1	0.0	2.6	1.3	4.3

For all three age groups, the percentage of adults with 18+ SUNT was greater amongst those who had domestic water fluoridation since birth (16-24 year-olds) or for at least 35 years (Table 3.23). The difference was greatest for the 35-44 year-old group, where 25.2% of the non fluoridated group and 47.0% of the full fluoride group had 18+ SUNT. This result indicates an important positive benefit of water fluoridation.

3.8.4 Percentage of adults with 18+ SUNT by general health status

Table 3.24 Percentage of adults with 18 + SUNT present by general health status (ASA) and age group
Base: Dentate and Edentulous

Age Group	ASA 1	ASA 2	ASA 3	ASA 4	Total
16-24	90.5	76.5	*	*	90.0
35-44	36.8	35.7	*	*	36.8
65+	4.2	1.9	0.0	*	3.3

* n < 30

Only 76.5% of 16-24 year-olds with mild systemic disease (ASA 2) had 18+ SUNT and 90.5% of those without systemic disease had 18+ SUNT. There was no marked difference in the percentage with 18+ SUNT amongst those aged 35-44 or 65+ years when this parameter was related to the health status (Table 3.24).

3.9 International comparisons
National adult oral health data collected in 1998 are available for England, Wales, Scotland and Northern Ireland. These data are used to compare the percentage edentulous and number of teeth present for 35-44 year-olds and those aged 65+ in the Republic of Ireland (RoI) with those in the UK. Levels of edentulousness among 16-24 year-olds were very small in all countries; therefore they are not included in the comparison. The data pertaining to the number of teeth present, percentage of adults with more than 20 natural teeth and percentage with 18+ SUNT were reported as percentages of the dentate population only in the UK survey report, hence they are compared here to the dentate population examined in Ireland in the 2000/'02 adult oral health survey.

3.9.1 Percentage of adults who were edentulous
Figures 3.6a and 3.6b compare RoI to England, Wales, Scotland and Northern Ireland[2].

Figure 3.6a Percentage of 35-44 year-olds edentulous in RoI in 2000/'02, and in England, Wales, Scotland and Northern Ireland in 1998
Base: Dentate and Edentulous
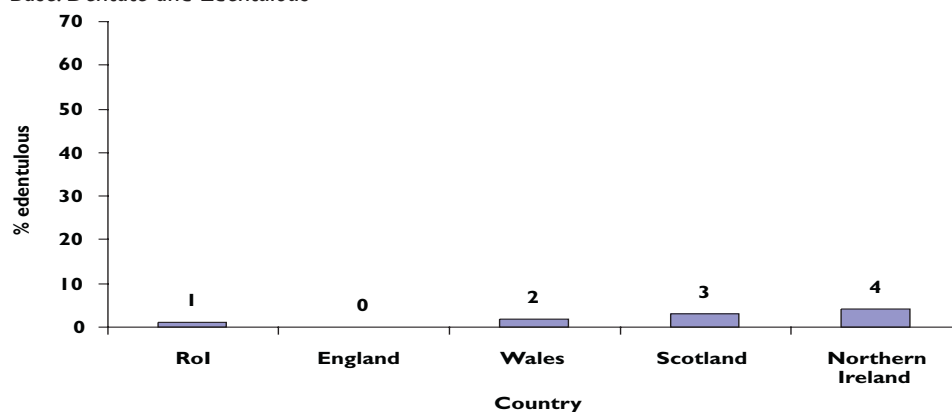
Figure 3.6b Percentage of 65+ year-olds edentulous in RoI in 2000/'02, and percentage of 65-74 and 75+ year-olds edentulous in England, Wales, Scotland and Northern Ireland in 1998
Base: Dentate and Edentulous
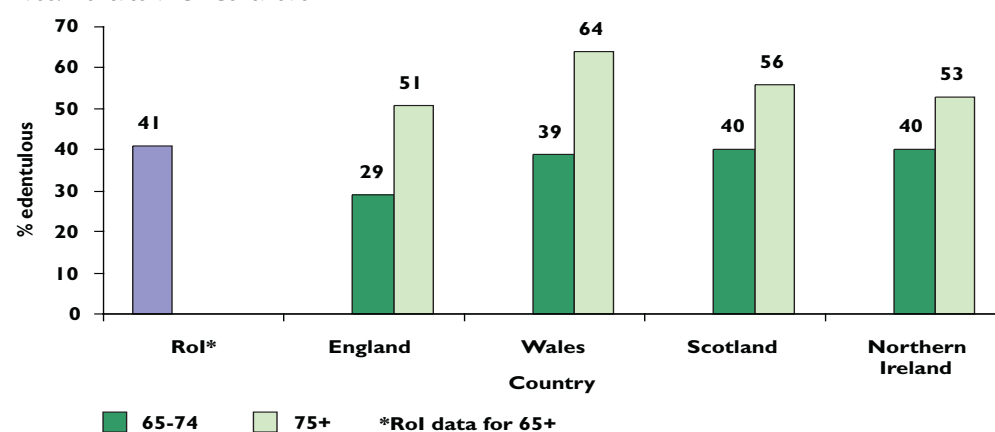
RoI had similar levels of edentulousness to England, Wales, Scotland and Northern Ireland[2] (Figures 3.6a and 3.6b). England had the lowest levels (0%) for 35-44 year-olds, followed by Ireland (1%), Wales (2%), Scotland (3%) and Northern Ireland (4%). The samples drawn for those aged 65 years and over in the UK were stratified according to age groups of 65-74 years and 75+ years. In Ireland however a single sample was drawn for all of those aged 65+. When comparing the data, it is important to remember that RoI figures for edentulousness for those aged 65+ should be compared with a figure somewhere between the mean figures for those aged 65-74 and 75+. Of those in the 65+ age group in the Irish survey, 72% were aged 65-74 years. Adopting this approach, it can be said that the percentages of 65-74 year-olds and those aged 75 years and over who were edentulous in England, Wales, Scotland and Northern Ireland and RoI show a similar pattern to the 35-44 year-old age group. Wales had the highest levels of edentulousness and there was a consistent trend towards England having the lowest levels followed by RoI.

3.9.2 Number of natural teeth present among dentate adults

Table 3.25a Mean number of natural teeth present by age group and country
Base: Dentate

	16-24 year-olds	35-44 year-olds	65+ year-olds
RoI	28.2	25.5	14.3
England	27.9	26.9	17.6
Wales	28.0	26.3	14.8
Scotland	27.9	25.1	16.2
Northern Ireland	28.2	26.4	14.9

There was little variation in the mean number of natural teeth present among dentate 16-24 year-olds in Ireland and the UK (Table 3.25a). Of the countries in the UK and RoI, 35-44 year-olds in Scotland had the lowest number of teeth (25.1) and those in England had the highest (26.9). In Ireland, dentate 35-44 year-olds had on average 25.5 natural teeth present. The variation amongst those aged 65 years and older was greater, ranging from 14.3 in RoI to 17.6 in England.

3.9.3 Percentage of dentate adults with more than 20 natural teeth

Table 3.25b Percentage of adults with more than 20 natural teeth by age group and country
Base: Dentate

	16-24 year-olds	35-44 year-olds	65+ year-olds
RoI	100	91	28
England	100	95	40
Wales	100	96	28
Scotland	98	86	31
Northern Ireland	100	93	30

Except for Scotland, 100% of dentate 16-24 year-olds had more than 20 natural teeth (Table 3.25b). Again for 35-44 year-olds, Scottish adults fared the worst in this measure: 86% of adults in Scotland had more than 20 natural teeth compared with 91% in RoI, 95% in England and 96% in Wales. For those dentate adults aged 65 years and older, 40% in England had more than 20 natural teeth compared to 28% in RoI and Wales.

3.9.4 Percentage of dentate adults with 18+ SUNT

Table 3.25c Percentage of adults with 18+ SUNT by age group and country
Base: Dentate

	16-24 year-olds	35-44 year-olds	65+ year-olds
RoI	90	37	6
England	92	40	5
Wales	85	19	7
Scotland	79	22	4
Northern Ireland	71	21	2

More dentate adults aged 16-24 and 35-44 in England and RoI had 18+ SUNT than in the other countries (Table 3.25c). In the 35-44 year-old group in England and Ireland, approximately twice as many adults had 18+ SUNT (40% and 37% respectively) than in Wales (19%). In all countries, very few dentate adults aged 65 years and over had 18+ SUNT.

3.10 Denture wearing and need for denture treatment
A denture is commonly provided for people with missing teeth. Where some teeth remain, partial dentures can be provided. Combinations of full and partial dentures are also possible where all of the teeth are missing in one arch and some teeth are missing in the other.

An increase in the proportion of the population retaining some natural teeth and an increase in the numbers of teeth retained have been reported in this chapter. It is to be expected that this change would be reflected in the level of denture wearing and the types of dentures worn. These data are presented here for 2000/'02 and are compared with 1989/'90. Such changes are of interest because they impact on the nature of dental services required. Historically, a high proportion of older adults have worn full dentures and the provision of dentures has been a very regular part of general dental practice. Increasing retention of teeth may impact on the frequency with which this time-consuming and costly service is required in the future. Current levels of denture wearing are presented below, and the issue will be considered further in Chapter 7, where need for treatment is presented.

The number of people wearing dentures was recorded according to the type of denture; this is presented in Table 3.26.

Table 3.26 Percentage of adults wearing full upper and lower dentures (F/F), full upper denture only (F/-), full lower only (-/F), and partial dentures (P/P, P/-,-/P) and combinations of both (P/F,F/P) by age group in 1989/'90 and in 2000/'02
Base: Dentate and Edentulous

Age Group		n	No Dentures	F/F	F/-	-/F	P/P	P/- or -/P	P/F or F/P
16-24	2000/'02	1196	98.6	0.0	0.0	0.0	0.1	1.1	0.0
	1989/'90	401	98.0	0.3	0.0	0.0	0.0	1.8	0.0
35-44	2000/'02	978	83.6	0.6	1.3	0.0	1.6	12.7	0.2
	1989/'90	419	68.0	3.3	4.8	0.0	2.1	21.0	0.7
65+	2000/'02	714	26.0	31.0	12.8	0.3	8.0	16.4	5.4
	1989/'90	242	42.6	29.8	12.0	0.8	4.6	5.8	4.6

The percentage of adults wearing all denture types increased with age (Table 3.26). Very few people wore full lower dentures only. Both in 1989/'90 and in 2000/'02, denture wearing was uncommon amongst the 16-24 year-old group (98.0% and 98.6%, respectively, wore no denture). The wearing of all types of dentures has decreased for 35-44 year-olds: 68.0% of this group did not wear a denture in 1989/'90, compared with 83.6% in 2000/'02. Wearing full dentures in either or both arches has changed little amongst the 65+ age group. In 2000/'02, more adults aged 65+ were wearing partial dentures. This has resulted in a reduction in the percentage of this age group wearing no denture (Table 3.26): In 1989/'90, 42.6% of adults aged 65+ did not wear a denture, whereas in 2000/'02, this figure was 26.0%.

It might be expected that adults with no teeth would wear both upper and lower full dentures; however, this is not always the case. Some adults prefer not to wear dentures and others find them uncomfortable. Some continue to wear partial dentures which were made for them prior to losing their last remaining natural teeth. The pattern of denture wearing for edentulous adults in 1989/'90 and 2000/'02 is presented in Table 3.27.

Table 3.27 Percentage of adults wearing full upper and lower dentures (F/F), full upper denture only (F/-), full lower only (-/F), and partial dentures (P/P, P/-,-/P) and combinations of both (P/F,F/P) by age group in 1989/'90 and in 2000/'02
Base: Edentulous

Age Group		n	No Dentures	F/F	F/-	-/F	P/P, P/- or -/P	P/F or F/P
35-44	**2000/'02**	9	0.0	63.3	36.7	0.0	0.0	0.0
	1989/'90	17	23.5	76.5	0.0	0.0	0.0	0.0
65+	**2000/'02**	292	6.0	75.3	10.0	0.0	8.7	0.0
	1989/'90	117	21.4	61.5	11.1	1.7	3.4	0.9

Amongst those aged 65 years and over with no natural teeth, 6.0% had no dentures in 2000/'02, compared with 21.4% in 1989/'90 (Table 3.27).

Table 3.28 presents the percentage of adults wearing dentures according to medical card status.

Table 3.28 Percentage of adults wearing full upper and lower dentures (F/F), full upper denture only (F/-), full lower only (-/F), and partial dentures (P/P, P/-,-/P) and combinations of both (P/F,F/P) by age group and medical card status
Base: Edentulous

Medical Card Status		n	No Dentures	F/F	F/-	-/F	P/P	P/- or -/P	P/F or F/P
MC Yes	35-44	3	0.0	100.0	0.0	0.0	0.0	0.0	0.0
	65+	213	6.8	71.9	11.3	0.0	8.0	2.1	0.0
MC No	35-44	4	0.0	100.0	0.0	0.0	0.0	0.0	0.0
	65+	73	2.3	88.6	5.6	0.0	3.5	0.0	0.0

The percentage of those aged 65+ with no dentures is higher amongst medical card holders than non medical card holders (6.8% vs. 2.3%) (Table 3.28). More non medical card holders (88.6%) have full upper and lower dentures than medical card holders (71.9%). The data indicate higher levels of edentulousness and possibly a lower level of treatment amongst medical card holders. However, as stated earlier, the data must be interpreted with caution for this age group due to the extension of eligibility for medical card ownership to all adults age 70 years and over during the course of the fieldwork for the survey.

Table 3.29 Percentage response to question "How old are your dentures?" for 65+ year-olds
Base: Edentulous

	2000/'02	1989/'90
Two years or less	12.4	6
Two to five years	20.7	16
More than five years but less than 10	19.1	7
10 years but less than 15	12.2	22
More than 15 years	35.5	51

Edentulous adults were asked how old their dentures were: 12.2% were 10-15 years old and a further 35.5% were more than 15 years old (Table 3.29). Regular review and replacement of dentures is important. As time passes the bony ridges supporting the dentures remodel and change shape; new dentures must be made every few years to accommodate these changes. The rate at which dentures should be replaced depends on the rate of change of the bony ridges and soft tissues. However, replacement of dentures would generally be recommended every 5-10 years. Thus, 47.7% (12.2% + 35.5%) of older edentulous adults had dentures that were too old. Although this situation is less than satisfactory, things have improved since 1989/'90 when 73% of this age group had dentures which were 10 years old or more.

Table 3.30 Percentage of 65+ year-olds with no natural teeth who were dissatisfied with the appearance or comfort or fit of their upper and/or lower dentures

	%
Appearance or Comfort or Fit of Upper and/or Lower Denture	40.8
Appearance of Upper Denture	10.7
Comfort or Fit of Upper Denture	15.0
Appearance of Lower Denture	9.9
Comfort or Fit of Lower Denture	33.8
No Lower Denture	8.3

Adults without any natural teeth (edentulous), and with full upper and lower dentures, were also asked whether they were satisfied with the appearance, comfort and fit of their upper and/or lower dentures.

Although all of the edentulous adults who answered this question had a full upper denture, 8.3% had no lower denture (Table 3.30). In total, 40.8% reported dissatisfaction with the appearance, comfort or fit of their upper and/or lower denture. Lower dentures most commonly present difficulties because of the poorer support and retention of dentures in the lower arch. This was evident in the high percentage of adults who expressed dissatisfaction with the comfort or fit of their lower dentures (33.8%). A further 15.0% expressed dissatisfaction with the comfort or fit of upper dentures. Appearance was less of an issue, with 10.7% and 9.9% reporting dissatisfaction with the appearance of their upper denture and lower denture respectively. Comfortable well-fitting upper and lower dentures are important for some of the basic activities of everyday living such as eating, talking and laughing. The high proportion of older adults with no natural teeth who reported difficulties with their dentures is a cause for concern; as such problems are likely to have a major impact on their enjoyment of life.

Table 3.31 Number and percentage of adults wearing a partial denture in which the denture(s) is affecting the oral mucosa by age group in 1989/'90 and in 2000/'02
Base: Dentate adults wearing a partial denture

Age Group		Total partial denture wearers (n)	Affecting n	Affecting %
16-24	**2000/'02**	12	7	34.5
	1989/'90	6	2	33.0
35-44	**2000/'02**	107	59	55.8
	1989/'90	91	42	46.0
65+	**2000/'02**	149	49	35.1
	1989/'90	34	8	24.0

Partial dentures are frequently provided where some but not all teeth are missing; they can improve both aesthetics and function. A major consideration in partial denture construction is to minimize the impact of the denture on the remaining teeth and the oral mucosa. Partial dentures can have a negative impact on both hard and soft tissues in the mouth through physical forces, food trapping and plaque retention. High quality design, manufacture and good denture hygiene are important factors in maintaining a healthy oral environment for partial denture wearers. Clinical examination revealed that of those wearing partial dentures, the dentures were adversely affecting the surrounding tissues in 34.5%, 55.8% 35.1% of cases for 16-24, 35-44 and 65+ year-olds respectively (Table 3.31). These figures were higher than those reported in 1989/'90. Most adults examined in the 1989/'90 survey were examined in their homes, whereas in the 2000/'02 survey most adults were examined in a clinical setting where visibility is likely to have been better. However, the figure is very high in both surveys and the source of partial denture trauma to oral soft tissues warrants investigation to enable improvement of this situation.

Given the high level of mucosal trauma reported among partial denture wearers, consideration should be given to minimising tooth loss and avoiding the need for provision of partial dentures. The Dental Treatment Services Scheme (DTSS), which provides state-funded dental care to all medical card holders, does not cover endodontic treatment of premolar teeth: It only provides for extraction of these teeth.

Loss of molar teeth leads to a shortened dental arch, which can function very well. However, loss of premolar teeth leads, in many cases, to a need for a partial denture to restore function as well as aesthetics. Consideration should be given to the provision for endodontic treatment of premolars among medical card holders to avoid the extraction of these teeth. This change would promote the retention of a functional natural dentition without the need for partial dentures.

Furthermore, oral health promotion activities for adults should include a program of denture hygiene. Poor denture hygiene affects the oral mucosa and can cause disease on the adjacent teeth, thus leading to a further deterioration of oral health for those affected.

3.11 Impact of smoking and alcohol on percent edentulous and mean number of teeth present

Adults in the study were asked whether they smoked tobacco or drank alcohol. The number and percentage of adults, percentage edentulous and mean number of teeth present according to smoking and alcohol consumption is presented by age group in Table 3.32.

Table 3.32 Number and percentage of adults, percent edentulous and mean number of teeth present according to smoking and alcohol consumption by age group

Base: Dentate and Edentulous

35-44 year-olds	n	%	% Edentulous	nt
Cigarette Smoker:				
Yes	284	30.1	2.1	24.2
No	660	69.9	0.4	26.1
Consume Alcohol:				
Yes	726	77.0	0.9	25.6
No	217	23.0	1.2	25.0
All	976		0.9	25.5

65+ year-olds	n	%	% Edentulous	nt
Cigarette Smoker:				
Yes	112	16.2	51.4	11.8
No	580	83.8	38.8	14.7
Consume Alcohol:				
Yes	328	48.0	36.7	15.2
No	356	52.0	44.6	13.3
All	714		40.9	14.3

Thirty percent of the 35-44 year-old group and 16.2% of the 65+ age group reported a current smoking habit (Table 3.32). Alcohol consumption was more frequent, with 77.0% of 35-44 year-olds and 48.0% of the 65+ group reporting drinking alcohol. Just over 2% of smokers and 0.4% of non smokers in the 35-44 age group were edentulous. In this age group, smokers had, on average, two teeth less than non smokers (24.2 vs. 26.1). The picture was similar for the 65+ age group with 51.4% of smokers and 38.8% of non smokers edentulous. Smokers had, on average, three less teeth than non smokers (11.8 vs. 14.7). With regard to alcohol consumption, 35-44 year-old drinkers had, on average, one more tooth than non drinkers (25.6 vs. 25.0); there was little difference in levels of edentulousness (0.9 vs. 1.2). For the 65+ age group, 36.7% of drinkers were edentulous compared to 44.6% of non drinkers; the number of teeth present was also greater among drinkers (15.2 vs. 13.3).

These results suggest that cigarette consumption is associated with higher levels of tooth loss and edentulousness, and that alcohol consumption is associated with lower levels of tooth loss and edentulousness.

Table 3.33 Percentage of dentate and edentulous adults who reported smoking tobacco and drinking alcohol by age group
Base: Dentate and Edentulous

Cigarette Smoker	% of dentate	% of edentulous	% of total
35-44 year-olds	29.2	67.6	29.6
65+ year-olds	14.4	21.9	17.4
Consume Alcohol	% of dentate	% of edentulous	% of total
35-44 year-olds	78.9	73.6	78.8
65+ year-olds	49.8	41.7	46.5

The association between smoking and tooth loss is also apparent in Table 3.33, where 29.2% of dentate 35-44 year-olds, and 67.6% of edentulous 35-44 year-olds, were smokers. Similarly, in the 65+year age group, 14.4% of dentate adults and 21.9% of edentulous adults were smokers. Alcohol consumption was more common among dentate adults than among the edentulous adults.

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Chapter 4
Decayed, Missing and Filled Teeth

4.1 Summary

- The mean number of decayed, missing (all reasons) and filled teeth ($D_{3c}MFT$) decreased by 33.8%, 21.1% and 5.1% among 16-24, 35-44 and 65+ year-olds respectively between 1989/'90 and 2000/'02.
- Gender differences in $D_{3c}MFT$ scores were consistent across all three age groups in 2000/'02. As in 1989/'90, females had higher mean $D_{3c}MFT$ scores than males.
- There was a consistent trend across all age groups for adults in the eastern region (ERHA) to have the lowest mean $D_{3c}MFT$ scores, and those in the mid-western region (MWHB) to have the highest.
- There was little difference in the mean $D_{3c}MFT$ according to medical card ownership for 16-24 and 35-44 year-olds. For those aged 65+, medical card holders tended to have higher mean $D_{3c}MFT$ scores (26.7) than non medical card holders (24.2).
- Mean $D_{3vc}MFT$ (visual plus cavitated dentine caries) scores were lower among fluoridated groups for all age groups. The difference was particularly noticeable among the 35-44 year-old group where those with fluoridated water supplies had, on average, 2.8 more healthy teeth than those in the non fluoridated group. This means that every 1,000 35-44 year-old adults living in fluoridated areas had 2,800 fewer decayed missing or filled teeth than those in non fluoridated areas.
- 35-44 year-olds in non fluoridated areas had more missing teeth than those with at least 35 years exposure to domestic water fluoridation.
- Those with water fluoridation had less caries on the aesthetically important anterior teeth. The relative contribution of anterior caries to the mean $D_{3c}MFT$ score was lower in fluoridated areas.
- For all three age groups, the mean $D_{3c}MFT$ was slightly lower amongst adults with good general health.
- Changes in the relative contribution of decayed, missing and filled teeth to $D_{3c}MFT$ between 1989/'90 and 2000/'02 indicate favourable trends in the treatment of disease. The changes indicate more treatment of caries by filling, fewer extractions, and less untreated disease.
- Amongst the health boards, the 16-24 and 35-44 year-old groups fared worst in the MWHB region where levels of untreated decay and missing teeth were higher and levels of filled teeth were lower than in the other health boards.
- In 1989/'90, for all age groups, medical card holders tended to have a higher proportion of their total $D_{3c}MFT$ attributable to missing teeth and a lower proportion attributable to fillings than non medical card holders. These differences according to medical card status were not found for the 16-24 year-old group in 2000/'02, thus indicating success in the delivery of more equitable dental services since the introduction of the DTSS. The scheme provides an easily accessible restorative dental service for adult medical card holders through a choice of dentist system.
- Multivariate analysis showed that age, gender and health board of residence had an impact on one's chances of having high caries levels; this information may help in the allocation of resources for preventive services.
- Multivariate analysis also showed that, when controlling for confounding factors, infrequent tooth brushing (less than twice a day) and frequent consumption of foods and drinks sweetened with sugar (twice a day or more) were found to be statistically significantly associated with high caries levels in adults. Efforts to reduce the frequency of consumption of foods and drinks sweetened with sugar have the potential to impact general health as well as oral health.
- Overall, the level of root caries in the Irish population was low. Levels of root caries increased with age and were higher among females and among the less well off.
- The level of root caries recorded in 2000/'02 was lower than that recorded in 1989/'90.

4.2 Introduction

The most common disease affecting the dentition is dental caries. In this chapter, the level of dental caries among adults in Ireland will be described. The mean number of decayed, missing (all reasons), and filled teeth ($D_{3c}MFT$) is used to describe the outcome of disease, and its treatment, on the dentition. Firstly, coronal $D_{3c}MFT$ levels among adults in 2000/'02 and changes in these levels since the last survey in 1989/'90 will be presented. The proportion of $D_{3c}MFT$ affecting anterior teeth is also presented, followed by a detailed examination of the contribution of the decayed, missing (all reasons) and filled components to the overall $D_{3c}MFT$. Multivariate analysis is then used to identify the risk factors associated with dental caries (as measured by mean number of decayed, missing (all reasons), and filled surfaces) among adults. Finally, the level of decay on exposed roots is also related: With increasing age, the gingiva sometimes recede exposing the roots of the teeth; once exposed these roots are prone to dental decay.

The data are presented according to age group nationally for 2000/'02 and 1989/'90, and for four health boards in 2000/'02. For each outcome variable, data are presented by gender, medical card status (surrogate for disadvantage for 16-24 and 35-44 year-old groups), fluoridation status and general health status.

4.2.1 Examination criteria, changes since 1989/'90, calculation of mean $D_{3c}MFT$

The WHO examination criteria were used in the adult oral health survey in Ireland in 1989/'90. These criteria were similar to both the current WHO criteria and the criteria used in the UK up to the 1990s. Using this method, only dental caries at cavitation level is recorded: That is, it must be possible to confirm cavitation to dentine by placing a probe in the cavity. It is acknowledged that indices for caries record a stage of the disease rather than the absolute presence or absence of the disease. The survey examination gives an underestimate of caries relative to a full clinical dental examination, in which the teeth are dried and often radiographed. However, cavitation level is a stage at which survey examiner calibration and reproducibility is easily achieved, whether examinations are conducted under clinical or field conditions. The survey examinations provide a measure according to nationally and internationally standardised criteria, and allow temporal, regional and international comparisons of oral health.

In recent years, in established market economies, the reduction in the prevalence of the disease and the greater availability and accessibility of treatment services has had an impact on the value of this method of measurement. Non cavitated dentine caries, where the caries is visible as a shadow under the enamel, is not recorded in the $d_{3c}mft/D_{3c}MFT$ index and was previously ignored in many systems for recording caries. This visual non cavitated dentine caries was recorded as requiring treatment under WHO criteria, but was not included in the reported figures for caries levels. However, for regular dental visitors, visual non cavitated dentine caries would be diagnosed and treated with a restoration, whereupon the caries would be counted in the filled component of the DMFT at any subsequent examination. This meant that as caries levels have decreased, and access to treatment has increased, the impact of the exclusion of visible, but not cavitated, dentine caries is likely to be expressed as an apparently higher DMFT score in areas with easily accessible services, and a lower DMFT score in areas with less access to services.

Accordingly, the British Association for the Study of Community Dentistry amended its criteria in the 1990s and now includes visible, non cavitated dentine caries (visual caries) in its DMF score. The UK survey of adult oral health in 1998[1] included visual non cavitated dentine caries in its criteria. Since the mid 1990s, surveys of children's oral health in Ireland have followed suit. The original criteria have been maintained to allow retrospective comparisons of disease levels and 'visual caries' have also been recorded but coded separately to allow analysis of the data both with and without the inclusion of caries at the 'visual' level. Data are therefore presented for the DMFT score at the 'cavitation' level ($D_{3c}MFT$) and at 'visual' (+ 'cavitation') level ($D_{3vc}MFT$). Where 'visual caries' is referred to in this report, it is implied that the data include caries at both 'visual' and 'cavitation' level.

The mean $D_{3c}MFT$ has been widely used over the years as a measure of dental caries. However it has major shortcomings when used in older age groups, as the reason for loss of a tooth cannot always be unequivocally ascertained. In this report, all missing teeth are included in the $D_{3c}MFT$ scores, edentulous adults being given a count of 32 missing teeth.

4.3 Mean number of decayed, missing (all reasons) and filled teeth and proportion of D$_{3c}$MFT due to anterior caries

Table 4.1a shows caries at cavitation level.

Table 4.1a Mean number and standard error (SE) of decayed (cavitated), missing, and filled teeth (D$_{3c}$MFT) according to age group and gender nationally and by health board of residence in 2000/'02 and nationally and for the EHB region in 1989/'90
Base: Dentate and Edentulous

16-24 year-olds	Male		Female		Total	
	D$_{3c}$MFT	SE	D$_{3c}$MFT	SE	D$_{3c}$MFT	SE
National 2000/'02	4.4	0.2	5.4	0.2	4.9	0.3
National 1989/'90	6.8	0.4	7.9	0.3	7.4	0.2
ERHA 2000/'02	3.6	0.3	4.9	0.4	4.3	0.3
MWHB 2000/'02	6.8	0.5	8.2	0.4	7.5	0.4
NEHB 2000/'02	4.5	0.5	5.3	0.5	4.8	0.4
SHB 2000/'02	4.1	0.5	6.2	0.6	5.1	0.4
EHB 1989/'90	6.9	0.6	7.7	0.4	7.3	0.4

35-44 year-olds	Male		Female		Total	
	D$_{3c}$MFT	SE	D$_{3c}$MFT	SE	D$_{3c}$MFT	SE
National 2000/'02	14.8	0.4	15.3	0.3	15.0	0.5
National 1989/'90	17.9	0.5	19.8	0.4	19.0	0.3
ERHA 2000/'02	13.4	0.7	14.0	0.5	13.7	0.5
MWHB 2000/'02	14.8	0.8	17.4	0.6	16.1	0.5
NEHB 2000/'02	14.8	1.0	15.4	0.6	15.1	0.6
SHB 2000/'02	15.3	0.8	15.9	0.6	15.6	0.6
EHB 1989/'90	18.1	0.7	18.9	0.6	18.6	0.5

65+ year-olds	Male		Female		Total	
	D$_{3c}$MFT	SE	D$_{3c}$MFT	SE	D$_{3c}$MFT	SE
National 2000/'02	24.7	0.5	26.9	0.5	25.9	0.7
National 1989/'90	25.6	0.6	28.8	0.4	27.3	0.4
ERHA 2000/'02	25.0	1.1	27.3	0.8	26.4	0.8
MWHB 2000/'02	26.4	0.7	28.0	0.5	27.3	0.4
NEHB 2000/'02	24.8	1.2	27.8	0.5	26.6	0.6
SHB 2000/'02	24.8	0.9	27.8	0.7	26.5	0.6
EHB 1989/'90	24.1	1.2	27.3	0.9	25.9	0.7

The mean D$_{3c}$MFT for 16-24 year-olds in 2000/'02 was 4.9 compared to 7.4 in 1989/'90. This represents a 33.8% decrease in D$_{3c}$MFT levels in little over a decade. For 35-44 year-olds, the mean D$_{3c}$MFT score decreased from 19.0 to 15.0 (a 21.1% decrease) between 1989/'90 and 2000/'02, and for those aged 65+ the mean D$_{3c}$MFT score decreased from 27.3 in 1989/'90 to 25.9 in 2000/'02 (a 5.1% decrease).

Gender differences in mean D$_{3c}$MFT scores were consistent across all three age groups in 2000/'02. As in 1989/'90, females had higher D$_{3c}$MFT scores than males. For example, in the 16-24 year age group, the mean D$_{3c}$MFT is 5.4 for females and 4.4 for males.

There was a consistent trend across all age groups for adults in the ERHA region to have the lowest D$_{3c}$MFT scores and those in the MWHB region to have the highest.

Table 4.1b Mean number and standard error (SE) of decayed (cavitated and visual), missing, and filled teeth ($D_{3vc}MFT$) according to age group and gender, nationally and by health board of residence in 2000/'02
Base: Dentate and Edentulous

16-24 year-olds	Male		Female		Total	
	$D_{3vc}MFT$	SE	$D_{3vc}MFT$	SE	$D_{3vc}MFT$	SE
National	5.3	0.2	6.1	0.2	5.7	0.3
ERHA	4.8	0.4	5.7	0.4	5.2	0.6
MWHB	7.6	0.5	9.0	0.4	8.3	0.7
NEHB	5.3	0.6	5.8	0.5	5.5	0.8
SHB	4.6	0.6	6.6	0.6	5.6	0.8

35-44 year-olds	Male		Female		Total	
	$D_{3vc}MFT$	SE	$D_{3vc}MFT$	SE	$D_{3vc}MFT$	SE
National	15.2	0.4	15.7	0.3	15.4	0.5
ERHA	13.6	0.7	14.4	0.5	14.0	0.9
MWHB	15.3	0.8	17.7	0.6	16.5	0.9
NEHB	15.2	1.0	15.6	0.6	15.4	1.1
SHB	15.7	0.8	16.1	0.6	15.9	1.0

65+ year-olds	Male		Female		Total	
	$D_{3vc}MFT$	SE	$D_{3vc}MFT$	SE	$D_{3vc}MFT$	SE
National	24.8	0.5	27.0	0.5	26.0	0.7
ERHA	25.1	1.1	27.4	0.8	26.5	1.3
MWHB	26.5	0.7	28.2	0.4	27.4	0.8
NEHB	25.0	1.2	28.0	0.5	26.7	1.3
SHB	24.8	0.9	27.9	0.7	26.5	1.1

The inclusion of visual non cavitated dentinal caries increases the $D_{3c}MFT$ score for all age groups (Table 4.1b). The impact was greatest in the 16-24 age group where the $D_{3c}MFT$ score increased by 0.8 from 4.9 (Table 4.1a) to 5.7 (Table 4.1b).

A further breakdown of $D_{3c}MFT$ was undertaken in order to determine the proportion of total caries experience which affects anterior (front) teeth (Table 4.1c). The rationale for this is that exposure to fluoride (e.g. fluoridated water and tooth paste) tends to have its greatest preventive effect on anterior teeth.

Table 4.1c Mean number of decayed (cavitated), missing, and filled teeth ($D_{3c}MFT$) and $D_{3c}MFT$ in anterior teeth (ant $D_{3c}MFT$) by age group and gender in 1989/'90 and in 2000/'02 (Percentage of total $D_{3c}MFT$ that is attributable to anterior $D_{3c}MFT$ given in parenthesis)
Base: Dentate and Edentulous

Age Group		Male		Female		Total	
		$D_{3c}MFT$	ant $D_{3c}MFT$ (%)	$D_{3c}MFT$	ant $D_{3c}MFT$ (%)	$D_{3c}MFT$	ant $D_{3c}MFT$ (%)
16-24	**2000/'02**	4.4	0.4 (8)	5.4	0.4 (7)	4.9	0.4 (7)
	1989/'90	6.8	0.6 (9)	7.9	0.6 (8)	7.4	0.6 (8)
35-44	**2000/'02**	14.8	2.3 (16)	15.3	2.0 (13)	15.0	2.2 (14)
	1989/'90	17.9	3.0 (17)	19.8	3.6 (18)	19.0	3.3 (17)
65+	**2000/'02**	24.7	7.3 (30)	26.9	8.6 (32)	25.9	8.0 (31)
	1989/'90	25.6	7.8 (30)	28.8	9.5 (33)	27.3	8.7 (32)

In the 16-24 year age group, anterior teeth (incisors and canines) contributed little to the total mean $D_{3c}MFT$ in 2000/'02 (7% of $D_{3c}MFT$) and in 1989/'90 (8% of $D_{3c}MFT$) (Table 4.1c). However in those aged 65 years and older, approximately a third of the total $D_{3c}MFT$ (31%) is attributable to anterior teeth. The percentage of the $D_{3c}MFT$ score attributable to anterior teeth has decreased slightly between 1989/'90 and 2000/'02, with the decrease being greatest in the 35-44 year-old group.

Table 4.1d Mean number of decayed (cavitated + visual), missing, and filled teeth ($D_{3vc}MFT$) and mean $D_{3vc}MFT$ in anterior teeth (ant $D_{3vc}MFT$) by age group and gender in 2000/'02 (Percentage of total $D_{3vc}MFT$ that is attributable to anterior $D_{3vc}MFT$ given in parenthesis)
Base: Dentate and Edentulous

Age Group	Male			Female			Total		
	$D_{3vc}MFT$	SE	ant $D_{3vc}MFT$ (%)	$D_{3vc}MFT$	SE	ant $D_{3vc}MFT$ (%)	$D_{3vc}MFT$	SE	ant $D_{3vc}MFT$ (%)
16-24	5.3	0.2	0.5 (8)	6.1	0.2	0.4 (7)	5.7	0.3	0.5 (8)
35-44	15.2	0.4	2.4 (16)	15.6	0.3	2.1 (13)	15.4	0.5	2.3 (15)
65+	24.8	0.5	7.4 (30)	27.0	0.5	8.6 (32)	26.0	0.7	8.1 (31)

Inclusion of visual caries in the calculation of $D_{3}MFT$ (Table 4.1d) does not change the proportion of $D_{3c}MFT$ due to anterior teeth. In fact, very little visual non cavitated caries was recorded on anterior teeth, evidenced by the similarity of $D_{3c}MFT$ and $D_{3vc}MFT$ scores on anterior teeth.

Table 4.2a Mean number and standard error (SE) of decayed (cavitated), missing, and filled teeth ($D_{3c}MFT$) by age group and medical card status in 1989/'90 and in 2000/'02
Base: Dentate and Edentulous

Age Group	MC Yes				MC No			
	1989/'90		2000/'02		1989/'90		2000/'02	
	$D_{3c}MFT$	SE	$D_{3c}MFT$	SE	$D_{3c}MFT$	SE	$D_{3c}MFT$	SE
16-24	7.5	0.5	4.8	0.3	7.4	0.3	5.0	0.2
35-44	18.0	0.7	15.2	0.7	19.2	0.3	14.9	0.3
65+	28.3	0.5	26.7	0.5	25.9	0.5	24.2	0.6

There is little difference in the mean $D_{3c}MFT$ score according to medical card ownership for 16-24 and 35-44 year-olds; older medical card holders (65+) tend to have higher $D_{3c}MFT$ scores (26.7) than non medical card holders (24.2) (Table 4.2a). The mean $D_{3c}MFT$ decreased in all age groups for both medical card and non medical card holders between 1989/'90 and 2000/'02.

The picture is similar when visual caries is included in the $D_{3c}MFT$ score (Table 4.2b).

Table 4.2b Mean number and standard error (SE) of decayed (cavitated + visual), missing and filled teeth ($D_{3vc}MFT$) by age group and medical card status in 2000/'02
Base: Dentate and Edentulous

Age Group	MC Yes		MC No	
	$D_{3vc}MFT$	SE	$D_{3vc}MFT$	SE
16-24	5.6	0.3	5.8	0.2
35-44	15.9	0.7	15.2	0.3
65+	26.7	0.5	24.4	0.6

Table 4.2c Mean number of decayed (cavitated + visual), missing, and filled teeth (D$_{3vc}$MFT) and D$_{3vc}$MFT in anterior teeth (ant D$_{3vc}$MFT) by age group and medical card status in 2000/'02 (Percentage of total D$_{3vc}$MFT that is attributable to anterior D$_{3vc}$MFT given in parenthesis)
Base: Dentate and Edentulous

Age Group	MC Yes		MC No		Total	
	D$_{3vc}$MFT	ant D$_{3vc}$MFT (%)	D$_{3vc}$MFT	ant D$_{3vc}$MFT (%)	D$_{3vc}$MFT	ant D$_{3vc}$MFT (%)
16-24	5.6	0.5 (9)	5.8	0.4 (8)	5.7	0.5 (8)
35-44	15.9	2.6 (17)	15.2	2.1 (14)	15.3	2.3 (15)
65+	26.7	8.5 (32)	24.4	7.1 (29)	26.1	8.1 (31)

Medical card holders tend to have a consistently greater proportion of their mean D$_{3c}$MFT score on their anterior teeth than non medical card holders for all age groups (Table 4.2c).

Table 4.3a Mean number and standard error (SE) of decayed (cavitated), missing, and filled teeth by age group and fluoridation status in 1989/'90 and in 2000/'02
Base: Dentate and Edentulous

Age Group		Fluoridation Status								
		Non			Part			Full		
		D$_{3c}$MFT	SE	% decrease	D$_{3c}$MFT	SE	% decrease	D$_{3c}$MFT	SE	% decrease
16-24	2000/'02	5.2	0.3	31.8	5.6	0.4	28.7	4.6	0.2	36.4
	1989/'90	7.6	0.5		7.8	0.5		7.2	0.3	
35-44	2000/'02	16.0	0.5	15.8	16.1	0.4	15.2	13.3	0.4	29.6
	1989/'90	19.0	0.7		19.0	0.5		18.9	0.4	
65+	2000/'02	26.7	0.9	4.5	25.6	0.6	6.9	25.9	0.6	2.2
	1989/'90	27.9	0.6		27.5	0.7		26.5	0.7	

There has been an encouraging decrease in mean D$_{3c}$MFT levels between 1989/'90 and 2000/'02 regardless of fluoridation status. Looking at the percentage change in mean D$_{3c}$MFT scores, the decrease has been greatest (36.4%) for the 16-24 year-old group with a fluoridated domestic water supply. In non fluoridated areas, the decrease was also greatest in this age group (31.8%). Similarly for 35-44 year-olds, the decrease in mean D$_{3c}$MFT score was considerably greater in the fluoridated group (29.6%) than the non fluoridated group (15.8%). For those in the 65+ age group, the change in mean D$_{3c}$MFT score between 1989/'90 and 2000/'02 was small and was greatest in the part fluoride group. This age group would have had well established high D$_{3c}$MFT levels prior to the introduction of water fluoridation when the youngest of them would have been 28 years old. Hence, as a D$_{3c}$MFT count is irreversible, there would have been little potential for fluoride to limit the D$_{3c}$MFT score in this age group. These data indicate that water fluoridation is working well to prevent dental caries in adults.

Table 4.3b Mean number and standard error (SE) of decayed (cavitated + visual), missing, and filled teeth (D$_{3vc}$MFT), mean number of decayed (cavitated + visual), missing, and filled anterior teeth (ant D$_{3vc}$MFT) and % of D$_{3vc}$MFT due to anterior D$_{3vc}$MFT by age group and fluoridation status in 2000/'02
Base: Dentate and Edentulous

Age Group		Fluoridation Status							
	Non			Part			Full		
	D$_{3vc}$MFT	SE	ant D$_{3vc}$MFT (%)	D$_{3vc}$MFT	SE	ant D$_{3vc}$MFT (%)	D$_{3vc}$MFT	SE	ant D$_{3vc}$MFT (%)
16-24	6.0	0.3	0.6 (10)	6.4	0.4	0.6 (9)	5.4	0.2	0.4 (7)
35-44	16.5	0.5	3.0 (18)	16.4	0.4	2.6 (16)	13.7	0.4	1.5 (11)
65+	26.8	0.8	8.5 (32)	25.8	0.6	7.9 (31)	26.0	0.6	8.1 (31)

The mean D$_{3vc}$MFT scores (Table 4.3b) were lower among fluoridated groups for all ages. The difference is particularly noticeable among the 35-44 year-old group, where, on average, those with fluoridated water supplies had 2.8 more healthy teeth than the non fluoridated group. Another way of looking at

this is to say that for every 1,000 35-44 year-old adults living in fluoridated areas, there are 2,800 teeth saved from disease. Also worth noting is that those with water fluoridation have less caries on the aesthetically important anterior teeth. As expected, the relative contribution of anterior caries to the mean $D_{3c}MFT$ score is lower in fluoridated areas.

Table 4.4 Mean number of decayed (cavitated), missing, and filled teeth by general health status (ASA) and age group
Base: Dentate and Edentulous

Age Group	ASA 1	ASA 2	ASA 3	ASA 4	Total
16-24	4.8	6.3	*	*	4.9
35-44	15.0	16.3	*	*	15.0
65+	25.3	27.0	27.8	*	25.9

For all three age groups, the mean $D_{3c}MFT$ was slightly lower amongst healthy adults (ASA 1) at 4.8, 15.0 and 25.3 for 16-24, 35-44 and 65+ year-olds respectively, when compared with those in ASA Class 2 at 6.3, 16.3 and 27.0 respectively.

4.4 Percentage of total decay experience which is attributable to decayed, missing, or filled teeth

Table 4.5a Percentage of the total $D_{3c}MFT$ (cavitated) which is attributable to the decayed ($D_{3c}T$), Missing (MT) or Filled (FT) components by age group, nationally and by health board of residence in 2000/'02, and nationally and for the EHB region in 1989/'90
Base: Dentate and Edentulous

16-24 year-olds	Mean $D_{3c}MFT$	Mean $D_{3c}T$	Mean MT	Mean FT	% $D_{3c}MFT$ Attributable to		
					$D_{3c}T$	MT	FT
National 2000/'02	4.9	0.7	1.5	2.7	14	30	54
National 1989/'90	7.4				19	35	46
ERHA 2000/'02	4.3	0.6	1.3	2.3	14	31	54
MWHB 2000/'02	7.5	1.6	2.7	3.2	21	36	42
NEHB 2000/'02	4.8	0.8	1.4	2.5	17	29	53
SHB 2000/'02	5.1	0.7	1.1	3.3	13	21	65
EHB 1989/'90	7.3				22	32	47
35-44 year-olds	Mean $D_{3c}MFT$	Mean $D_{3c}T$	Mean MT	Mean FT	% $D_{3c}MFT$ Attributable to		
					$D_{3c}T$	MT	FT
National 2000/'02	15.0	1.0	5.7	8.3	6	38	55
National 1989/'90	19.0				6	56	38
ERHA 2000/'02	13.7	1.0	4.6	8.1	7	33	59
MWHB 2000/'02	16.1	1.4	7.1	7.5	9	44	46
NEHB 2000/'02	15.1	0.8	5.8	8.4	5	38	56
SHB 2000/'02	15.6	0.8	5.8	8.8	5	37	57
EHB 1989/'90	18.6				3	49	48

65+ year-olds	Mean D$_{3c}$MFT	Mean D$_{3c}$T	Mean MT	Mean FT	% D$_{3c}$MFT Attributable to		
					D$_{3c}$T	MT	FT
National 2000/'02	25.9	0.5	22.8	2.6	2	88	10
National 1989/'90	27.3				4	90	6
ERHA 2000/'02	26.4	0.4	23.2	2.8	2	88	11
MWHB 2000/'02	27.3	0.8	24.3	2.2	3	89	8
NEHB 2000/'02	26.6	0.6	23.4	2.5	2	88	10
SHB 2000/'02	26.5	0.4	23.9	2.2	1	90	8
EHB 1989/'90	25.9				2	82	15

Note: Percentages may not add to 100 due to rounding errors

An indication of the extent to which dental caries is being treated, and of the pattern of treatment, can be obtained by an analysis of the components of total decay experience (D$_{3c}$MFT). It is generally accepted that the decayed (D$_{3c}$T) component is an indication of unmet need, the filled component (FT) represents successful treatment, and the missing component (MT) represents failed treatment. The D$_{3c}$T component was highest in the 35-44 year-old group: On average, each adult in this age group had 1.0 decayed teeth (Table 4.5a). The mean number of decayed teeth was lower for 16-24 year-olds, at 0.7. Mean D$_{3c}$T was less than 1.0 for 16-24 year-olds in all health boards except the MWHB region, where the mean number of decayed teeth (1.6) was considerably higher than in the other areas. The mean number of missing teeth was dramatically greater in the older age groups compared to the 16-24 year-old group. Loss of teeth is becoming less common, and as the 16-24 year-old group in this survey get older, they will not experience the same levels of tooth loss as previous age cohorts.

The proportion of total D$_{3c}$MFT that was attributable to untreated decay (D$_{3c}$T) was 14% among those aged 16-24, 6% in 35-44 year-olds and 2% in 65+ year-olds (Table 4.5a). Missing teeth (in this report, teeth missing for any reason) accounted for 30% of the total D$_{3c}$MFT in those aged 16-24 and 88% in those aged 65 years and over. The proportion of total D$_{3c}$MFT attributable to filled teeth was 54% in those aged 16-24, and was only 10% in those aged 65 years and over.

Changes in the relative contribution of decayed, missing and filled teeth to the D$_{3c}$MFT between 1989/'90 and 2000/'02 indicate favourable trends in the treatment of disease. For example, among 16-24 year-olds, the relative contribution of the decayed component declined from 19% to 14%, missing teeth decreased from 35% to 30%, and the filled component increased from 46% to 54%. These changes indicate more treatment of caries by filling rather than extraction, and less untreated disease. Amongst the health board areas, the 16-24 and 35-44 year-old groups fared worst in the MWHB region where levels of untreated decay (1.6 and 1.4) and missing teeth (2.7 and 7.1) were high compared to the other health board areas. Levels of filled teeth were lower in the MWHB region for those aged 35-44 years (7.5) compared to the other health boards. The differences among the other health boards were minor, except in the case of the SHB region, where the contribution of missing teeth to the overall D$_{3c}$MFT among the 16-24 year-old group was lower than in the other health boards (1.1).

Table 4.5b Mean D$_{3vc}$MFT and percentage of the total D$_{3vc}$MFT (cavitated + visual) which is attributable to the decayed cavitated + visual (D$_{3vc}$T), Missing (MT) or Filled (FT) components by age group, nationally and by health board of residence in 2000/'02
Base: Dentate and Edentulous

16-24 year-olds	Mean D$_{3vc}$MFT	% Attributable to		
		D$_{3vc}$T	MT	FT
National	5.7	28	26	46
ERHA	5.2	31	25	44
MWHB	8.3	29	32	38
NEHB	5.5	28	26	46
SHB	5.6	22	19	59

35-44 year-olds	Mean D_{3vc}MFT	D_{3vc}T	MT	FT
National	15.4	9	37	54
ERHA	14.0	10	33	58
MWHB	16.5	12	43	45
NEHB	15.4	7	38	55
SHB	15.9	8	37	56

65+ year-olds	Mean D_{3vc}MFT	D_{3vc}T	MT	FT
National	26.0	2	88	10
ERHA	26.5	2	88	10
MWHB	27.4	3	89	8
NEHB	26.7	3	88	9
SHB	26.5	2	90	8

Inclusion of visual caries in the D_{3c}MFT score (Table 4.5b) increases the percentage of the D_{3c}MFT attributable to the decayed component (for example from 14% to 28% for the 16-24 year age group), and reduces the percentage attributable to the missing and filled components.

Table 4.6a Mean D_{3c}MFT (cavitated) and percentage of total D_{3c}MFT (cavitated) which are attributable to the Decayed (D_{3c}T), Missing (MT) or Filled (FT) components according to age group and gender, nationally and by health board of residence in 2000/'02, and nationally in 1989/'90
Base: Dentate and Edentulous

| 16-24 year-olds | Mean D_{3c}MFT | | % Attributable to | | | | | |
| | | | D_{3c}T | | MT | | FT | |
	M	F	M	F	M	F	M	F
National 2000/'02	4.4	5.4	17	13	28	32	54	54
National 1989/'90	6.8	7.9	23	17	32	37	46	47
ERHA 2000/'02	3.6	4.9	20	9	26	35	53	55
MWHB 2000/'02	6.8	8.2	23	19	37	35	39	46
NEHB 2000/'02	4.5	5.3	22	13	28	30	48	57
SHB 2000/'02	4.1	6.2	15	12	19	22	65	65

| 35-44 year-olds | Mean D_{3c}MFT | | D_{3c}T | | MT | | FT | |
	M	F	M	F	M	F	M	F
National 2000/'02	14.8	15.3	8	5	38	38	53	57
National 1989/'90	17.9	19.8	7	6	54	58	39	37
ERHA 2000/'02	13.4	14.0	9	6	30	36	60	58
MWHB 2000/'02	14.8	17.4	10	8	44	44	45	47
NEHB 2000/'02	14.8	15.4	6	4	40	36	52	59
SHB 2000/'02	15.3	15.9	7	4	40	35	52	61

| 65+ year-olds | Mean D_{3c}MFT | | D_{3c}T | | MT | | FT | |
	M	F	M	F	M	F	M	F
National 2000/'02	24.7	26.9	3	1	87	89	11	10
National 1989/'90	25.6	28.8	7	1	85	94	8	5
ERHA 2000/'02	25.0	27.3	3	1	86	89	12	10
MWHB 2000/'02	26.4	28.0	4	2	89	90	8	8
NEHB 2000/'02	24.8	27.8	3	2	86	90	12	8
SHB 2000/'02	24.8	27.8	2	1	89	91	9	8

The percentage of the D_{3c}MFT attributable to the different components varied little between males and females in the 35-44 and 65+ age groups (Table 4.6a). In the 16-24 year-old group, gender differences were evident in the proportion of the D_{3c}MFT attributable to the decayed component (17% for males and 13% for females). This difference was more obvious at health board level. In the ERHA region, decayed teeth accounted for 20% of the D_{3c}MFT for male, and 9% for female, 16-24 year-olds. This difference was balanced by a higher proportion of the D_{3c}MFT due to missing teeth in females (35%) than in males (26%). The mean D_{3c}MFT score for females was higher than that for males in the ERHA region (4.9 vs. 3.6). These data indicate that young females in the ERHA region have more extraction of teeth than males. It should be noted that the missing component of the D_{3c}MFT includes extractions for all reasons; orthodontic extractions are included, and this may contribute to the difference. In the NEHB region, males in the 16-24 age group tended to have a greater proportion of untreated decay and a lower proportion of fillings than females.

Table 4.6b Mean D_{3vc}MFT (cavitated + visual) and percentage of total D_{3vc}MFT (cavitated + visual) which are attributable to the Decayed (D_{3vc}T), Missing (MT) or Filled (FT) components according to age group and gender, nationally and by health board of residence in 2000/'02
Base: Dentate and Edentulous

| 16-24 year-olds | Mean D_{3vc}MFT | | % Attributable to | | | | | |
| | | | D_{3vc}T | | MT | | FT | |
	M	F	M	F	M	F	M	F
National	5.4	6.1	32	24	23	28	45	48
ERHA	4.8	5.7	41	23	19	30	40	47
MWHB	7.6	9.0	32	27	33	32	35	41
NEHB	5.3	5.8	35	21	24	27	41	52
SHB	4.6	6.6	26	19	17	21	58	60

| 35-44 year-olds | Mean D_{3vc}MFT | | D_{3vc}T | | MT | | FT | |
	M	F	M	F	M	F	M	F
National	15.2	15.7	11	8	37	37	51	56
ERHA	13.6	14.4	11	9	30	35	60	56
MWHB	15.3	17.7	13	10	43	43	44	46
NEHB	15.2	15.6	9	6	39	36	51	59
SHB	15.7	16.1	9	6	40	34	51	60

| 65+ year-olds | Mean D_{3vc}MFT | | D_{3vc}T | | MT | | FT | |
	M	F	M	F	M	F	M	F
National	24.8	27.0	3	2	86	89	10	10
ERHA	25.1	27.4	3	1	85	89	12	10
MWHB	26.5	28.2	4	3	88	89	8	8
NEHB	25.0	28.0	3	3	85	89	11	8
SHB	24.8	27.9	2	1	89	91	9	8

The inclusion of visual caries in D_{3vc}MFT (Table 4.6b) exaggerated the gender differences in the proportion of D_{3vc}MFT attributable to the decayed component.

Table 4.7a Percentage of total D_{3c}MFT (cavitated) which is attributable to the Decayed (cavitated) (D_{3c}T), Missing (MT) and Filled (FT) components according to age group and medical card status, nationally and by health board of residence in 2000/'02 and nationally in 1989/'90
Base: Dentate and Edentulous

16-24 year-olds	% D_{3c}T		% MT		% FT	
	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No
National 2000/'02	16	14	30	30	53	55
National 1989/'90	24	16	37	34	39	50
ERHA 2000/'02	23	13	23	32	53	54
MWHB 2000/'02	24	20	35	36	40	43
NEHB 2000/'02	16	17	30	29	53	52
SHB 2000/'02	12	14	28	19	60	66

35-44 year-olds	% D_{3c}T		% MT		% FT	
	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No
National 2000/'02	8	6	51	34	40	59
National 1989/'90	9	5	61	54	30	41
ERHA 2000/'02	11	7	48	31	41	61
MWHB 2000/'02	14	8	56	40	29	51
NEHB 2000/'02	8	5	58	34	34	61
SHB 2000/'02	6	5	51	34	42	60

65+ year-olds	% D_{3c}T		% MT		% FT	
	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No
National 2000/'02	2	3	91	80	7	17
National 1989/'90	3	5	94	83	3	12
ERHA 2000/'02	1	2	92	81	7	17
MWHB 2000/'02	3	3	92	83	5	14
NEHB 2000/'02	2	4	91	76	7	19
SHB 2000/'02	1	1	92	85	6	14

Note: Percentages may not add to 100 due to rounding errors

In 1989/'90, medical card holders tended to have a higher proportion of their total D_{3c}MFT attributable to missing teeth and a lower proportion attributable to fillings for all age groups. The data shown in Table 4.7a indicate that these differences according to medical card status no longer exist for the 16-24 year-old group. For medical card holders in the 35-44 and 65+ age groups, the percentage of the total D_{3c}MFT attributable to missing teeth remains higher, and the proportion attributable to fillings remains lower than that for non medical card holders. As tooth loss due to extraction is irreversible, and this difference according to medical card status existed a decade ago for all age groups, it is not surprising that the situation has not changed for the older groups. However, the change in the 16-24 age group indicates success in the delivery of more equitable dental services since the introduction of the DTSS. The scheme provides an easily accessible restorative dental service for adult medical card holders through a choice of dentist system.

Table 4.7b Percentage of total D_{3vc}MFT (cavitated + visual) which is attributable to the Decayed (cavitated + visual) (D_{3vc}T), Missing (MT) and Filled (FT) components according to age group and medical card status, nationally and by health board of residence in 2000/'02
Base: Dentate and Edentulous

16-24 year-olds	% D_{3vc}T		% MT		% FT	
	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No
National	30	27	26	26	45	47
ERHA	39	30	19	26	43	44

16-24 year-olds	% D_{3vc}T		% MT		% FT	
	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No
MWHB	34	28	31	33	35	39
NEHB	25	29	27	25	48	46
SHB	17	23	26	17	57	60

35-44 year-olds	% D_{3vc}T		% MT		% FT	
	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No
National	13	9	49	33	38	58
ERHA	15	9	46	31	39	60
MWHB	17	11	55	39	28	49
NEHB	11	7	56	33	33	60
SHB	11	7	49	34	40	60

65+ year-olds	% D_{3vc}T		% MT		% FT	
	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No
National	2	3	91	80	7	17
ERHA	1	3	92	80	7	17
MWHB	3	3	92	82	5	14
NEHB	2	6	91	75	7	19
SHB	2	2	92	85	6	14

When visual caries is included in the D_{3vc}MFT score (Table 4.7b), the findings are similar to those for the cavitated D_{3c}MFT.

Table 4.8a Percentage of total D_{3c}MFT (cavitated) which is attributable to the Decayed (cavitated) (D_{3c}T), Missing (MT) and Filled (FT) components according to age group and fluoridation status, nationally and by health board of residence in 2000/'02, and nationally in 1989/'90

Base: Dentate and Edentulous

16-24 year-olds	Fluoridation Status											
	Non				Part				Full			
	D_{3c}MFT	D_{3c}T	MT	FT	D_{3c}MFT	D_{3c}T	MT	FT	D_{3c}MFT	D_{3c}T	MT	FT
National 2000/'02	5.2	16	30	53	5.6	14	33	52	4.6	14	29	56
National 1989/'90	7.6	16	33	51	7.9	18	34	48	7.2	21	36	43
ERHA 2000/'02	3.7	0	16	84	5.3	10	34	54	4.0	15	30	53
MWHB 2000/'02	7.5	20	33	46	6.7	18	41	39	8.1	23	36	40
NEHB 2000/'02	5.3	15	29	55	5.1	20	30	49	4.0	16	29	54
SHB 2000/'02	6.9	9	21	69	4.9	13	17	69	4.7	15	21	63

35-44 year-olds	Non				Part				Full			
	D_{3c}MFT	D_{3c}T	MT	FT	D_{3c}MFT	D_{3c}T	MT	FT	D_{3c}MFT	D_{3c}T	MT	FT
National 2000/'02	16.0	7	45	47	16.1	5	38	56	13.3	8	35	56
National 1989/'90	19.0	10	66	24	19.0	7	57	36	18.9	3	49	48
ERHA 2000/'02	4.0	0	50	50	15.4	4	32	64	13.0	9	34	57
MWHB 2000/'02	17.7	10	51	38	15.6	8	38	54	13.7	10	46	44
NEHB 2000/'02	17.9	6	48	46	14.2	5	35	60	12.7	11	27	61
SHB 2000/'02	15.9	7	38	55	15.9	5	37	58	15.1	5	38	56

65+ year-olds	Non				Part				Full			
	$D_{3c}MFT$	$D_{3c}T$	MT	FT	$D_{3c}MFT$	$D_{3c}T$	MT	FT	$D_{3c}MFT$	$D_{3c}T$	MT	FT
National 2000/'02	26.7	2	91	7	25.6	2	86	12	25.9	2	89	9
National 1989/'90	27.9	4	93	3	27.5	6	89	6	26.5	3	86	11
ERHA 2000/'02	32.0	0	97	3	27.2	1	83	16	26.1	2	89	9
MWHB 2000/'02	27.8	3	94	4	26.7	2	90	8	27.5	4	87	9
NEHB 2000/'02	26.0	1	91	8	26.5	3	85	12	31.5	2	96	2
SHB 2000/'02	26.0	2	86	12	27.5	2	90	8	25.5	1	92	7

Mean $D_{3c}MFT$ tends to be higher in the non fluoridated group than in the full fluoridated group. The difference was greatest in the 35-44 age group, where the percentages of total $D_{3c}MFT$ which are attributable to missing teeth were 45% and 35% for the non fluoridated and full fluoridated groups respectively.

The percentage of the $D_{3c}MFT$ attributable to the decayed, missing and filled components when visual caries is included in the score is presented in Table 4.8b.

Table 4.8b Percentage of total $D_{3vc}MFT$ (cavitated + visual) which is attributable to the Decayed (cavitated + visual) ($D_{3vc}T$), Missing (MT) and Filled (FT) components according to age group and fluoridation status, nationally and by health board of residence in 2000/'02
Base: Dentate and Edentulous

16-24 year-olds	Fluoridation Status											
	Non				Part				Full			
	$D_{3vc}MFT$	$D_{3vc}T$	MT	FT	$D_{3vc}MFT$	$D_{3vc}T$	MT	FT	$D_{3vc}MFT$	$D_{3vc}T$	MT	FT
National	6.0	29	26	45	6.4	25	29	46	5.4	28	25	47
ERHA	3.7	0	16	84	6.1	24	29	47	5.0	33	24	43
MWHB	8.4	30	30	41	7.4	28	37	35	8.6	29	33	38
NEHB	6.1	27	25	48	5.6	28	27	45	4.8	30	24	45
SHB	7.7	19	19	62	5.2	19	16	65	5.2	23	19	57

35-44 year-olds	Non				Part				Full			
	$D_{3vc}MFT$	$D_{3vc}T$	MT	FT	$D_{3vc}MFT$	$D_{3vc}T$	MT	FT	$D_{3vc}MFT$	$D_{3vc}T$	MT	FT
National	16.5	11	44	45	16.4	8	37	55	13.7	12	34	55
ERHA	4.0	0	50	50	15.5	5	32	63	13.3	12	33	55
MWHB	18.0	12	50	38	16.0	11	37	53	14.4	15	43	41
NEHB	18.2	8	47	45	14.5	7	34	59	13.1	14	26	59
SHB	16.1	8	38	54	16.1	7	36	57	15.5	8	37	54

65+ year-olds	Non				Part				Full			
	$D_{3vc}MFT$	$D_{3vc}T$	MT	FT	$D_{3vc}MFT$	$D_{3vc}T$	MT	FT	$D_{3vc}MFT$	$D_{3vc}T$	MT	FT
National	26.8	3	90	7	25.8	3	85	12	26.0	2	89	9
ERHA	32.0	0	97	3	27.3	1	83	16	26.1	2	89	9
MWHB	28.1	4	93	4	26.9	3	89	8	27.5	4	87	9
NEHB	26.1	2	90	8	26.7	4	84	12	31.5	2	96	2
SHB	26.0	2	86	12	27.5	2	90	8	25.5	1	92	7

4.5 Mean number of decayed, missing and filled surfaces

Another outcome variable for caries is the $D_{3c}MFS$ score which counts decay on tooth surfaces rather than teeth. The $D_{3c}MFT$ Index has a range of 0-32 whereas the range of the $D_{3c}MFS$ Index is 0-148. Table 4.9 presents the mean $D_{3c}MFS$ by age, gender and medical card status, and largely supplements and supports the $D_{3c}MFT$ results in Table 4.1a.

Table 4.9 Mean number and standard deviation of decayed, missing, and filled surfaces (D$_{3c}$MFS) according to age group, gender and medical card status, nationally and by health board of residence in 2000/'02 and nationally in 1989/'90

Base: Dentate and Edentulous

16-24 year-olds	MC Yes				MC No			
	Male		Female		Male		Female	
	Mean	sd	Mean	sd	Mean	sd	Mean	sd
National 2000/'02	10.1	10.3	15.2	14.7	10.4	9.3	12.3	10.6
National 1989/'90	14.6	9.7	16.5	14.2	13.9	11.2	16.6	10.7
ERHA 2000/'02	4.3	3.8	9.1	10.9	7.9	7.5	10.2	9.6
MWHB 2000/'02	15.3	11.0	19.5	11.3	14.2	10.2	16.5	10.4
NEHB 2000/'02	6.3	7.9	15.6	16.6	9.5	8.8	10.0	10.7
SHB 2000/'02	9.4	11.8	12.3	7.1	7.5	8.0	11.3	11.4

35-44 year-olds	Male		Female		Male		Female	
	Mean	sd	Mean	sd	Mean	sd	Mean	sd
National 2000/'02	35.8	20.7	38.7	22.0	35.7	18.5	38.0	19.2
National 1989/'90	41.9	24.2	54.6	33.3	47.6	25.3	52.7	24.3
ERHA 2000/'02	31.0	17.3	30.2	22.9	29.6	17.4	32.3	16.2
MWHB 2000/'02	33.9	22.8	49.3	20.8	37.9	18.5	42.1	22.2
NEHB 2000/'02	45.4	31.6	36.7	17.3	34.9	16.3	36.3	16.9
SHB 2000/'02	36.3	19.8	33.6	18.7	37.0	18.5	38.7	19.9

65+ year-olds	Male		Female		Male		Female	
	Mean	sd	Mean	sd	Mean	sd	Mean	sd
National 2000/'02	75.7	24.0	81.3	20.2	67.9	24.3	75.7	20.2
National 1989/'90	103.6	45.8	125.8	37.8	82.4	35.2	103.8	41.6
ERHA 2000/'02	76.4	22.8	84.0	17.8	66.6	26.2	74.9	22.1
MWHB 2000/'02	81.7	22.4	84.0	16.8	71.4	21.6	79.2	15.5
NEHB 2000/'02	72.7	28.3	85.1	15.4	72.0	21.6	75.7	20.6
SHB 2000/'02	73.2	25.4	82.4	20.6	69.6	25.8	77.6	20.8

Table 4.9 shows that, as with mean D$_{3c}$MFT, the mean D$_{3c}$MFS score increases with age. Medical card holders generally have higher D$_{3c}$MFS scores than non medical card holders. Females also tend to have higher D$_{3c}$MFS scores than males. At health board level, adults in the ERHA region had below-average levels of D$_{3c}$MFS for all groups, except medical card holders aged 65 and over. Adults in the MWHB region had above-average D$_{3c}$MFS in all groups, except for male medical card holders aged 35-44.

4.6 Identifying risk indicators associated with dental caries
Because of the intense competition for resources within the health system, there is an argument for selective targeting of individuals or groups at high-risk to caries for preventive measures[2,3]. The identification of characteristics of low- and high-risk groups enables policy makers to selectively target groups at high-risk for preventive dental services, hence improving the cost-effectiveness of services.

A number of studies have illustrated the value of past caries experience in predicting future caries risk[4,5]. Thus, the identification of the characteristics of Irish adults with high caries levels can be of value in the prediction of future caries risk. In both the 1989/'90 and 2000/'02 national surveys, past caries experience was estimated using D$_{3c}$MFS scores for adults clinically examined. Hence, these scores are available for use as an outcome measure in modeling the profile of adults with high caries levels. D$_{3c}$MFS and D$_{3vc}$MFS are the dependent, or outcome, variables used in this analysis.

It is well established that the prevalence of caries varies according to the demographic, socio-economic, and behavioural characteristics of individuals[2,4,6]. The purpose of this empirical analysis is to identify such indicators associated with high D$_{3c}$MFS scores in the Irish adult population, while controlling for

age, gender, fluoridation status, eligibility status, health board differences, socio-economic characteristics and attitudinal factors.

For this investigation, the explanatory variables are presented in groups (or blocks): demographic, socio-economic, and behavioural. The demographic variables included are age, gender, fluoridation status and health board of residence. Caries levels also vary according to socio-economic factors, therefore medical card ownership, educational attainment, and employment status are included to control for socio-economic differences. In what is described by Grembowski *et al.* (1989)[7] as the 'cognitive block', variables representing fear of the dentist, regular brushing, regular attendance, and frequent snacking are included. The variables entered into the analysis are briefly described in Table 4.10.

Table 4.10 Description of variables included in multivariate analysis
Base Dentate and Edentulous

Variable	Description
$D_{3c}MFS$	Decayed Missing Filled Surfaces, based on clinical examination from the national surveys of adult oral health in 1989/'90 and 2000/'02, ranging from 0 to 148
$D_{3vc}MFS$	$D_{3c}MFS$ plus a visual component
Age	Age in years at the time of the clinical examination
Age 16-24	= 1 if aged between 16 and 24, 0 = otherwise
Age 35-44	= 1 if aged between 35 and 44, 0 = otherwise
Age 65+	= 1 if aged over 65 years, 0 = otherwise
Female	1 = female, 0 = male
Fluoride	1 = fluoride, 0 = non fluoridated water supply
ERHA	= 1 if Eastern Regional Health Authority, 0 = otherwise
MHB	= 1 if Midlands Health Board, 0 = otherwise
MWHB	= 1 if Mid Western Health Board, 0 = otherwise
NEHB	= 1 if North Eastern Health Board, 0 = otherwise
NWHB	= 1 if North Western Health Board, 0 = otherwise
SEHB	= 1 if South Eastern Health Board, 0 = otherwise
SHB	= 1 if Southern Health Board, 0 = otherwise
WHB	= 1 if Western Health Board, 0 = otherwise
Medical card	1 = medical card, 0 = other (including PRSI, None, Private)
Third level	1 = adults who received third level education, 0 otherwise
Unemployed	1 = unemployed, 0 = otherwise
Primary education	1 = primary education only, 0 = otherwise
Smoker	1 = smoker, 0 = otherwise
Frequent snacks	1 = frequent snacks, 0 = other (less than twice a day)
Regular brusher	1 = regular brusher, 0 = other (if less than twice a day)
Regular user	1 = regular user, 0 = other (not visited the dentist in the past 24 months)
Fear of dentist	1 = frightened, 0 = other (worried to relaxed while waiting in the dentist chair)

4.6.1 Dependent variables
The dependent variables are the $D_{3c}MFS$ and $D_{3vc}MFS$ index scores, which describe the amount, or prevalence, of dental caries in an individual. The $D_{3vc}MFS$ index includes visually detected caries and is also included as a dependent variable as it is sometimes found to be a more sensitive measure[8]. Tables

4.11a and 4.11b present the distribution of the dependent variables ($D_{3c}MFS/D_{3vc}MFS$) by age group.

Table 4.11a Mean and standard deviation of $D_{3c}MFS$ scores, cut off scores for percentiles and maximum and minimum $D_{3c}MFS$ scores, by age group

| | | | | Percentiles - $D_{3c}MFS$ cut off scores | | | | | | |
| | | | | Low | | Medium | High | | | |
Age Group	n	Mean	sd	10%	25%	50%	75%	90%	Max	Min
16-24	1,196	11.8	10.9	0	3	9	18	26	0	94
35-44	978	37.3	19.5	14	23	35	48	63	0	118
65+	714	76.2	22.5	44	58	83	96	96	0	107
All	2,888	36.4	30.8	3	11	28	55	96	0	118

Table 4.11b Mean and standard deviation of $D_{3vc}MFS$ scores, cut off scores for percentiles and maximum and minimum $D_{3vc}MFS$ scores by age group

| | | | | Percentiles - $D_{3vc}MFS$ cut off scores | | | | | | |
| | | | | Low | | Medium | High | | | |
Age Group	n	Mean	sd	10%	25%	50%	75%	90%	Max	Min
16-24	1,196	13.0	11.3	1	4	11	19	27	0	94
35-44	978	38.1	19.5	15	24	36	49	64	0	118
65+	714	76.5	22.3	44	59	83	96	98	0	107
All	2,888	37.2	30.5	4	12	28.5	57	96	0	118

These tables reveal that what constitutes high caries levels for 16-24 year-olds (in terms of the prevalence of $D_{3c}MFS/D_{3vc}MFS$) would be inappropriate for 65+ year-olds. For example, the mean $D_{3c}MFS$ for 16-24 year-olds in 2000/'02 was 11.8, compared with 76.2 for those aged 65 and over. Therefore, it is more appropriate, for this investigation, to disaggregate $D_{3c}MFS$ and $D_{3vc}MFS$ scores by age group. It was decided to include adults with prevalence $D_{3c}MFS$ and $D_{3vc}MFS$ scores above the 75th percentile for their age group as being most likely to be categorised as having high caries levels, and those adults below the 25th percentile to have low caries levels. Individuals between the 25th and 75th percentiles are deemed to have medium caries levels.

4.6.2 Factors associated with variation in caries levels

The demographic characteristics associated with variation in caries levels, as reported in the earlier part of this chapter, were age, gender, fluoridation status, and health board of residence. Caries levels increase with age and are higher among females. Evidence shows that the fluoridation of public water supplies reduces the incidence of dental caries. Health board of residence may explain characteristics of the individuals' environment factors influencing caries levels and or provision of treatment. Medical card status is associated with dental caries levels in children and adolescents in Ireland[9], therefore medical card eligibility is included as an indicator of economic status. The level of educational attainment, which increases the individuals' uptake of dental care, is generally correlated with social class[10] and is also included. Employment status is included as it is often correlated with income and social class. Regular brushing is positively associated with good oral health, and frequent snacks are associated with increased caries levels: Both these variables are also included in the analysis. The regular use of dental services is included, although it has an unpredictable relationship with need. In some studies[2], regular use of dental services, particularly amongst lower socio-economic groups, is associated with increased caries levels. The explanation here is that those from lower socio-economic groups generally visit the dentist for symptomatic rather than preventive reasons. Other studies show that regular users of dental services have lower levels of disease. The effect of anxiety and fear on the model is tested by including the response to a question asking adults whether they felt frightened while awaiting dental treatment. Adults were also dichotomized into smokers and non smokers to determine whether smoking had an impact on dental caries levels. In the total sample, 26.8% assessed themselves as smokers, whereas 29.4% of medical card holders were smokers. When smoking was analysed by gender, 27.4% of females were smokers compared with 25.5% of males.

The summary statistics of $D_{3c}MFS$, $D_{3vc}MFS$ and age are presented in Table 4.12.

Table 4.12 Summary statistics of variables

Variable	Mean	Std. Dev.	Min	Max
$D_{3c}MFS$	36.4	30.75	0	118
$D_{3vc}MFS$	37.2	30.49	0	118
Age	39.2	20.95	16	95

Table 4.13 presents the percentage distribution of adults by demographic, socio-economic and behavioural characteristics. The variables included were found to be significant according to the Chi^2 estimates of the stepwise regression.

Table 4.13 Percentage composition by demographic, socio-economic and behavioural characteristics

Variable	Percent	Variable	Percent
Demographic Characteristics:			
Age 16-24	41.4	**Age 65+**	24.7
Age 35-44	33.9	**Female**	58.1
ERHA	24.0	**NWHB**	5.2
MHB	5.3	**SEHB**	5.0
MWHB	23.3	**SHB**	15.9
NEHB	15.9	**WHB**	5.5
Non fluoride	22.2	**Full fluoride**	40.6
Part fluoride	37.2		
Socio-Economic Characteristics:			
Medical Card	32.3	**Unemployed**	8.0
Third Level	18.8	**Primary Education Only**	10.7
Behavioural Characteristics:			
Smoking	26.8	**Regular User**	43.9
Frequent Snacks	40.7	**Fear of dentist**	8.0
Regular Brusher	59.8		

4.6.3 Profile of adults with high caries levels

The likelihood of having high caries levels was calculated by logistic or ordered logistic regression for each of the age groups. The logistic regression fitted the data better than the ordered logistic regression in terms of explained variation using the count R^2, which measures the proportion of correct categorisations by the logistic and ordered logistic models. A coefficient with a positive sign indicates the variable increases the likelihood of being in the high caries group, whereas a negative coefficient implies that the variable reduces the likelihood of being in the high caries group. The estimates based on the logistic and ordered logistic models for 16-24 year-olds are presented in Table 4.14.

Table 4.14 Logistic and ordered logistic estimates of factors influencing high or low levels of $D_{3c}MFS/D_{3vc}MFS$, for 16-24 year-olds

16-24 year-olds	Logistic estimates				Ordered logistic estimates			
	$D_{3c}MFS$		$D_{3vc}MFS$		$D_{3c}MFS$		$D_{3vc}MFS$	
Age	0.27	(0.04)***	0.27	(0.04)***	0.18	(0.02)***	0.18	(0.02)***
Female	0.64	(0.20) ***	0.61	(0.20)***	0.43	(0.12)***	0.40	(0.12)***
Part fluoride	-0.20	(0.28)	-0.17	(0.28)	-0.07	(0.17)	-0.07	(0.17)
Full fluoride	-0.23	(0.25)	-0.37	(0.25)	-0.15	(0.15)	-0.19	(0.15)
ERHA	-0.41	(0.32)	-0.36	(0.31)	-0.30	(0.19)	-0.19	(0.19)
MHB	0.16	(0.47)	-0.09	(0.46)	0.09	(0.27)	0.01	(0.27)
MWHB	1.96	(0.32)***	1.89	(0.31)***	1.22	(0.19)***	1.28	(0.19)***
NEHB	0.22	(0.34)	-0.02	(0.34)	0.11	(0.20)	0.07	(0.21)
NWHB	1.71	(0.52)***	2.16	(0.54)***	1.23	(0.30)***	1.46	(0.30)***
SEHB	0.28	(0.58)	0.54	(0.58)	0.12	(0.34)	0.29	(0.34)
SHB	Reference health board							
WHB	-0.68	(0.61)	-0.62	(0.57)	-0.48	(0.33)	-0.50	(0.33)

16-24 year-olds	Logistic estimates				Ordered logistic estimates			
	D_{3c}MFS		D_{3vc}MFS		D_{3c}MFS		D_{3vc}MFS	
Medical Card	0.12	(0.24)	0.01	(0.25)	0.07	(0.14)	0.05	(0.14)
Primary Education	0.63	(1.09)	1.83	(1.50)	0.47	(0.74)	0.75	(0.71)
Unemployed	0.30	(0.38)	0.71	(0.39)*	0.24	(0.20)	0.31	(0.20)
Smoking	0.36	(0.21)*	0.30	(0.21)	0.29	(0.12)**	0.28	(0.12)**
Regular Brusher	-0.50	(0.23)**	-0.71	(0.23)***	-0.46	(0.13)***	-0.55	(0.13)***
Frequent Snacks	-0.04	(0.20)	0.17	(0.20)	0.05	(0.12)	0.16	(0.12)
Regular User	0.83	(0.20)***	0.63	(0.20)***	0.60	(0.12)***	0.48	(0.12)***
Fear of Dentist	0.51	(0.39)	0.48	(0.37)	0.45	(0.21)**	0.38	(0.22)*
No. of Obs.	632		644		1196		1196	
LR χ^2 (19)	202.19		211.57		223.42		230.98	
Prob > χ^2	0.00		0.00		0.00		0.00	
Pseudo R^2	0.2309		0.2370		0.0883		0.0908	
Count R^2	0.7420		0.7340		0.5190		0.5130	

Notes: Standard Errors reported in parenthesis. *Statistically significant at 10% level; **statistically significant at 5 % level; *** statistically significant at 1% level.

The logistic model (Table 4.14) explained approximately 74.2% (R^2) (0.7420) of the variation in D_{3c}MFS scores in the 16-24 year age group, compared with 51.9% (0.5190) for the ordered logistic model. However, the significant variables explaining those of high or low caries levels were consistent from both estimations (except for fear of dentist which was significant for the ordered logistic model and not significant for the logistic model). The magnitudes of the coefficients were generally greater for the logistic model.

The national survey indicates that caries levels increase with age; both models indicate that age significantly increased the odds of being in a high caries group (Table 4.14). Since females had a higher mean D_{3c}MFS score (Table 4.11), it is not a surprise that they were more likely to be in a high caries group than their male counterparts. This finding is supported in Irish studies[2,3].

Residing in the MWHB or NWHB regions significantly increased the odds of being in the high caries group. Although exposure to fluoridated water tended to reduce the odds of being in the high caries group, it was not statistically significant for this age group. Socio-economic characteristics (having a medical card, being unemployed, or having primary education only) gave a non statistically significant increase in the odds of being in the high caries group. However, the increase in the odds of having high caries was significant for D_{3vc}MFS for the unemployed in the logistic model. In both models, regular brushing significantly reduced the likelihood of being in a high caries group, whereas regular use of dental services and anxiety about the dental visit increased the odds that a 16-24 year-old had high caries levels. However, anxiety was not significant in the logistic model. In the ordered logistic model, smoking significantly increased the odds of a 16-24 year-old having high caries levels; it was also significant in the logistic estimate for D_{3c}MFS.

The logistic and ordered logistic estimates, for 35-44 year-olds, are presented in Table 4.15.

Table 4.15 Logistic and ordered logistic estimates of factors influencing high or low levels of D_{3c}MFS/D_{3vc}MFS, for 35-44 year-olds

35-44 year-olds	Logistic estimates				Ordered logistic estimates			
	D_{3c}MFS		D_{3vc}MFS		D_{3c}MFS		D_{3vc}MFS	
Age	0.31	(0.04)***	0.30	(0.04)***	0.19	(0.02)***	0.18	(0.02)***
Female	0.28	(0.23)	0.29	(0.23)	0.26	(0.14)*	0.28	(0.14)**
Part fluoride	-0.38	(0.30)	-0.44	(0.30)	-0.28	(0.18)	-0.32	(0.18)*
Full fluoride	-1.09	(0.36)***	-1.15	(0.36)***	-0.73	(0.22)***	-0.75	(0.22)***
ERHA	-0.92	(0.35)***	-0.95	(0.35)***	-0.64	(0.21)***	-0.66	(0.21)***
MHB	1.08	(0.63)*	0.79	(0.59)	0.45	(0.34)	0.42	(0.35)
MWHB	0.08	(0.35)	0.08	(0.35)	0.05	(0.21)	0.02	(0.21)

35-44 year-olds	Logistic estimates				Ordered logistic estimates			
	D_{3c}MFS		D_{3vc}MFS		D_{3c}MFS		D_{3vc}MFS	
NEHB	-0.55	(0.38)	-0.55	(0.38)	-0.36	(0.23)	-0.36	(0.23)
NWHB	0.30	(0.58)	0.49	(0.58)	0.33	(0.32)	0.35	(0.32)
SEHB	0.45	(0.61)	0.22	(0.59)	-0.01	(0.31)	-0.10	(0.31)
SHB	Reference health board							
WHB	-0.80	(0.50)	-0.74	(0.50)	-0.28	(0.32)	-0.26	(0.31)
Medical Card	-0.19	(0.28)	-0.12	(0.28)	-0.22	(0.18)	-0.09	(0.17)
Primary Education	0.81	(0.51)	0.87	(0.52)*	0.42	(0.32)	0.45	(0.32)
Unemployed	-0.47	(0.39)	-0.39	(0.37)	-0.12	(0.24)	-0.20	(0.24)
Smoking	0.69	(0.24)***	0.75	(0 .24)***	0.44	(0.14)***	0.47	(0.14)***
Regular Brusher	-0.43	(0 25)*	-0.43	(0.25)*	-0.31	(0.15)**	-0.26	(0.15)*
Frequent Snacks	0.24	(0.22)	0.23	(0.22)	0.09	(0.13)	0.07	(0.13)
Regular User	0.70	(0.24)***	0.62	(0.24)***	0.42	(0.14)***	0.38	(0.14)***
Fear of Dentist	0.29	(0.35)	0.35	(0.34)	0.11	(0.21)	0.12	(0.21)
No. of Obs.	502		501		978		978	
LR χ^2 (19)	147.97		141.06		152.09		143.70	
Prob > χ^2	0.00		0.00		0.00		0.00	
Pseudo R²	0.2126		0.2031		0.0742		0.0701	
Count R²	0.7210		0.7090		0.5170		0.5180	

Notes: Standard Errors reported in parenthesis. *Statistically significant at 10% level; **statistically significant at 5 % level; *** statistically significant at 1% level.

For the 35-44 age group, the logistic model explained approximately 72.1% of the variation of D_{3c}MFS scores, compared with 51.7% for the ordered logistic model. However, the significant variables explaining those with high or low caries levels were again closely related in both models. Both models showed that age significantly increased the odds of being in the high caries group. While females in the 35-44 age group were more likely to have high caries levels, this was not statistically significant in the logistic model. Exposure to fully fluoridated water was significant in reducing the odds of being in the high caries group; limited exposure to fluoridated water ('Part') was also significant for D_{3vc}MFS in the ordered logistic model.

At health board level, residence in the ERHA region significantly reduced the odds of an individual being in the high caries group, whereas residence in the MHB region increased the likelihood of being in the high caries group, relative to the SHB region. Both models estimated that regular use of dental services, and being a smoker, made it increasingly likely that an individual had high caries levels, whereas regular brushing reduced the likelihood.

The odds of being in a high or low caries group for those aged 65 and over are presented in Table 4.16.

Table 4.16 Logistic and ordered logistic estimates of factors influencing high or low levels of D_{3c}MFS/D_{3vc}MFS, for 65+ year-olds

65+ year-olds	Logistic estimates				Ordered logistic estimates			
	D_{3c}MFS		D_{3vc}MFS		D_{3c}MFS		D_{3vc}MFS	
Age	0.04	(0.03)	0.04	(0.03)	0.04	(0.01)***	0.04	(0.02)***
Female	1.68	(0.35)***	1.60	(0.34)***	1.01	(0.17)***	1.00	(0.17)***
Part fluoride	0.51	(0.40)	0.48	(0.39)	0.11	(0.22)	0.15	(0.22)
Full fluoride	0.09	(0.44)	0.11	(0.44)	-0.07	(0.24)	-0.05	(0.24)
ERHA	0.35	(0.48)	0.43	(0.47)	-0.06	(0.25)	-0.08	(0.25)
MHB	-0.52	(0.73)	-0.44	(0.72)	-0.35	(0.37)	-0.34	(0.37)
MWHB	0.38	(0.51)	0.46	(0.50)	0.12	(0.26)	0.12	(0.26)
NEHB	-0.33	(0.53)	-0.20	(0.53)	-0.16	(0.28)	-0.12	(0.28)
NWHB	0.47	(0.86)	0.66	(0.85)	0.54	(0.44)	0.69	(0.45)
SEHB	-1.99	(0.61)***	-1.85	(0.60)***	-1.53	(0.36)***	-1.53	(0.36)***

65+ year-olds	Logistic estimates				Ordered logistic estimates			
	D$_{3c}$MFS		D$_{3vc}$MFS		D$_{3c}$MFS		D$_{3vc}$MFS	
SHB	Reference health board							
WHB	-0.60	(0.67)	-0.48	(0.67)	-0.71	(0.33)**	-0.63	(0.33)*
Medical Card	0.56	(0.33)*	0.61	(0.33)*	0.12	(0.17)	0.12	(0.17)
Primary Education	0.46	(0.34)	0.45	(0.34)	0.22	(0.18)	0.19	(0.18)
Unemployed	1.51	(0.80)*	1.52	(0.79)*	0.44	(0.32)	0.43	(0.32)
Smoking	1.21	(0.48)***	1.22	(0.47)**	0.68	(0.23)***	0.68	(0.23)***
Regular Brusher	-3.97	(0.55)***	-3.91	(0.54)***	-1.98	(0.20)***	-1.94	(0.20)***
Frequent Snacks	2.24	(0.63)***	2.19	(0.63)***	1.09	(0.21)***	1.10	(0.21)***
Regular User	-1.72	(0.44)***	-1.70	(0.44)***	-0.82	(0.20)***	-0.87	(0.20)***
Fear of dentist	-0.26	(0.78)	-0.23	(0.78)	-0.07	(0.38)	-0.07	(0.38)
No. of Obs.	481		482		714		714	
LR χ^2 (19)	326.87		322.99		341.25		340.11	
Prob > χ^2	0.00		0.00		0.00		0.00	
Pseudo R^2	0.5139		0.5071		0.2219		0.2212	
Count R^2	0.8710		0.8630		0.6190		0.6200	

Notes: Standard Errors reported in parenthesis. *Statistically significant at 10% level; **statistically significant at 5 % level; *** statistically significant at 1% level.

The logistic model explained approximately 87.1% of the variation in D$_{3c}$MFS scores, compared with 61.9% for the ordered logistic model. For those aged 65 and over, the logistic model estimated that the odds of having a high D$_{3c}$MFS score was higher for females. Exposure to fluoridated water was not significant for this age group: however, many of those aged 65 and over had dentures and very probably had high D$_{3c}$MFS scores prior to the introduction of water fluoridation in 1964, thus this age group had less capacity to benefit from water fluoridation.

At health board level, residence in the SEHB region significantly reduced the odds of an individual being in the high caries group. Having a medical card, being unemployed, and having primary education only, all increased the odds of being in the high caries group. If the adult was a regular brusher, and/or a regular user of dental services, the maximum likelihood of having high caries levels was reduced. Having frequent snacks had a positive and significant relationship with high D$_{3c}$MFS/D$_{3vc}$MFS scores. Being a smoker significantly increased the odds of having high caries levels.

Table 4.17 presents a summary of the significant variables influencing categorisation of D$_{3c}$MFS according to High, Medium or Low levels using Logistic Regression.

Table 4.17 Summary of significant variables influencing categorisation of D$_{3c}$MFS according to High, Medium or Low levels using Logistic Regression

16-24 year-olds	35-44 year-olds	65+ year-olds
➢ Age	➢ Age	
➢ Gender		➢ Gender
	➢ Some exposure to domestic water fluoridation	
➢ Health board	➢ Health board	➢ Health board
➢ Brushes 2/day or more	➢ Brushes 2/day or more	➢ Brushes 2/day or more
➢ Visited dentist in last 24 months	➢ Visited dentist in last 24 months	➢ Visited dentist in last 24 months
	➢ Frequent Snacks	➢ Frequent Snacks

16-24 year-olds	35-44 year-olds	65+ year-olds
➢ Fears the dentist		➢ Fears the dentist
	➢ Education to primary level only	➢ Education to primary level only

It is interesting to know that age, gender and health board of residence have an impact on an individual's chances of having high caries levels: This information may help in the allocation of resources for preventive services. The fact that brushing twice a day or more (regular brushing) was a significant variable for all three age groups underlines the importance of supporting people to brush their teeth with fluoride toothpaste at least twice per day. The development of twice daily brushing as part of routine grooming early in life is a very worthwhile objective, which is strongly supported by these findings. Clearly the targeting of adults with this dental health education message is also important. Frequency of snacking was a also a significant variable in the model, thus supporting the development of health promotion programs to advise adults to reduce the frequency of consumption of foods and drinks sweetened with sugar between meals. Given the current concern about rising levels of obesity in Ireland, oral health promoters should work with those in other disciplines to adopt a common risk factor approach to the prevention of oral disease. Efforts to reduce the frequency of consumption of foods and drinks sweetened with sugar have the potential to impact on general health as well as oral health.

4.7 Root caries

The increased retention of teeth reported in Chapter 3 means that more adults are at risk for root caries. As adults grow older, root surfaces exposed to the oral environment by gingival recession are at risk of developing root caries. Identifying and measuring root caries is important because this condition can be prevented and/or arrested in its early stages with topical fluoride treatment.

The interpretation of root caries data is facilitated by the presentation of the mean number of teeth present (nt), the mean number of exposed (and thereby susceptible to caries) roots (nrt), and the percentage of exposed roots which developed caries, also known as the Root Caries Index (RCI)[11]. All four surfaces (buccal, lingual, mesial, distal) of each tooth were assessed for the presence of gingival recession and root caries. If one or more of the surfaces with recession in any one tooth were decayed, or filled, the tooth was regarded as having root caries. The RCI allows the comparison of root caries levels across age groups and, when considered in conjunction with the number of teeth present, a clearer picture of root caries prevalence is seen.

Overall, the level of root caries in the Irish population is low; the age related nature of the condition is seen in Table 4.18. Looking at the data for the country as a whole, the mean number of teeth present (nt) was found to decrease with age - from 28.2 in the 16-24 year-old group to 14.4 in the 65+ age group. Accompanying this decrease in the number of teeth present was a change in the mean number of exposed root surfaces (nrt), increasing from 1.2 in the youngest group to 6.2 among 35-44 year-olds and 8.4 in the 65+ age group. On average, there were 0.2 decayed or filled roots (rDFT) in the 35-44 year-old group and this increased to 0.9 in the 65+ age group. Thus, the RCI increased from 2.5 in the 35-44 age group to 11.6 in the 65+ age group.

Although females tended to have fewer teeth than males, they had similar numbers of teeth with exposed roots and greater numbers of teeth with root caries.

The level of root caries recorded in 2000/'02 was considerably lower than that recorded in 1989/'90 for 35-44 and 65+ year-olds: This was an unexpected finding as it was thought that with increasing tooth retention, greater numbers of root surfaces would be at risk of root caries and that the levels would have increased. Future monitoring of root caries is warranted to determine whether this reduction in root caries levels persists.

Root caries is rare in the youngest age group; it is more common in the older age groups. Extensive loss of teeth, including teeth which may have had root caries or may have been susceptible to root caries, confounds the interpretation of the distribution of this condition in the older age group.

Although there was some variation in the levels of root caries among the health board regions (Table 4.18), the overall pattern was similar to that of the national data.

Table 4.18 Mean number of teeth present (nt), mean number of exposed roots (nrt), mean number of decayed and filled roots (rDFT) and the Root Caries Index (RCI = (rDFT/nrt) x 100) by age group and gender
Base: Dentate

16-24 year-olds	Male				Female				Total			
	nt	nrt	rDFT	RCI	nt	nrt	rDFT	RCI	nt	nrt	rDFT	RCI
National 2000/'02	28.5	1.2	0.0	0.3	27.9	1.1	0.0	0.5	28.2	1.2	0.0	0.4
National 1989/'90	27.6	0.6	0.0	0.0	26.9	0.7	0.0	0.0	27.2	0.6	0.0	0.0
ERHA 2000/'02	28.7	2.1	0.0	0.3	27.9	2.1	0.0	0.2	28.3	2.1	0.0	0.2
MWHB 2000/'02	28.4	0.6	0.0	0.0	28.1	0.5	0.0	0.0	28.3	0.5	0.0	0.0
NEHB 2000/'02	28.3	0.7	0.0	0.0	27.8	0.4	0.0	0.0	28.0	0.6	0.0	0.0
SHB 2000/'02	28.5	0.2	0.0	0.0	28.1	0.2	0.0	0.0	28.3	0.2	0.0	0.0
EHB 1989/'90												0.0

35-44 year-olds	Male				Female				Total			
	nt	nrt	rDFT	RCI	nt	nrt	rDFT	RCI	nt	nrt	rDFT	RCI
National 2000/'02	25.6	6.1	0.2	1.8	25.4	6.2	0.3	3.1	25.5	6.2	0.2	2.5
National 1989/'90	22.8	5.3	0.3	3.3	21.2	4.4	0.4	6.8	21.9	4.8	0.3	5.3
ERHA 2000/'02	26.9	8.1	0.2	2.0	26.1	8.0	0.3	2.9	26.5	8.1	0.2	2.5
MWHB 2000/'02	25.4	7.0	0.3	3.0	24.4	6.8	0.4	4.6	24.9	6.9	0.3	3.8
NEHB 2000/'02	26.2	5.0	0.1	2.1	26.0	5.6	0.2	4.4	26.1	5.3	0.2	3.2
SHB 2000/'02	24.6	3.8	0.1	1.0	25.1	3.1	0.1	2.6	24.8	3.5	0.1	1.8
EHB 1989/'90												1.5

65+ year-olds	Male				Female				Total			
	nt	nrt	rDFT	RCI	nt	nrt	rDFT	RCI	nt	nrt	rDFT	RCI
National 2000/'02	15.2	8.5	0.8	12.7	13.7	8.3	1.1	10.6	14.4	8.4	0.9	11.6
National 1989/'90	15.2	8.7	1.6	20.9	12.6	7.1	1.1	14.9	14.1	8.0	1.4	18.5
ERHA 2000/'02	15.9	10.8	0.9	11.8	13.7	10.3	1.0	7.9	14.7	10.5	0.9	9.7
MWHB 2000/'02	13.9	8.3	0.8	19.5	12.4	8.3	1.2	14.1	13.1	8.3	1.0	16.6
NEHB 2000/'02	15.3	10.2	1.1	14.6	14.4	8.5	0.9	11.0	14.8	9.3	1.0	12.7
SHB 2000/'02	14.9	6.4	0.5	5.0	13.2	6.0	1.3	18.5	14.1	6.2	0.9	11.6
EHB 1989/'90												10.2

In all age groups, the mean RCI was higher among those adults in possession of a medical card (less well off) compared with those not possessing a medical card (Table 4.19). Medical card holders also had fewer teeth and more decayed roots.

Table 4.19 Mean number of teeth present (nt), mean number of exposed roots (nrt), mean number of decayed and filled roots (rDFT) and the Root Caries Index (RCI = (rDFT/nrt) x 100) by age group and medical card status
Base: Dentate

Age Group	MC Yes				MC No			
	nt	nrt	rDFT	RCI	nt	nrt	rDFT	RCI
16-24	28.1	1.0	0.0	0.5	28.2	1.2	0.0	0.3
35-44	23.7	6.6	0.3	3.6	25.9	6.2	0.2	2.2
65+	13.3	7.8	1.0	12.8	16.4	9.4	0.7	9.2

The difference in the RCI between the fluoridation groups was not consistent across the age groups (Table 4.20). For 35-44 year-olds, the RCI was 3.6 in the non fluoridated group and 2.2 in the full fluoridated group. Although the full fluoridated group had, on average, more teeth and more exposed root surfaces, it had the same mean number of decayed or filled root surfaces. In the 65+ age group, the RCI was 9.0 in the non fluoride group compared with 10.6 in the full fluoride group. The fully fluoridated group had, on average, more teeth, more exposed roots and more decayed or filled roots.

Table 4.20 Mean number of teeth present (nt), mean number of exposed roots (nrt), mean number of decayed and filled roots (rDFT) and the Root Caries Index (RCI = (rDFT/nrt) x 100) by age group and fluoridation status
Base: Dentate

Age Group	Fluoridation Status											
	Non				Part				Full			
	nt	nrt	rDFT	RCI	nt	nrt	rDFT	RCI	nt	nrt	rDFT	RCI
16-24	28.2	0.7	0.0	0.0	28.1	0.8	0.0	1.2	28.3	1.4	0.0	0.2
35-44	24.0	5.0	0.3	3.6	25.3	5.5	0.2	2.3	26.3	7.5	0.3	2.2
65+	12.5	6.7	0.7	9.0	15.5	8.8	1.1	13.4	13.9	8.5	0.9	10.6

People with poor general health may also be at greater risk of poor oral health as many medications used to treat systemic disease cause a reduction in salivary flow. The greater the amount of medicines taken, the greater the risk of oral dryness. As saliva is protective against dental decay, it would be reasonable to suggest that those with systemic disease would have greater levels of root caries. It is important to investigate this link, as adults with poor general health should be advised if they are at greater risk to dental disease.

Healthy adults had more teeth, fewer exposed roots, fewer decayed and filled roots, and a lower RCI score in all three age groups when compared with those with mild systemic disease. For example, healthy 35-44 year-olds (ASA 1) had a mean RCI of 2.3 compared with a mean RCI of 5.2 for those with mild systemic disease (ASA 2) (Table 4.21). The numbers with moderate systemic disease (ASA 3) were insufficient to draw conclusions.

Table 4.21 Number of adults, mean number of teeth present (nt), mean number of exposed roots (nrt), mean number of decayed and filled roots (rDFT) and the Root Caries Index (RCI = (rDFT/nrt) x 100) by age group and general health status (ASA)
Base: Dentate

Age Group	ASA 1					ASA 2					ASA 3	
	n	nt	nrt	rDFT	RCI	n	nt	nrt	rDFT	RCI	n	*
16-24	1139	28.2	1.2	0.0	0.4	50	27.5	1.2	0.0	0.4	5	*
35-44	907	25.6	6.1	0.2	2.3	55	24.0	8.4	0.4	5.2	5	*
65+	295	14.6	8.3	0.8	10.4	104	14.5	9.5	1.5	16	21	*

*n < 30

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Chapter 5
Periodontal Health

5.1 Summary

- The results show a high level of periodontal disease and attachment loss in the population. As fewer teeth are lost due to caries, more teeth remain in the mouth for longer and more teeth are susceptible to periodontal disease.
- The presence of calculus was the most common periodontal condition recorded amongst Irish adults.
- Periodontal disease and attachment loss levels were higher amongst older age groups in spite of the increase in tooth loss with age.
- Overall, males had more periodontal disease than females.
- Medical card holders had poorer periodontal health as evidenced by higher CPITN scores and loss of attachment levels.
- There is some evidence to suggest that adults classified as having mild to moderate systemic diseases (ASA Class 2) have poorer periodontal health than those without systemic disease.
- Periodontal health was worse amongst adults who smoked tobacco or drank alcohol in all age groups.
- Oral health promotion programs (promoting effective non-traumatic plaque removal techniques) are needed to improve periodontal health in Ireland. Effective plaque removal from an early age would prevent much of the gingivitis that precedes the periodontal diseases that occur later in life.

5.2 Introduction

In this chapter, the level of periodontal disease amongst Irish adults will be described. Data on loss of attachment and some indications of the treatment needed will also be discussed. The variations in these measures according to age group, gender, medical card possession, health board of residence and general health status will be outlined.

Periodontal disease is the second most common oral disease after dental caries. It is a disease that affects the supporting structures of the tooth, i.e. the gingivae (or gum), the bone supporting the tooth, and the periodontal ligament (which surrounds the tooth root and forms the attachment of the tooth to its bony socket). The earliest visible sign of disease of the gingivae is redness due to inflammation. Dental plaque is the most common cause of inflammation of the gingivae, although the mere presence of dental plaque (poor oral hygiene) is not a predictable indicator of gingival inflammation and periodontal destruction because the individual host response is a determining factor. However, gingival inflammation resolves if the plaque is removed and the tooth is kept clean. Because it is usually painless, people are often unaware of gingival inflammation until the gingivae start to bleed during tooth brushing. Bleeding gingivae usually indicate an inadequate brushing technique, which fails to remove sufficient plaque for gingival health. Not all gingivitis proceeds to periodontitis; however, for that which does, the earliest sign is periodontal pocketing. Periodontal pocketing is measured from the margins (crest) of the gingiva to the base of the sulcus (crevice) or pocket: It may be true or false. False pocketing involves enlargement of the gingivae without loss of periodontal attachment to the tooth. True pocketing occurs where inflammation destroys the periodontal ligament allowing the junctional epithelium to move onto the root surface. As a result it is possible to place a probe in a 'pocket' between the root of the tooth and the gingivae. It is not possible to insert a probe between the root of a tooth and the gingivae where the periodontal ligament has not been affected by disease (clinical attachment loss). Deeper pockets indicate more advanced destruction, unless the gingivae have receded apically as the periodontal ligament is broken down, and the bony socket is resorbed due to the disease process. In this case, the root of the tooth becomes exposed in the mouth (gingival recession) as the supporting structures break down. Chronic Periodontitis is a painless disease: the first symptoms experienced by those with the disease may be gingival recession or looseness of the tooth. If left untreated, tooth loss may result.

5.3 Community Periodontal Index of Treatment Need (CPITN)

The Community Periodontal Index of Treatment Need (CPITN) was used in this survey to estimate the need for treatment to prevent and treat periodontal disease among adults in Ireland. The CPITN index is useful in estimating the levels of disease that would benefit from oral hygiene instruction, basic scaling and polishing, deep scaling and root debridement, and more advanced periodontal treatment. The CPITN index does not measure the total loss of periodontal support experienced when there is gingival recession, or a combination of recession and pocketing. To provide a more complete estimate of periodontal destruction, in addition to the use of the CPITN index, loss of attachment was also measured.

Over the past two decades, numerous international reports on the prevalence of periodontal treatment needs according to the CPITN (or CPI) index have been published. The WHO Global Data Bank on oral health and disease records summaries of these studies for 35-44 year-olds.

There are different methods of presenting CPITN data. In this report, the percentage of adults with one or more sextants affected by scores H (Healthy), B (Bleeding), C (Calculus), P1 (Shallow pocketing 4-5mm) and P2 (Deep pocketing ≥ 6 mm) as a maximum score will be presented: This indicates the severity of the periodontal condition. The mean number of sextants affected by the different scores is used to indicate the extent of the periodontal condition.

When examining for the CPITN, the mouth is divided into six parts, or sextants, and normally only the worst score per sextant is recorded. Using this approach, it is not known whether there is also calculus in a sextant scored as having pocketing: Being a higher score than calculus, pocketing is the only score recorded. Using this original method, it would not be possible to determine the prevalence of calculus in the population.

To overcome this, the method of using the CPITN was adapted for the 2000/'02 survey. Examiners were asked to record the presence or absence of each condition in each sextant: Where there were a variety of conditions, multiple scores were recorded per sextant. These data can be analysed for all conditions present or according to the highest score present.

Comparisons with the 1989/'90 data are not drawn because the 2000/'02 survey examinations were largely carried out with the adult in a reclined position in a dental chair with good access to all sites in the mouth, and under ideal lighting conditions. The examinations for the 1989/'90 survey were carried out largely in people's homes where the adult sat in an upright position on a chair, and using a portable dental light. Whereas these differing conditions are unlikely to impact on the caries examination, the periodontal examination is less robust and could be more sensitive to changes in examining conditions. Hence the validity of retrospective comparisons of the periodontal results is questionable.

5.3.1 Maximum CPITN scores per adult

Table 5.1 shows the distribution of the highest CPITN scores, which were recorded for each dentate adult.

Table 5.1 Periodontal disease – Severity: The number and percentage of dentate adults with maximum CPITN score of H (healthy), B (bleeding), C (calculus), P1 (shallow pocketing), P2 (deep pocketing), all X (all sextants excluded) or UR (no reliable recording was possible) according to age group and health board region

Base: Dentate

16-24 year-olds	Maximum CPITN														Total
	H		B		C		P1		P2		X		UR		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n
National	162	18.1	223	19.4	630	50.2	156	11.5	3	0.4	4	0.4	.	0.0	1178
ERHA	39	13.9	49	17.3	152	55.4	33	12.3	.	0.0	3	1.1			276
MWHB	18	5.6	36	10.8	184	59.2	74	24.2	.	0.0	1	0.3	.	0.0	313
NEHB	35	16.0	18	8.7	139	69.8	11	5.5	.	0.0	.	0.0			203
SHB	32	18.4	61	33.5	70	41.3	13	6.8	.	0.0	.	0.0			176

| 35-44 year-olds | Maximum CPITN | | | | | | | | | | | | | Total |
| | H | | B | | C | | P1 | | P2 | | X | | UR | | |
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n
National	63	8.4	49	4.9	417	45.2	348	33.9	48	6.3	12	1.3	.	0.0	937
ERHA	19	8.6	12	4.6	104	47.0	72	29.5	21	8.4	5	1.8			233
MWHB	3	1.1	7	2.9	71	30.5	134	61.1	6	3.4	2	1.1	.	0.0	223
NEHB	10	5.9	2	1.1	84	62.2	35	25.7	6	4.6	1	0.6			138
SHB	8	5.6	9	4.8	84	56.7	43	30.1	2	1.4	2	1.4			148

65+ year-olds	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n
National	23	6.9	15	3.6	129	29.5	144	37.6	38	12.0	38	9.8	3	0.7	390
ERHA	2	2.0	2	2.2	15	18.6	43	50.0	13	16.6	8	10.5			83
MWHB	4	5.3	2	3.0	27	41.0	20	29.9	2	3.0	10	15.9	1	1.9	66
NEHB	.	0.0	.	0.0	28	46.2	21	35.4	7	12.7	3	5.7			59
SHB	6	8.1	7	10.7	29	38.0	22	29.4	5	6.1	6	7.6			75

In the 16-24 year-old age group, 18.1% had a maximum score of 'H' (Healthy), indicating that they had no periodontal treatment requirement, compared with only 6.9% of 65+ year-olds (Table 5.1). Over the whole age range, 3.6% to 19.4% of adults had a highest score of 'B' (Bleeding) on probing. Adults in this group require instruction in oral hygiene procedures to improve their plaque control and thus resolve their gingival inflammation. A high proportion of people in all age groups (50.2% of 16-24 year-olds, 45.2% of 35-44 year-olds and 29.5% of 65+ year-olds) had a highest score of 'C' (Calculus). Adults in this group require scaling and polishing of the teeth and instruction in oral hygiene. The percentage of adults that required more complex periodontal treatment (those whose maximum score was shallow pocketing 4-5mm 'P1', or deep pocketing ≥ 6 mm 'P2'), such as root planing or surgical intervention, increased with age (from 11.9% among 16-24 year-olds to 49.6% among the 65+ age group). The percentage of adults who had a score of 'X' (excluded because the required teeth were not present or were designated for extraction) for all sextants, increased with age as tooth loss increased. There were very few cases where all sextants were unrecordable ('UR'), due for example to heavy deposits of calculus preventing probing of pocket depth.

There was regional variation among the health board regions with the MWHB region showing the highest CPITN scores for 16-24 and 35-44-year-olds. For example, 24.2% of 16-24 year-olds in the MWHB region had pocketing compared to 12.3% in the ERHA region, 5.5% in the NEHB region and 6.8% in the SHB region (Table 5.1). Among 35-44 year-olds, almost twice as many adults in the MWHB region had pocketing compared to those in the other health board regions.

These results suggest a high level of periodontal inflammation and disease in the population. As fewer teeth are lost due to caries, more teeth remain in the mouth for longer and more teeth are susceptible to periodontal disease. It would be timely to build on the successful prevention of dental caries and promote the development of effective non-traumatic plaque removal techniques aimed at children. Effective plaque removal from an early age would prevent much of the periodontal diseases that occur later in life. A population approach to primary prevention of periodontal disease should be coupled with a preventive and treatment service. This would identify, and cater for, the small portion of the population with increased susceptibility to periodontal destruction, for example those with susceptibility for genetic reasons, diabetics, and those with cyclic neutropaenia.

5.3.2 Mean number of sextants per adult affected by CPITN scores (maximum score per sextant)

In the CPITN examination, a number of scores per sextant were recorded. In the 'extent' tables that follow, only the maximum score recorded per sextant is reported. Table 5.2 presents periodontal disease by extent.

Table 5.2 Periodontal disease – Extent: Mean number of sextants per person affected by the different CPITN scores of H (healthy), B (bleeding), C (calculus), P1 (shallow pocketing), P2 (deep pocketing) or all X (all sextants excluded) according to age group and health board region

Base: Dentate

16-24 year-olds	H	B	C	P1	P2	X
National	3.1	1.2	1.4	0.2	0.0	0.1
ERHA	2.5	1.5	1.7	0.2	0.0	0.1
MWHB	2.5	1.0	2.0	0.5	0.0	0.0
NEHB	3.7	0.6	1.6	0.1	0.0	0.0
SHB	3.3	1.8	0.7	0.1	0.0	0.0

35-44 year-olds	H	B	C	P1	P2	X
National	1.9	0.8	1.8	0.9	0.1	0.4
ERHA	1.7	1.0	1.9	0.9	0.2	0.3
MWHB	1.3	0.5	2.2	1.6	0.1	0.4
NEHB	2.6	0.3	2.0	0.7	0.1	0.3
SHB	1.9	1.1	1.8	0.6	0.0	0.6

65+ year-olds	H	B	C	P1	P2	X
National	0.8	0.2	1.0	1.1	0.2	2.7
ERHA	0.5	0.2	0.7	1.8	0.2	2.6
MWHB	0.6	0.1	1.3	0.6	0.1	3.2
NEHB	0.8	0.1	1.3	0.7	0.3	2.7
SHB	1.0	0.5	1.1	0.7	0.1	2.6

The mean number of sextants per dentate adult affected by the different scores indicates the extent of the various conditions recorded. For example, in the 16-24 year-old group, of their six sextants recorded, there were on average 3.1 healthy, 1.2 with bleeding, 1.4 with calculus and 0.2 with pocketing (Table 5.2). As expected, the mean number of healthy sextants decreased with age, and the mean number of sextants with pocketing increased with age. In adults aged 65 years and over there were on average 0.8 healthy sextants, 0.2 with bleeding, 1.0 with calculus, 1.3 (1.1 + 0.2) with pocketing, and a large proportion of sextants (2.7) were excluded due to tooth loss. The small increase in the extent of periodontal disease in the older age groups is accounted for by the increase in levels of tooth loss in these groups.

Table 5.3 Periodontal disease – Extent: Mean number of sextants per person affected by the different CPITN scores of H (healthy), B (bleeding), C (calculus), P1 (shallow pocketing), P2 (deep pocketing) or all X (all sextants excluded) according to age group, gender and health board region

Base: Dentate

	H		B		C		P1		P2		X	
16-24 year-olds	M	F	M	F	M	F	M	F	M	F	M	F
National	2.9	3.2	1.3	1.2	1.5	1.3	0.2	0.2	0.0	0.0	0.1	0.0
ERHA	2.3	2.8	1.5	1.5	1.9	1.5	0.2	0.3	0.0	0.0	0.1	0.1
MWHB	2.3	2.6	1.0	0.9	2.1	1.9	0.6	0.5	0.0	0.0	0.0	0.0
NEHB	3.6	3.7	0.7	0.5	1.6	1.6	0.1	0.1	0.0	0.0	0.0	0.1
SHB	3.2	3.4	1.9	1.7	0.7	0.8	0.2	0.1	0.0	0.0	0.0	0.0
35-44 year-olds	M	F	M	F	M	F	M	F	M	F	M	F
National	1.8	2.0	0.8	0.8	1.9	1.7	1.0	0.9	0.1	0.1	0.3	0.5
ERHA	1.8	1.7	1.1	0.9	2.1	1.8	0.8	1.0	0.1	0.2	0.1	0.4
MWHB	1.1	1.5	0.5	0.5	2.2	2.2	1.8	1.4	0.1	0.0	0.2	0.5
NEHB	2.4	2.9	0.2	0.4	2.4	1.7	0.8	0.6	0.1	0.1	0.2	0.4
SHB	1.8	2.0	0.9	1.3	2.0	1.6	0.7	0.6	0.0	0.0	0.6	0.6

65+ year-olds	M	F	M	F	M	F	M	F	M	F	M	F
National	0.8	0.7	0.2	0.3	1.0	1.0	1.2	0.9	0.2	0.1	2.4	2.9
ERHA	0.5	0.5	0.1	0.2	0.7	0.7	2.1	1.5	0.2	0.2	2.4	2.8
MWHB	0.7	0.6	0.2	0.1	1.2	1.3	0.6	0.7	0.1	0.0	2.9	3.4
NEHB	0.7	0.8	0.2	0.1	1.5	1.2	0.9	0.5	0.2	0.4	2.3	3.0
SHB	0.9	1.1	0.4	0.6	1.2	1.0	0.8	0.6	0.1	0.0	2.6	2.7

Table 5.3 presents periodontal disease by extent for males and females separately. Male adults tended to have slightly higher levels of periodontal disease than females. In the 16-24 and 35-44 age group, males had on average 2.9 and 1.8 healthy sextants respectively, compared with 3.2 and 2.0 respectively among females. Females had more healthy sextants and, conversely, fewer sextants with calculus. The difference in pocketing was small, although females tended to have lower levels. In the 65+ age group, the higher level of tooth loss among females is illustrated by the higher number of sextants with a score of X (all sextants excluded) for females (2.9) compared to males (2.4). In this age group, males had pocketing in 1.4 (1.2 + 0.2) sextants and females had pocketing in 1.0 (0.9 + 0.1) sextants. Males in the 65+ age group had more teeth (fewer sextants scored X, and mean number of natural teeth was 9.9 vs. 7.4 for females (Table 3.10)) and more periodontal pocketing. Gender differences were consistent throughout the health board areas.

Table 5.4 presents the mean number of sextants affected by the maximum CPITN scores according to medical card status.

Table 5.4 Periodontal disease – Extent: Mean number of sextants per person affected by the different CPITN scores of H (healthy), B (bleeding), C (calculus), P1 (shallow pocketing), P2 (deep pocketing) or all X (all sextants excluded) according to age group, medical card status and health board region

Base: Dentate

16-24 year-olds	H MC Yes	H MC No	B MC Yes	B MC No	C MC Yes	C MC No	P1 MC Yes	P1 MC No	P2 MC Yes	P2 MC No	X MC Yes	X MC No
National	3.0	3.0	1.0	1.3	1.6	1.4	0.2	0.2	0.0	0.0	0.1	0.1
ERHA	1.9	2.6	1.3	1.5	2.5	1.6	0.1	0.3	0.0	0.0	0.1	0.1
MWHB	2.2	2.5	0.8	1.0	2.3	2.0	0.7	0.5	0.0	0.0	0.0	0.0
NEHB	3.3	3.7	0.7	0.6	1.7	1.6	0.2	0.1	0.0	0.0	0.1	0.0
SHB	3.6	3.2	1.5	1.9	1.0	0.7	0.0	0.2	0.0	0.0	0.0	0.0
35-44 year-olds	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No
National	1.2	2.1	0.8	0.8	1.9	1.8	1.2	0.9	0.2	0.1	0.7	0.3
ERHA	0.9	1.9	1.1	1.0	2.1	1.9	1.2	0.9	0.2	0.1	0.5	0.2
MWHB	1.0	1.3	0.7	0.5	2.3	2.2	1.1	1.7	0.0	0.1	0.9	0.2
NEHB	1.7	2.8	0.3	0.3	2.2	2.0	1.1	0.6	0.0	0.1	0.8	0.2
SHB	1.6	2.0	0.6	1.2	1.8	1.8	1.1	0.5	0.0	0.0	0.9	0.5
65+ year-olds	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No
National	0.6	1.0	0.2	0.2	0.9	1.2	0.9	1.3	0.2	0.2	3.0	2.1
ERHA	0.3	0.7	0.1	0.2	0.7	0.7	1.5	2.1	0.3	0.2	3.2	2.1
MWHB	0.4	1.0	0.2	0.0	1.1	1.5	0.6	0.5	0.1	0.0	3.4	2.9
NEHB	0.6	1.2	0.0	0.3	1.3	1.4	0.7	0.7	0.3	0.3	3.0	2.1
SHB	0.8	1.3	0.6	0.3	1.0	1.4	0.7	0.7	0.1	0.1	2.9	2.1

In Chapter 3, medical card holders were shown to have fewer teeth than non medical card holders in the 35-44 and 65+ age groups. This is illustrated in Table 5.4 by the higher mean number of sextants with a maximum CPITN score of X. For example, 35-44 year-old medical card holders had on average 0.7 excluded sextants (missing teeth) (X) compared to 0.3 for non medical card holders. Non medical card

holders tend to have more healthy sextants than medical card holders. This was the case amongst all age groups and in all health board regions, with the exception of 16-24 year-olds in the SHB region.

Table 5.5 Periodontal disease – Extent: Mean number of sextants per person affected by the different CPITN scores of: H (healthy), B (bleeding), C (calculus), P1 (shallow pocketing), P2 (deep pocketing) or all X (all sextants excluded) according to general health status in dentate adults aged 65 years and older

Base: Dentate

Health Status	H	B	C	P1	P2	X
ASA 1 (n = 284)	0.8	0.3	1.0	1.1	0.2	2.6
ASA 2 (n = 92)	0.4	0.2	1.2	1.3	0.2	2.8
ASA 3 (n = 14)	1.1	0.1	0.8	0.4	0.0	3.2

The number of 65+ year-olds classified as ASA 3 and dentate is low (a total of 14 adults), hence these groups will not be included when discussing the relationship between general health and the mean number of sextants affected by the different CPITN scores (Table 5.5). Comparing adults classified as ASA 1 and ASA 2, there is some evidence to suggest that adults classified as having mild to moderate systemic diseases (ASA Class 2) have a lower mean number of healthy sextants (0.4) than adults classified as ASA Class 1 (0.8). They also have a higher mean number of sextants with calculus (1.2 vs. 1.0) and shallow pocketing (P1) (1.3 vs. 1.1), and a higher mean number of excluded sextants (X) (2.8 vs. 2.6).

5.3.3 Mean number of adults affected by any CPITN score (all scores per sextant)

For each adult in the study, the CPITN examination was extended beyond the recording of the maximum score per sextant to include a record of other conditions besides the worst one. For example, where pocketing was recorded in a sextant, the examiner examined it further to see if there was calculus and if the gingiva bled on probing. The presence of any healthy scores was also recorded.

Table 5.6 Periodontal disease – Prevalence of Condition Recorded: Percentage of dentate adults with any CPITN score of H (healthy), B (bleeding), C (calculus), P1 (shallow pocketing), P2 (deep pocketing), all X (all sextants excluded) or UR (no reliable recording was possible) according to age group

Base: Dentate

	Any CPITN Score						
16-24 year-olds	**H**	**B**	**C**	**P1**	**P2**	**X**	**UR**
National	84.8	51.9	58.2	11.9	0.4	2.5	0.1
ERHA	76.4	52.1	60.8	12.3	0.0	2.2	0.0
MWHB	83.1	52.9	80.2	24.2	0.0	0.5	1.1
NEHB	94.4	37.6	73.7	5.5	0.0	2.4	0.0
SHB	91.4	73.5	47.2	6.8	0.0	2.8	0.0
35-44 year-olds	**H**	**B**	**C**	**P1**	**P2**	**X**	**UR**
National	68.9	41.0	71.0	39.3	6.3	17.8	0.2
ERHA	63.7	41.5	69.7	36.7	8.4	10.8	0.0
MWHB	61.0	33.7	85.2	63.8	3.4	15.0	0.3
NEHB	88.2	23.9	83.1	29.3	4.6	15.5	0.0
SHB	72.8	54.4	83.5	31.0	1.4	20.9	0.7
65+ year-olds	**H**	**B**	**C**	**P1**	**P2**	**X**	**UR**
National	36.1	16.1	51.1	46.5	12.0	76.3	1.3
ERHA	25.9	11.2	36.5	61.8	16.6	79.1	1.1
MWHB	30.8	7.8	59.3	32.9	3.0	80.7	3.8
NEHB	35.9	11.7	67.8	40.3	12.7	78.3	1.7
SHB	40.7	23.6	63.1	35.5	6.1	74.7	0.0

Table 5.6 shows the full extent of the scores recorded per adult. For example, 58.2%, 71.0% and 51.1% of the 16-24, 35-44 and 65+ age groups respectively had calculus on their teeth. The lowest level of calculus was recorded in the ERHA region for the 35-44 and 65+ age groups, and in the SHB region for the 16-24 age group.

In the UK, the 1998 national survey of adult dental health[1] reported that 61%, 77% and 83% of adults in the 16-24, 35-44 and 65+ age groups had calculus. Levels of calculus appear to be lower in Ireland than the UK, particularly amongst the 65+ age group.

5.4 Loss of attachment

Whilst CPITN is a widely used measure of periodontal treatment need, it does not capture the loss of tooth support as a result of bony resorbtion and loss of attachment accompanied by gingival recession. Even adults with CPITN scores of 'Healthy' can have extensive loss of attachment with gingival recession rather than periodontal pocket formation. In addition to the CPITN measurement, loss of attachment was also recorded to determine the extent to which loss of attachment of the periodontal ligament to the tooth root affects adults in Ireland. The CPITN probe was used to measure the distance between the base of the gingival crevice, or pocket, and the cemento enamel junction. The data are presented as falling within certain ranges measured with the CPITN probe. Two measures of loss of attachment are presented: maximum loss of attachment (which is an indication of severity), and mean number of sextants affected (which indicates the extent of the loss of attachment).

Table 5.7 presents the number and percentage of dentate adults with maximum loss of attachment score by age group.

Table 5.7 Number and percentage of dentate adults with maximum loss of attachment score of ≤3mm, 4-5mm, 6-8mm, 9-11mm, ≥12mm, X (sextant excluded) according to age group

Base: Dentate

16-24 year-olds	Maximum Loss of Attachment Score											
	≤3mm		4-5mm		6-8mm		9-11mm		≥12mm		X	
	n	%	n	%	n	%	n	%	n	%	n	%
National	1150	97.3	24	2.3	.	0.0	.	0.0	1	0.1	3	0.3
ERHA	266	96.3	7	2.6	.	0.0	.	0.0	1	0.3	2	0.8
MWHB	311	99.5	1	0.3	.	0.0	.	0.0	.	0.0	1	0.3
NEHB	200	98.2	3	1.8	.	0.0	.	0.0	.	0.0	.	0.0
SHB	171	97.5	5	2.5	.	0.0	.	0.0	.	0.0	.	0.0

35-44 year-olds	≤3mm		4-5mm		6-8mm		9-11mm		≥12mm		X	
	n	%	n	%	n	%	n	%	n	%	n	%
National	643	67.9	213	22.9	52	5.8	12	1.7	5	0.4	12	1.3
ERHA	154	68.0	47	19.7	19	7.2	8	3.2	.	0.0	5	1.8
MWHB	160	72.1	53	23.0	6	3.1	1	0.4	1	0.4	2	1.1
NEHB	110	80.3	19	12.6	7	6.0	.	0.0	1	0.6	1	0.6
SHB	107	71.5	30	20.6	3	1.8	3	2.5	3	2.2	2	1.4

65+ year-olds	≤3mm		4-5mm		6-8mm		9-11mm		≥12mm		X	
	n	%	n	%	n	%	n	%	n	%	n	%
National	95	24.2	156	39.8	57	15.5	27	6.7	18	4.9	35	8.4
ERHA	12	16.0	46	52.7	8	9.3	5	7.1	5	6.6	7	8.4
MWHB	19	27.5	24	35.2	8	12.5	4	6.9	.	0.0	10	15.9
NEHB	12	20.2	24	39.8	13	21.1	3	5.1	4	8.1	3	5.7
SHB	26	33.8	26	35.6	6	8.7	8	10.8	4	4.9	5	6.1

Attachment loss increases with age: 2.4% of 16-24 year-olds, 30.8% of 35-44 year-olds and 66.9% of those in the 65+ age group had more than 3mm attachment loss. The most common level of attachment loss (other than ≤3mm) was 4-5mm, with 2.3%, 22.9% and 39.8% of 16-24, 35-44 and

65+ year-olds respectively having this level of attachment loss (Table 5.7). Attachment loss at the 6-8mm level was not very common: 5.8% of 35-44 year-olds and 15.5% of the 65+ year-old group had this level of attachment loss.

There was some variation amongst the health board areas. For example, in the 35-44 year-old group, 80.3% of adults in the NEHB area had a loss of attachment score of ≤3mm compared with only 68.0% in the ERHA region.

Table 5.8 Mean number of sextants per dentate adult according to degree of loss of attachment of the periodontium, age group and health board region

Base: Dentate

16-24 year-olds	≤3mm	4-5mm	6-8mm	9-11mm	≥12mm	X
National	5.9	0.0	0.0	0.0	0.0	0.1
ERHA	5.9	0.1	0.0	0.0	0.0	0.1
MWHB	6.0	0.0	0.0	0.0	0.0	0.0
NEHB	6.0	0.0	0.0	0.0	0.0	0.0
SHB	5.9	0.1	0.0	0.0	0.0	0.0
35-44 year-olds	≤3mm	4-5mm	6-8mm	9-11mm	≥12mm	X
National	4.9	0.6	0.1	0.0	0.0	0.4
ERHA	5.1	0.5	0.1	0.1	0.0	0.3
MWHB	5.2	0.4	0.0	0.0	0.0	0.4
NEHB	5.3	0.3	0.1	0.0	0.0	0.3
SHB	5.0	0.3	0.0	0.0	0.1	0.5
65+ year-olds	≤3mm	4-5mm	6-8mm	9-11mm	≥12mm	X
National	1.8	1.1	0.3	0.1	0.1	2.6
ERHA	1.7	1.4	0.2	0.1	0.1	2.5
MWHB	1.6	0.7	0.2	0.1	0.0	3.2
NEHB	1.8	0.9	0.3	0.2	0.1	2.7
SHB	2.1	1.0	0.2	0.1	0.1	2.4

The mean number of sextants with 4-5mm attachment loss also increased with age from 0.0 for 16-24 year-olds to 0.6 for 35-44 year-olds and 1.1 for 65+ year-olds (Table 5.8). As with coronal and root caries, the increase in tooth loss with age makes it difficult to interpret the results of the extent of loss of attachment in older age groups.

For investigating the difference in the levels of loss of attachment between those who possessed a medical card (MC Yes) and those who did not (MC No), the 35-44 year-old group are the most interesting group to look at (Table 5.9). The prevalence of loss of attachment in this group is higher than in the 16-24 year-old group and, unlike the 65+ age group, tooth loss does not pose too great a challenge to the interpretation of the findings. In the 35-44 year-old age group, the mean number of sextants with loss of attachment ≤3mm was higher amongst those who were not in possession of a medical card (5.1) compared to those with medical cards (4.1). As expected from data presented earlier on tooth loss, the mean number of sextants, which could not be scored because of lack of teeth (X), was higher amongst medical card holders (0.7) than amongst those who did not possess a medical card (0.3).

Table 5.9 Mean number of sextants per dentate adult according to degree of loss of attachment of the periodontium, for the 35-44 age group according to medical card status and health board region
Base: Dentate

	≤3mm		4-5mm		6-8mm		9-11mm		≥12mm		X	
	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No	MC Yes	MC No
National	4.1	5.1	1.0	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.7	0.3
ERHA	4.6	5.1	0.6	0.5	0.3	0.1	0.0	0.1	0.0	0.0	0.5	0.2
MWHB	4.7	5.3	0.3	0.5	0.0	0.1	0.0	0.0	0.0	0.0	0.9	0.2
NEHB	4.4	5.5	0.5	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.8	0.2
SHB	4.3	5.2	0.5	0.3	0.2	0.0	0.0	0.0	0.1	0.0	0.8	0.4

A similar consistent pattern of greater loss of attachment among medical card holders was seen among the sample in the various health board regions.

Interpretation of these results for loss of attachment is difficult, due mainly to the varying levels of tooth loss in the different groups. It is likely that many extracted teeth would have had extensive loss of attachment prior to extraction. This would not be reflected in the loss of attachment data presented in Tables 5.7, 5.8 and 5.9. It could be hypothesised, for example, that the loss of attachment data for medical card holders is underestimated in comparison with non medical card holders, due to the higher levels of tooth loss in the former group.

5.5 Smoking and periodontal disease

Adults were asked whether they smoked cigarettes, cigars or a pipe, or whether they drank alcohol. The consistently higher prevalence of periodontal pocketing among those who smoked tobacco or drank alcohol is clearly illustrated in Table 5.10. These data support the concept of a common risk factor approach to health promotion. Health promotion activities designed to reduce the consumption of cigarettes and alcohol would benefit oral health as well as many of the common diseases affecting general health. Dentists have an important responsibility to advise their patients of the impact of smoking and of alcohol consumption on their oral health as well as on their general health.

Table 5.10 Number of adults and percent with periodontal pocketing (CPITN scores P1 and P2, shallow and deep pockets) according to whether they smoke and consume alcohol by age group
Base: Dentate

	16-24 year-olds		35-44 year-olds		65+ year-olds	
	n	%	n	%	n	%
Smoker						
Yes	370	14.0	270	49.5	48	50.9
No	788	10.9	638	35.7	330	48.7
Consume Alcohol						
Yes	799	13.5	701	40.4	193	51.2
No	360	7.7	204	36.0	180	46.4

REFERENCE

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Chapter 6
The Need for Dental Treatment

6.1 Summary

- Over 65% of Irish males and 56% of females surveyed required some treatment to the crown or root for denture related conditions, with little change between 1989/'90 and 2000/'02.
- As in 1989/'90, treatment needs were highest amongst medical card holders.
- For 35-44 year-olds, the requirement for partial dentures declined from 29% in 1989/'90 to 21.9% in 2000/'02.
- For those aged 65 years and over, the requirement for full upper and lower dentures declined from 24% in 1989/'90 to 16.5% in 2000/'02.
- As in 1989/'90, medical card holders had the greatest need for denture treatment.
- The mean number of teeth present increased between 1989/'90 and 2000/'02, with males having more natural teeth in all age groups.
- The mean number of natural teeth present increased from 5.3 to 13.4, for medical card holders aged 65 and over.
- With more natural teeth present, the mean number of teeth judged as requiring any treatment increased for all age groups.
- The mean number of teeth judged as requiring any treatment was highest amongst medical card holders in the 35-44 and 65+ age groups.
- As in 1989/'90, fillings were more commonly required than extractions, except for those aged 65 and over.
- Amongst older groups (35-44 and 65+), medical card holders had more extracted teeth and a greater need for further extractions when compared with adults eligible for the PRSI dental treatment benefit scheme (DTBS).
- Medical card holders received higher levels of invasive treatments, whereas patients eligible for the DTBS and private patients received more non-invasive treatments.
- Females had received higher levels of treatment than males, even though males had a greater mean number of teeth present.
- Adults eligible for the DTBS had the greatest mean number of teeth present, and with the exception of 16-24 year-olds, they had the lowest treatment needs overall. Middle aged and older adults eligible for the PRSI scheme would therefore appear to have greater access to dental treatment than medical card holders.
- The level of advanced restorative treatment is low but has increased for all age groups since 1989/'90. Given the changes in oral health, the demand for advanced restorative treatment is likely to increase further as the need for denture treatment decreases.

6.2 Introduction

In this chapter, results are presented for epidemiologically assessed treatment need (excluding need for periodontal treatment and correction of dentofacial anomalies), and are compared with the results from the 1989/'90 survey. In estimating the dental treatment needs, the examining dentists did not have recourse to radiographs. It is therefore reasonable to suggest that the figures presented here are an underestimate of the treatment that would be provided if the adults were to attend a dentist for a full clinical examination and a course of treatment.

After assessing each subject for caries, periodontal destruction, tooth wear and denture status, the examiners were asked to make a treatment-need decision in light of that adult's overall dental health status. The clinical examiners were provided with a set of 'treatment-need' codes (for the crown and for the root), and general guidelines on how to arrive at a decision on the treatment required. However, it was emphasised during training and calibration that the examiners' own clinical judgement would be a major factor, and individual variations were therefore to be expected. Despite these individual variations amongst the clinicians, it is practicable to suggest that the resulting treatment-need scores reasonably reflect adults' treatment needs, as perceived by a group of practicing dentists.

6.3 Need for any treatment

The percentage of adults who required any treatment for crown or root caries or prosthetic replacement of teeth in 2000/'02 is presented in Table 6.1 by gender, age group and health board region. Comparisons are made with the 1989/'90 survey.

Table 6.1 Percentage of adults requiring any treatment for crown or root caries or prosthetic replacement of teeth by age group and gender

Base: Dentate and Edentulous

16-24 year-olds	Male	Female	Total
National 2000/'02	65.1	56.6	60.9
National 1989/'90	65.9	55.2	60.6
ERHA 2000/'02	70.4	54.0	62.2
MWHB 2000/'02	70.3	71.4	70.8
NEHB 2000/'02	77.1	79.4	78.2
SHB 2000/'02	45.3	39.2	42.4

35-44 year-olds	Male	Female	Total
National 2000/'02	69.9	63.2	66.5
National 1989/'90	67.6	69.6	68.6
ERHA 2000/'02	71.9	64.3	68.0
MWHB 2000/'02	75.5	71.1	73.3
NEHB 2000/'02	71.4	66.6	69.1
SHB 2000/'02	62.0	48.9	55.5

65+ year-olds	Male	Female	Total
National 2000/'02	74.7	65.8	69.7
National 1989/'90	71.2	58.8	65.0
ERHA 2000/'02	71.5	64.1	67.2
MWHB 2000/'02	69.7	63.4	66.2
NEHB 2000/'02	78.3	69.7	73.2
SHB 2000/'02	73.8	50.3	60.5

The percentage of 16-24 year-olds requiring any treatment increased from 60.6% in 1989/'90 to 60.9% in 2000/'02. It decreased from 68.6% to 66.5% for 35-44 year-olds, and increased from 65.0% to 69.7% for 65+ year-olds. There was a greater treatment requirement for males within all age groups.

Analysis of the representative health boards shows that, for all age groups, the lowest treatment requirement was in the SHB region.

The nature of the system under which dental treatment is provided might be expected to influence the extent to which adults' treatment needs have been fulfilled. Table 6.2 presents the percentage of adults requiring any treatment (for crown or root caries or prosthetic replacement of teeth) by age group and eligibility for the major dental treatment schemes. The different dental schemes are Private (None), Social Welfare Dental Treatment Benefit Scheme - DTBS (PRSI), or DTSS (possession of a medical card - MC).

The 1989/'90 survey established that a greater proportion of medical card holders had treatment requirements than those who were eligible for either pay related social welfare dental benefit (PRSI), or those with no entitlements to third party funded dental care (None) for 16-24 and 35-44 year-olds (Table 6.2). The higher proportion of medical card holders requiring any treatment was also evident in 2000/'02 in the 35-44 and 65+ age groups, but was lower for medical card holders in the 16-24 year-old group relative to those with PRSI dental benefits.

Table 6.2 Percentage of adults requiring any treatment (for crown or root caries or prosthetic replacement of teeth) by age group and eligibility for dental treatment schemes
Base: Dentate and Edentulous

16-24 year-olds	None	PRSI	MC
National 2000/'02	53.1	71.9	64.2
National 1989/'90	57.3	54.1	64.5
ERHA 2000/'02	53.8	73.8	66.5
MWHB 2000/'02	64.4	82.1	77.4
NEHB 2000/'02	82.7	61.9	82.6
SHB 2000/'02	36.3	49.8	49.2

35-44 year-olds	None	PRSI	MC
National 2000/'02	61.9	61.3	87.5
National 1989/'90	69.0	65.0	71.6
ERHA 2000/'02	61.6	68.2	91.5
MWHB 2000/'02	68.3	65.6	89.7
NEHB 2000/'02	82.2	53.2	93.7
SHB 2000/'02	56.4	46.1	67.4

65+ year-olds	None	PRSI	MC
National 2000/'02	81.0	69.7	87.2
National 1989/'90	68.4	50.0	64.4
ERHA 2000/'02	75.4	50.7	91.8
MWHB 2000/'02	94.6	87.2	88.7
NEHB 2000/'02	95.9	83.7	87.0
SHB 2000/'02	74.6	90.8	77.4

In all age groups, regardless of eligibility for the various dental schemes, a high proportion of Irish adults were found to require dental treatment. For 16-24 year-olds, the proportion requiring treatment increased from 54.1% in 1989/'90 to 71.9% in 2000/'02 among those eligible for PRSI dental benefit, but reduced for those eligible under the other schemes. Among 35-44 year-olds, the proportion requiring treatment declined for those with PRSI (65.0% to 61.3%) and for private patients (None) (69.0% to 61.9%). The substantial increase for medical card holders may be explained by the fact that the DTSS was not extended to this group until January 2000, and there may be some backlog residual of unmet need captured in the 2000/'02 survey. Among 65+ year-olds, there were substantial increases in the proportion with treatment requirements between 1989/'90 and 2000/'02. At health board level, the SHB area had a lower treatment requirement in all schemes and age groups, except for those aged 65 and over with PRSI dental benefits.

These figures could be interpreted as providing an indication of accessibility to dental services for the three age groups. Adults eligible for PRSI dental benefits have ready access to subsidised dental treatment. Private patients have to pay a fee per item of dental treatment: As they are not eligible for a medical card, they are judged as having an adequate income to pay for treatment. Adult medical card holders have been eligible for the DTSS on a phased basis since 1994.

6.4 Denture treatment needs
The need for treatment involving dentures by age group and gender is presented in Table 6.3.

Table 6.3 Percentage of adults requiring denture treatment, including repairs, adjustments, replacements or new dentures (full or partial), by age group and gender

Base: Dentate and Edentulous

16-24 year-olds	Male	Female	Total
National 2000/'02	2.1	1.4	1.7
National 1989/'90	2.4	3.5	3.0
ERHA 2000/'02	1.9	1.1	1.5
MWHB 2000/'02	0.5	1.6	1.0
NEHB 2000/'02	2.6	3.7	3.1
SHB 2000/'02	5.5	0.8	3.2

35-44 year-olds	Male	Female	Total
National 2000/'02	22.7	25.7	24.3
National 1989/'90	34.1	37.9	36.0
ERHA 2000/'02	23.0	30.1	26.6
MWHB 2000/'02	19.7	24.6	22.1
NEHB 2000/'02	14.5	12.4	13.5
SHB 2000/'02	34.0	15.1	24.6

65+ year-olds	Male	Female	Total
National 2000/'02	61.4	52.0	56.1
National 1989/'90	52.3	55.7	54.0
ERHA 2000/'02	58.3	53.4	55.4
MWHB 2000/'02	50.2	47.8	48.9
NEHB 2000/'02	52.2	48.7	50.2
SHB 2000/'02	65.5	47.7	55.4

The relationship between age and tooth loss has already been discussed in Chapter 3. In Table 6.3, there is a clear positive relationship between age and denture treatment need, with 1.7% of 16-24 year-olds requiring some denture related treatment, compared to 56.1% of those aged 65 years and older. While gender differences were not very pronounced, more males than females had denture treatment requirements in the 16-24 and 65+ age groups. Between 1989/'90 and 2000/'02, there was a decline in the denture treatment requirement in both the 16-24 and the 35-44 age groups, and a small increase for those aged 65 and over.

The need for treatment involving dentures (by age group and eligibility status) is presented in Table 6.4.

Table 6.4 Percentage of adults requiring denture treatment, including repairs, adjustments, replacements or new dentures (full or partial), by age group and eligibility status for dental treatment schemes

Base: Dentate and Edentulous

35-44 year-olds	None	PRSI	MC
National 2000/'02	16.7	23.3	34.5
National 1989/'90	35	36	38

65+ year-olds	None	PRSI	MC
National 2000/'02	52.3	43.7	67.5
National 1989/'90	57	22	57

Just 1.7% of the adults examined in the 16-24 age group required denture treatment (Table 6.3). When disaggregated by eligibility status at health board level, the sample sizes were too small to warrant presentation. As in 1989/'90, medical card holders had the greatest need for denture treatment

according to eligibility status. In the 35-44 age group, the need for denture treatment declined for all eligibility groups between 1989/'90 and 2000/'02. The denture treatment requirement for medical card holders, aged 65 and over, increased from 57% in 1989/'90 to 67.5% in 2000/'02, and almost doubled for those with PRSI (from 22% to 43.7%). The introduction of the DTSS for adult medical card holders did not reduce the denture requirement for those aged 65 and over. This may be explained by the very low utilisation rate for this age group. Analysis of the DTSS database revealed that even though 397,590 of those aged 65 and over were eligible for treatment, only 37,776 (or just 9.5%) made a dental visit in 2001. However, 34.3% of those aged less than 65 years used the DTSS during the same period.

The number and percentage of adults requiring new dentures, or adjustments to existing dentures, are presented in Table 6.5.

Table 6.5 Number and percentage of adults requiring new dentures, or repairs or adjustments to existing dentures. P/-: Upper Partial; -/P: Lower Partial; P/P: Upper and Lower Partial; F/-: Upper Full; -/F: Lower Full; F/F: Full Upper and Lower Dentures; Rep. Adj: repair or adjustment

Base: Dentate and Edentulous

16-24 year-olds	P/- or -/P		P/P		F/- or -/F		P/F or F/P		F/F		Rep. Adj	
	n	%	n	%	n	%	n	%	n	%	n	%
National 2000/'02	18	1.4	5	0.3	0	0	0	0	0	0	1	0
National 1989/'90	8	2	3	1	1	0	0	0	0	0	0	0

35-44 year-olds	n	%	n	%	n	%	n	%	n	%	n	%
National 2000/'02	131	13.8	75	8.1	4	0.2	4	0.5	4	0.2	13	1.5
National 1989/'90	78	19	42	10	9	2	8	2	8	2	7	2

65+ year-olds	n	%	n	%	n	%	n	%	n	%	n	%
National 2000/'02	99	13.2	68	10.8	43	4.8	32	4.5	116	16.5	33	6.2
National 1989/'90	20	8	28	12	12	5	7	3	58	24	6	3

There was a reduction in the denture treatment requirement of adults examined between 1989/'90 and 2000/'02. Adults in the 35-44 age group mostly required partial dentures. This consisted of 13.8% of adults requiring either a partial upper, or a partial lower denture, and 8.1% requiring both partial upper and lower dentures. In total, 24.3% of the 35-44 year-olds examined required a denture-related treatment, compared with 37% in 1989/'90. This reduction is an important indication of the changing nature of treatment needs in the population. The need for denture treatment has decreased, and given the trends in increasing retention of natural teeth, it is likely to decrease further in the future.

New full upper and full lower dentures were required by 16.5% of 65+ year-olds. A further 10.8% required upper and lower partial, and 13.2% required a partial upper or a partial lower denture. In total, 56.0% of 65+ year-olds examined had a denture treatment requirement, compared with 55% in 1989/'90.

6.5 Need for extractions and conservative treatment

The nature of the treatment required by the adults examined is described in Tables 6.6 and 6.7. The treatment required is categorised into: the mean number of extractions (which includes extractions for all reasons); mean number of teeth requiring fillings (regardless of extent, location or number of surfaces involved); mean number of advanced restorations (which includes endodontics, crowns, bridges and veneers); and mean number of teeth requiring other treatment (e.g. polishing of margins, repair of fillings, fissure sealing, and treatment of sensitive teeth). The mean number of teeth requiring any treatment is also presented. It is important to note that the mean number of teeth requiring treatment is dependent on the mean number of teeth present, hence the latter is also presented for each age group.

Table 6.6 Mean number of teeth present and the mean number of teeth, which were judged as requiring treatment (of the crown or root) by treatment type, age group and gender

Base: Dentate and Edentulous

	No. of Teeth		Extractions		Fillings		Advanced Restorations		Any Treatment	
16-24 year-olds	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
2000/'02	28.5	27.9	0.2	0.2	1.6	1.4	0.1	0.1	2.6	1.9
1989/'90	28	27	0.2	0.2	1.4	1.3	0.0	0.1	1.7	1.5
35-44 year-olds	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
2000/'02	25.3	25.2	0.8	1.1	1.8	1.3	0.3	0.2	3.2	2.8
1989/'90	22	20	0.4	0.4	1.0	1.0	0.1	0.2	1.8	1.8
65+ year-olds	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
2000/'02	9.9	7.4	1.6	0.9	0.8	0.6	0.0	0.0	4.5	3.0
1989/'90	10	5	2.0	0.2	0.8	0.2	0.0	0.0	2.7	0.4

The higher level of tooth loss in females (F) is apparent when looking at the mean number of teeth present by gender within age group. For example, males (M) aged 65+ had more teeth than their female contemporaries (9.9 vs. 7.4), and also required more extractions (1.6 vs. 0.9). However, even if all teeth clinically judged as requiring extraction were extracted, the gender difference in mean number of teeth present would still exist. There was also a tendency for male adults to require more fillings than females: 65+ year-old males required an average of 0.8 teeth filled, whereas females required an average of 0.6 teeth filled.

The mean number of teeth requiring any treatment increased in all age groups between 1989/'90 and 2000/'02. This may be explained by the increase in the mean number of teeth present.

Considering the total mean number of teeth that required treatment (Table 6.6), males consistently had greater treatment requirements than females, indicating that perhaps females are more likely to seek treatment for dental problems than males (see Table 6.10). This finding is consistent with data reported in Chapter 4: Females in each age group had a higher mean decay experience ($D_{3c}MFT$) than males (Table 4.1a). Hence, although females had a greater disease level, they were also more likely to have had their disease treated. This finding is also supported by the national data, shown in Table 4.6a, which shows that for each age group, the percentages of total $D_{3c}MFT$, which were attributable to the decayed ($D_{3c}T$) or untreated component, were consistently lower for females than for males.

The need for treatment according to eligibility status is presented in Table 6.7. Due to the relatively low number of patients examined in the 'other treatment' category, figures are only presented for the 'None', 'PRSI' and 'MC' categories.

Table 6.7 Mean number of teeth present and the mean number of teeth, which were judged as requiring treatment (of the crown or root) by treatment type, age group and eligibility status

Base: Dentate and Edentulous

16-24 year-olds		No. of Teeth	Extractions	Fillings	Advanced Restorations	Other	Any Treatment
2000/'02	**None**	28.1*	0.1	1.3	0.1	0.5*	1.9*
	PRSI	28.4*	0.3*	1.9*	0.2*	0.6*	2.8*
	MC	28.1*	0.3	1.6	0.1	0.4*	2.2
1989/'90	**None**	27.2*	0.2	1.2	0.0	0.1*	1.4*
	PRSI	27.5*	0.1*	1.2*	0.1*	0.0*	1.4*
	MC	27.0*	0.2	1.7	0.0	0.0*	2.0

35-44 year-olds		No. of Teeth	Extractions	Fillings	Advanced Restorations	Other	Any Treatment
2000/'02	None	25.9*	0.8*	1.5*	0.3	0.9*	2.7*
	PRSI	26.0*	0.8*	1.3*	0.2	1.1*	2.7*
	MC	23.4*	1.4*	2.1*	0.3*	2.2*	4.8*
1989/'90	None	20.9*	0.3*	1.1*	0.2	0.4*	1.9*
	PRSI	21.5*	0.1*	0.7*	0.2	0.3*	1.4*
	MC	20.9*	0.9*	1.0*	0.0*	0.1*	2.0*

65+ year-olds		No. of Teeth	Extractions	Fillings	Advanced Restorations	Other	Any Treatment
2000/'02	None	16.5*	1.6	1.6*	0.2*	3.2*	5.3*
	PRSI	16.9*	1.6	0.9	0.1*	2.6*	3.7*
	MC	13.4*	2.4*	1.2*	0.0	5.0*	6.6*
1989/'90	None	9.7*	1.3	0.5*	0.1*	0.2*	1.8*
	PRSI	12.1*	0.8	0.6	0.0*	0.0*	1.2*
	MC	5.3*	0.8*	0.4*	0.0	0.0*	1.2*

* Statistically significant at 95% level based on t-test for the difference between two means, from
 independent samples.

For all age groups, adults eligible for PRSI dental benefits had a greater mean number of teeth present, compared with either those with no eligibility for treatment, or those with medical cards. Medical card holders aged 65 and over had considerably fewer teeth (13.4) than those eligible for the DTBS (PRSI) (16.9) or private patients (16.5).

There was a substantial increase in the mean number of teeth present by eligibility status and age group between 1989/'90 and 2000/'02. For 35-44 year-olds, the mean number of teeth present increased from 21.5 to 26.0 for those eligible for the DTBS (PRSI), and from 20.9 to 25.9 for the 'None' category. The most significant improvements were for those aged 65 and over, with the mean number of teeth present increasing from 5.3 to 13.4 for medical card holders (MC), from 12.1 to 16.9 for those eligible for the DTBS (PRSI), and from 9.7 to 16.5 for private patients (None). The increase in the mean number of teeth present was reflected in an increased treatment requirement in all categories.

6.6 Multivariate analysis
Dichotomous logistic regression was used to assess the risk of treatment need and denture need. The statistical significance of interactions was evaluated using a backwards step-wise procedure with the likelihood ratio test.

The variables age, gender, medical card status and health board were included in the models for treatment need (coronal portion of the tooth) and denture treatment need. For treatment need, it was found that there were a number of statistically significant interactions between age and the other variables in the model; therefore, each age group was analysed separately. Denture treatment need was only modelled for the 35-44 and 65+ age groups due to insufficient numbers of 16-24 year-olds with denture treatment need. Significance of predictors was assessed using the Wald test statistic. Pairwise comparisons of health board areas used the Wald statistic with the Bonferroni correction for multiple comparisons.

6.6.1 Treatment need – coronal portion of the tooth
Tables 6.8a, 6.8b and 6.8c present estimates from the dichotomous logistic regression for 16-24, 35-44 and 65+ year-olds respectively. The number and percentage of adults with 'none' and 'some' need for treatment of the coronal part of the tooth, adjusted odds ratio of having 'none' vs. 'some' treatment need, 95% Confidence Interval (CI) and significance (p-value) according to the independent variables tested are presented. Health Board of residence was entered as a variable for those living in the ERHA, MWHB, NEHB and SHB regions. The samples from all other health boards were grouped as Other Health Boards (OHB) as these regions opted to contribute to a national sample rather than examining a representative sample of adults for their area.

Adults aged 16-24 years residing in the MWHB and NEHB regions had a significantly higher likelihood of having treatment need than those residing in the ERHA region. Those residing in the SHB region had a significantly lower likelihood of having treatment need than the four other regions (Table 6.8a).

Table 6.8a Estimates for treatment need (coronal portion of the tooth) for 16-24 year-olds

Characteristic (16-24 year-olds)	Number (%) by Treatment Need (unadjusted)		Adj. odds ratio	95% CI	P-value
	None	Some			
Age			1.03	0.98-1.08	0.2068
Health Board:					
ERHA	109 (39.4%)	168 (60.6%)	1.00		
MWHB	91 (29.1%)	222 (70.9%)	1.61	1.14-2.28	0.0068
NEHB	45 (22.2%)	158 (77.8%)	2.31	1.53-3.48	<0.0001
SHB	102 (57.6%)	75 (42.4%)	0.49	0.33-0.72	0.0003
OHB	69 (32.9%)	141 (67.1%)	1.35	0.92-1.97	0.1233
Gender:					
Male	164 (32.4%)	342 (67.6%)	1.00		
Female	252 (37.4%)	422 (62.6%)	0.80	0.62-1.02	0.0723
Medical Card Status:					
Yes	84 (32.1%)	178 (67.9%)	1.09	0.81-1.48	0.5605
No	332 (36.2%)	586 (63.8%)	1.00		

For 35-44 year-olds, the SHB region had a significantly lower likelihood of having treatment need than the ERHA and MWHB regions. Gender and medical card status were also significantly associated with treatment need (Table 6.8b).

Table 6.8b Estimates for treatment need (coronal portion of the tooth) for 35-44 year-olds

Characteristic (35-44 year-olds)	Number (%) by Treatment Need (unadjusted)		Adj. odds ratio	95% CI	P-value
	None	Some			
Age			1.07	1.02-1.13	0.0061
Health Board:					
ERHA	73 (29.9%)	171 (70.1%)	1.00		
MWHB	63 (27.9%)	163 (72.1%)	1.17	0.77-1.76	0.4650
NEHB	46 (32.4%)	96 (67.6%)	0.97	0.61-1.54	0.9022
SHB	68 (46.9%)	77 (53.1%)	0.48	0.31-0.75	0.0013
OHB	63 (31.7%)	136 (68.3%)	0.86	0.57-1.31	0.4934
Gender:					
Male	100 (27.8%)	260 (72.2%)	1.00		
Female	213 (35.7%)	383 (64.3%)	0.66	0.49-0.89	0.0060
Medical Card Status:					
Yes	27 (13.7%)	170 (86.3%)	3.88	2.50-6.01	<0.0001
No	286 (37.7%)	473 (62.3%)	1.00		

Adults in the 65+ age group, residing in the SHB area, had a significantly lower likelihood of having treatment need than those residing in the 'other' health boards (OHB). Females were also significantly less likely to have treatment need than males (Table 6.8c).

For all age groups, the estimated treatment need was lower in the SHB region. One possible contributory factor to this difference is the higher dentist to population ratio in the SHB region when compared with the other regions. For example, in 2001, in the case of the DTSS for medical card

holders, the dentist to eligible adult (MC holder) ratio was 1:716 in the SHB region, 1:881 in the ERHA region and 1:982 in the MWHB region.

Table 6.8c Estimates for treatment need (coronal portion of the tooth) for 65+ year-olds

Characteristic (65+ year-olds)	Number (%) by Treatment Need (unadjusted)		Adj. odds ratio	95% CI	P-value
	None	Some			
Age			0.98	0.95-1.01	0.1272
Health Board:					
ERHA	50 (32.1%)	50 (32.1%)	1.00		
MWHB	38 (32.2%)	38 (32.2%)	1.00	0.59-1.67	0.9868
NEHB	27 (25.5%)	27 (25.5%)	1.49	0.85-2.60	0.1653
SHB	51 (38.1%)	51 (38.1%)	0.77	0.47-1.26	0.3058
OHB	41 (23.0%)	41 (23.0%)	1.63	0.99-2.68	0.0529
Gender:					
Male	82 (25.5%)	239 (74.5%)	1.00		
Female	125 (33.7%)	246 (66.3%)	0.68	0.48-0.94	0.0221
Medical Card Status:					
Yes	141 (31.2%)	311 (68.8%)	0.86	0.59-1.24	0.4170
No	66 (27.5%)	174 (72.5%)	1.00		

6.6.2 Denture treatment need

Tables 6.9a and 6.9b present estimates for denture treatment need from the dichotomous logistic regression for 35-44 and 65+ year-olds respectively. The number and percentage of adults with 'none' and 'some' need for denture treatment, adjusted odds ratio of having 'none' vs. 'some' denture treatment need, 95% CI and significance (p value) according to the independent variables tested are presented.

For 35-44 year-olds, age, health board area and medical status were all significantly associated with denture need at the p = 0.01 level. Age and having a medical card were associated with increased likelihood of need. Adults aged 35-44 years residing in the NEHB region had a significantly higher likelihood of need than those in the ERHA region (Table 6.9a).

Table 6.9a Estimates for denture treatment need for 35-44 year-olds

Characteristic (35-44 year-olds)	Number (%) by Treatment Need (unadjusted)		Adj. odds ratio	95% CI	P-value
	None	Some			
Age			1.20	1.13-1.27	<0.0001
Health Board:					
ERHA	173 (70.9%)	71 (29.1%)	1.00		
MWHB	177 (78.3%)	49 (21.7%)	0.68	0.44-1.06	0.0870
NEHB	124 (87.3%)	18 (12.7%)	0.38	0.21-0.68	0.0011
SHB	112 (77.2%)	33 (22.8%)	0.78	0.48-1.28	0.3233
OHB	147 (73.9%)	52 (26.1%)	0.79	0.51-1.23	0.2917
Gender:					
Male	275 (76.4%)	85 (23.6%)	1.00		
Female	458 (76.8%)	138 (23.2%)	0.99	0.71-1.36	0.9343
Medical Card Status:					
Yes	125 (63.5%)	72 (36.5%)	2.24	1.57-3.20	<0.0001
No	608 (80.1%)	151 (19.9%)	1.00		

For the 65+ age group, both age and medical card status were significantly associated with denture need. Age was negatively associated with increased likelihood of need, whereas having a medical card was positively associated with increased likelihood of need (Table 6.9b).

Table 6.9b Estimates for denture treatment need for 65+ year-olds

Characteristic (65+ year-olds)	Number (%) by Treatment Need (unadjusted)		Adj. odds ratio	95% CI	P-value
	None	Some			
Age			0.97	0.94-0.99	0.0115
Health Board:					
ERHA	71 (45.5%)	85 (54.5%)	1.00		
MWHB	59 (50.0%)	59 (50.0%)	0.77	0.47-1.25	0.2830
NEHB	53 (50.0%)	53 (50.0%)	0.81	0.49-1.34	0.4129
SHB	59 (44.0%)	75 (56.0%)	1.01	0.63-1.62	0.9532
OHB	66 (37.1%)	112 (62.9%)	1.28	0.82-2.01	0.2762
Gender:					
Male	131 (40.8%)	190 (59.2%)	1.00		
Female	177 (47.7%)	194 (52.3%)	0.74	0.54-1.00	0.0527
Medical Card Status:					
Yes	191 (42.3%)	261 (57.7%)	1.47	1.04-2.06	0.0267
No	117 (48.8%)	123 (51.3%)	1.00		

6.7 Previous treatment

For each adult, the examiners determined the mean number of teeth that had previously received treatment at the time of examination. The distribution of treatment received for each age group is presented by gender in Table 6.10 and by eligibility status in Table 6.11.

Table 6.10 Mean number of teeth that had received treatment at time of examination by treatment type, age group and gender

Base: Dentate and Edentulous

	Extractions		Fillings		Teeth replaced by bridge		Crowns		Total Treatment	
16-24 year-olds	M	F	M	F	M	F	M	F	M	F
National 2000/'02	0.8	0.8	2.7	3.2	0.0	0.0	0.0	0.0	3.5	4.0
National 1989/'90	2.2	2.9	3.4	3.9	0.0	0.0	0.0	0.0	5.6	6.8
ERHA 2000/'02	0.7	0.5	2.3	2.9	0.0	0.0	0.1	0.0	3.0	3.4
MWHB 2000/'02	0.4	0.5	3.1	4.2	0.0	0.0	0.0	0.0	3.5	4.8
NEHB 2000/'02	0.4	0.8	2.5	3.2	0.0	0.0	0.0	0.0	3.0	4.1
SHB 2000/'02	1.2	2.2	2.8	4.5	0.0	0.0	0.0	0.0	4.0	6.7
35-44 year-olds	M	F	M	F	M	F	M	F	M	F
National 2000/'02	4.7	4.7	8.4	9.0	0.0	0.0	0.2	0.3	13.4	14.0
National 1989/'90	9.7	11.4	7.4	7.8	0.0	0.1	0.2	0.3	17.3	19.6
ERHA 2000/'02	3.2	4.2	8.8	8.4	0.0	0.0	0.2	0.2	12.2	12.8
MWHB 2000/'02	4.5	5.7	7.2	8.6	0.0	0.1	0.3	0.5	12.0	14.8
NEHB 2000/'02	4.5	3.9	8.1	9.3	0.1	0.0	0.3	0.3	12.9	13.5
SHB 2000/'02	5.4	4.9	8.4	9.7	0.0	0.0	0.2	0.5	14.0	15.1

	Extractions		Fillings		Teeth replaced by bridge		Crowns		Total Treatment	
65+ year-olds	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
National 2000/'02	21.1	23.3	2.7	2.7	0.0	0.0	0.2	0.3	24.0	26.3
National 1989/'90	21.7	27.1	2.4	1.7	0.0	0.0	0.1	0.1	24.2	28.9
ERHA 2000/'02	21.2	24.0	3.1	2.5	0.1	0.1	0.2	0.5	24.6	27.0
MWHB 2000/'02	22.5	24.5	2.1	2.5	0.1	0.0	0.2	0.3	24.8	27.3
NEHB 2000/'02	21.3	24.5	3.3	2.4	0.0	0.1	0.0	0.3	24.7	27.2
SHB 2000/'02	21.8	25.1	2.2	2.3	0.0	0.0	0.1	0.2	24.1	27.6

Both the 1989/'90 and 2000/'02 survey results show that females had received consistently higher levels of treatment than males. Females tended to have more filled teeth than males in the 16-24 and 35-44 age groups. Males had a substantially greater mean number of teeth present (Table 6.6), whereas females tended to have more extracted teeth and fillings (Table 6.10).

The number of total treatments received decreased in all age groups between 1989/'90 and 2000/'02. When treatment content was examined, extractions decreased between 1989/'90 and 2000/'02 in all age groups. There was an increase in fillings for the 35-44 year-olds (from 7.4 to 8.4 for males and 7.8 to 9.0 for females) and 65+ year-olds (from 2.4 to 2.7 for males and 1.7 to 2.7 for females) (Table 6.10). At health board level, adults in the SHB area received an above-average number of treatments in all age groups. Table 6.11 presents previously received treatments by age group and eligibility status.

Table 6.11 Mean number of teeth that had received treatment at the time of examination by treatment type, age group and eligibility status

Base: Dentate and Edentulous

16-24 year-olds		Extractions	Fillings	Teeth replaced by bridge	Crowns	Total Treatment
2000/'02	**None**	0.9*	3.2*	0.0	0.0	4.1*
	PRSI	1.1*	3.4*	0.0	0.0	4.5*
	MC	0.7*	2.7	0.0*	0.0	3.4*
1989/'90	**None**	2.4*	3.8*	0.0	0.0	6.2*
	PRSI	2.7*	4.4*	0.0	0.0	7.2*
	MC	2.8*	3.1	0.0*	0.0	6.0*

35-44 year-olds		Extractions	Fillings	Teeth replaced by bridge	Crowns	Total Treatment
2000/'02	**None**	4.1*	9.4*	0.1	0.4	13.9*
	PRSI	3.7*	9.3	0.0	0.3	13.3*
	MC	7.2*	6.4	0.0	0.1	13.7*
1989/'90	**None**	10.7*	8.2*	0.1	0.3	19.2*
	PRSI	10.3*	8.4	0.0	0.2	18.9*
	MC	10.9*	5.7	0.0	0.2	16.9*

65+ year-olds		Extractions	Fillings	Teeth replaced by bridge	Crowns	Total Treatment
2000/'02	**None**	13.5*	5.7*	0.2*	0.9*	20.2*
	PRSI	13.0*	6.0	0.0	0.3*	19.2*
	MC	17.2*	3.9*	0.1*	0.2*	21.4*
1989/'90	**None**	22.2*	3.1*	0.0*	0.2*	25.6*
	PRSI	19.8*	5.8	0.0	0.0*	25.6*
	MC	26.7*	1.0*	0.0*	0.0*	27.7*

*Statistically significant at 95% level based on t-test comparing two proportions.

The mean number of teeth which had previously received any treatment did not vary much by eligibility status. Medical card holders received more extractions and fewer fillings than either those eligible for the DTBS (PRSI) or private patients (None), with the exception of extractions for 16-24 year-olds. For 65+ year-olds, the mean number of teeth extracted for the 'None', 'PRSI', and 'MC' groups were 13.5, 13.0 and 17.2 respectively. The mean numbers of fillings for the three eligibility groups in this age group were 5.7, 6.0, and 3.9 respectively.

Between surveys, the mean number of teeth extracted for medical card holders declined from 2.8 to 0.7 for the 16-24 year-olds, from 10.9 to 7.2 for the 35-44 year-olds, and from 26.7 to 17.2 for the 65+ year-olds. This represents an important change in treatment patterns, which will impact on demand for future services. There was little difference between the surveys in the estimates for teeth replaced by bridge and crowns for the 16-24 year-olds and 35-44 year-olds. However, for those aged 65 and over, all groups had significant increases in the number of crowns previously received.

For those eligible for private services only (None), the mean number of teeth filled decreased significantly from 3.8 to 3.2 for 16-24 year-olds, increased from 8.2 to 9.4 for 35-44 year-olds, and increased from 3.1 to 5.7 for 65+ year-olds. The only significant change in the mean number of fillings received by medical card holders was an increase from 1.0 to 3.9 for 65+ year-olds.

There was a substantial reduction in extractions for all age groups between 1989/'90 and 2000/'02. There was also an increase in the numbers of fillings, with the exception of the 16-24 age group. For those with PRSI dental benefit, the mean number of teeth filled decreased from 4.4 to 3.4 for 16-24 year-olds, increased 8.4 to 9.3 for 35-44 year-olds, and increased from 5.8 to 6.0 for 65+ year-olds.

Overall, in addition to a reduction in treatments received, these data indicate a move away from extraction of teeth towards restoration with fillings, particularly among the 35-44 and 65+ age groups. Crowns and bridges were also more common amongst the 65+ age group in 2000/'02 than in 1989/'90. These subtle changes may indicate a trend towards an increasing demand for more advanced restorative treatments as teeth are retained instead of being extracted. Once a tooth is extracted, it requires no further treatment; however, if it is filled it may require refilling on a periodic basis for life or, if it is heavily filled, it may require crowning. Where few teeth are extracted, the possibility of replacing missing teeth by a bridge is likely to be more appealing than replacement by denture, particularly as dentures become less common. Hence, as fewer teeth are extracted, there may be an increased demand for more costly bridgework than for dentures. The slight increase in the need for advanced restorations in all age groups (Tables 6.6 and 6.7) would seem to support this suggestion.

Chapter 7
Other Oral Conditions Measured

7.1 Summary
- The prevalence of trauma to permanent incisors was considerably higher amongst males (24.6%) than females (15.8%).
- There was a substantial increase in trauma to permanent incisors between 1989/'90 and 2000/'02, particularly among females where trauma increased from 8% to 15.8%.
- The use of acid-etch composite restorations increased considerably. For example, it was found that 16% of the injuries recorded for males in 1989/'90 were restored using acid-etch composite material. This figure had increased to 33.7% in 2000/'02.
- Though the proportion of trauma that was untreated decreased between 1989/'90 and 2000/'02, it still remained high.
- The prevalence of opacities increased in the full fluoridated group between 1989/'90 and 2000/'02.
- The difference in the prevalence of opacities between the full fluoridated and non fluoridated groups in 2000/'02 was small (p = 0.2883).
- Temporo Mandibular Joint dysfunction was greater in the older age groups and amongst females.
- Need for orthodontic treatment was estimated for 16-24 year-olds: 7% had a definite need, 19% had a borderline need and 74% had no need for orthodontic treatment on aesthetic grounds.
- Approximately 25.7% of 16-24 year-olds had a definite need for orthodontic treatment on dental health grounds.
- As expected, tooth wear increased with age: The proportion of adults for whom 'any wear' was recorded was 38.1% for 16-24 year-olds, 76.2% for 35-44 year-olds and 93.0% for 65+ year-olds.

7.2 Introduction
Chapters 3, 4 and 5 presented details of the more common oral conditions: tooth loss, caries and periodontal disease. This chapter presents an overview of a number of other conditions affecting the dentition. The following conditions are described:
- Trauma (16-24 year-olds)
- Developmental Defects of Enamel (16-24 year-olds)
- Enamel fluorosis (16-24 year-olds)
- The condition of the Temporo Mandibular Joint (TMJ) (all age groups)
- Orthodontic treatment need (16-24 year-olds)
- Tooth wear and erosion (all age groups)
- Lesions of the oral mucosa (all age groups).

7.3 Trauma to permanent incisors
Over the last 50 years, many epidemiological studies of oral health have reported on the prevalence of traumatic injuries to permanent incisor teeth. These studies, and treatment services data, indicate that these injuries are a major contributor to dental treatment need worldwide. In this section, the prevalence, distribution and pattern of traumatic injuries to permanent incisor teeth of 16-24 year-olds is presented. In order to assess trends over time, the data collected in 2000/'02 are compared with those recorded in 1989/'90 when similar diagnostic criteria were used. It was decided that only the 16-24 year age group would be assessed for traumatic injuries to permanent incisors since measurement of these conditions is problematic for older age groups.

Table 7.1 presents the number of 16-24 year-olds examined, and the percentage with at least one permanent incisor affected by trauma according to gender and medical card status.

Table 7.1 Number of 16-24 year-olds examined and percentage with at least one permanent incisor affected by trauma, according to gender and medical card status
Base: Dentate

	Male		Female		All	
	n	%	n	%	n	%
2000/'02	510	24.6	684	15.8	1194	20.3
1989/'90	170	21	230	8	400	13.5
	MC Yes		MC No		All	
2000/'02	263	20.7	920	20.0	1183	20.1

Of the 1,194 16-24 year-olds examined, 20.3% had at least one permanent incisor affected by trauma (Table 7.1). The prevalence was considerably higher amongst males (24.6%) than females (15.8%) (p = 0.0002). Comparing these figures with those of 1989/'90, there was a substantial increase in the percentage with trauma; this is particularly apparent amongst females (from 8% in 1989/'90 to 15.8% in 2000/'02).

The prevalence of traumatic injuries to permanent incisors was similar amongst medical card holders (20.7%) and non medical card holders (20.0%) (Table 7.1).

Table 7.2 Percentage of 16-24 year-olds with at least one permanent incisor affected by trauma, according to whether the tooth was located in the upper or lower jaw, by gender
Base: Dentate

	Upper			Lower		
	Male	Female	All	Male	Female	All
2000/'02	22.7	13.2	18.0	4.6	2.7	3.6
1989/'90	15.9	7.8	11.9	7.1	0.4	3.8

The vast majority of the traumatic injuries recorded affected the upper permanent incisors. For both males and females combined, 18.0% had at least one upper permanent incisor affected by trauma the corresponding percentage for traumatic injuries to lower incisors was 3.6%. A similar pattern was found in 1989/'90 (Table 7.2).

The distribution of adults according to the number of traumatised incisors is presented in Table 7.3.

Table 7.3 Number of 16-24 year-olds examined and percentage of adults according to the number of traumatised incisors by gender
Base: Dentate

		0	1	2	3	4	5	n
2000/'02	**Male**	75.4	14.9	8.5	0.8	0.3	0.2	510
	Female	84.2	12.4	3.0	0.2	0.3	0.0	684
	All	79.7	13.6	5.8	0.5	0.3	0.1	1194
1989/'90	**Male**	79.4	14.1	4.7	1.2	0.6	0.0	170
	Female	91.7	6.5	1.3	0.0	0.4	0.0	230
	All	85.6	10.3	3.0	0.6	0.5	0.0	400

For both males and females, the majority of trauma cases involved a single incisor. Approximately 6.7% of the 1,194 16-24 year-olds examined were found to have two or more incisors affected by trauma. These distributions were similar to those recorded in 1989/'90.

Table 7.4 presents the percentage of traumatised incisors according to the category of trauma for 16-24 year-olds by gender in 2000/'02 and in 1989/'90.

Table 7.4 Percentage of traumatised incisors according to the category of trauma for 16-24 year-olds by gender
Base: Dentate

Category of Trauma	2000/'02		1989/'90	
	Male	Female	Male	Female
Discolouration	9.1	11.5	6	0
Fracture Involving Enamel and Dentine	48.0	36.9	48	44
Fracture Involving Enamel, Dentine, and Pulp	1.7	1.5	2	4
Missing Due to Trauma	2.9	2.3	12	4
Acid-Etch Composite	33.7	36.9	16	12
Other Semi-Permanent / Permanent Restorations	1.1	6.9	10	12
Denture	3.4	0.8	6	24
Bridge	0.0	3.1	0	0
Implant	0.0	0.0		

There is a marked difference in the pattern of treatment provided for traumatic injuries of permanent incisor teeth between 1989/'90 and 2000/'02 (Table 7.4). In particular, the use of acid-etch composite restorations increased considerably. For example, amongst males in 1989/'90, 16% of the injuries recorded were restored using acid-etch composite material, compared with 33.7% in 2000/'02. The percentage of untreated trauma can be estimated by adding the percentages recorded as fractured and missing. Adding these figures, the level of untreated trauma decreased between 1989/'90 and 2000/'02, from 62% to 52.6% for males and from 52% to 40.7% for females. However, whilst this is a marked improvement, a large proportion of traumatic injuries to permanent incisors remain untreated.

The data presented above indicates that traumatic injuries to permanent incisors continue to affect a high percentage of young adults. There is no ready explanation for the increase in the prevalence of traumatic injuries to permanent incisors between 1989/'90 and 2000/'02, a finding which was particularly noticeable amongst females. A difference in the examining conditions for the two surveys may explain some of the recorded increase. Adults were examined in their homes in the earlier survey and in the clinic in the more recent one. However, considering for example the large change in discolouration recorded, the increase amongst females (0% up to 11.5%), is still greater than the increase recorded for males (6% up to 9.1%) although both genders were examined contemporaneously and in the same type of setting in 2000/'02. Hence females went from having less discolouration due to trauma than males to having more. It would be interesting to determine whether the increase in trauma for females accompanied an increase in female participation in contact sport, rollerblading or cycling in childhood or teenage years for this age cohort as compared with that examined in 1989/'90. It is interesting to note that the pattern of treatment of trauma to incisors changed between 1989/'90 and 2000/'02 because of the increased use generally of composite materials amongst practicing dentists. It is also worth noting the reduction in the percentage of traumatic injuries recorded as missing (either lost or extracted) due to trauma. This finding was particularly noticeable amongst males, where the percentage treated in this manner declined from 12% in 1989/'90 to 2.9% in 2000/'02.

7.4 Developmental defects of enamel and fluorosis
Water fluoridation was introduced in Dublin in 1964 and in the major urban areas of Ireland over the subsequent 8-year period. In 2000/'02, an estimated 71%[1] of the total population of 4.2 million had fluoridated domestic water supplies. In the early 1970s, fluoridated toothpastes were introduced to the Irish market; currently over 95% of toothpaste sold is fluoridated. The benefits of fluoride in preventing dental caries are well documented. The risk of developing enamel fluorosis (i.e. fine white lines or paper white patches on the teeth), when fluoride is ingested during enamel formation or maturation in childhood, is also widely reported. When water fluoridation was introduced, it was judged that the benefits of fluoridation in promoting oral health outweighed the risks of developing fluorosis. It is important to monitor the level of enamel opacities and fluorosis among the Irish population to detect any changes in prevalence. Levels of fluorosis have been monitored in Irish children and adolescents since 1984[2], and were measured among the 16-24 age group in the 1989/'90 adult survey[3]. In both the 1989/'90 and 2000/'02 surveys, two indices were used to describe the condition of the enamel. The first index was a general index of enamel opacities and hypoplasia, namely the Developmental Defects of Enamel (DDE) Index. This index is non-specific, and does not attempt to diagnose the cause of the conditions recorded. The condition of ten index teeth is recorded; within this index, the sub group of diffuse opacities are considered to be associated with fluoride. The second index was the Dean's Index

of Fluorosis, and requires the examiner to first make a diagnosis as to whether fluorosis is present. If fluorosis is diagnosed, the two most severely affected teeth are identified, and the subject score is based on the level of fluorosis on the second most severely affected tooth.

Table 7.5 presents the prevalence of different types of enamel defects according to the DDE Index for 16-24 year-olds in 2000/'02 and in 1989/'90. It is presented by fluoridation status: 'Full Fl' refers to those who have had continuous fluoridation of their domestic water supplies since birth, and 'Non Fl' refers to those who have had no domestic water fluoridation since birth.

Table 7.5 Percentage of 16-24 year-olds affected by various types of opacities/hypoplasia (DDE Index) according to fluoridation status
Base: Dentate

	Full Fl		Non Fl	
	2000/'02	**1989/'90**	**2000/'02**	**1989/'90**
	n = 604	**n = 227**	**n = 312**	**n = 101**
Normal	38.9	74	43.3	54
Demarcated	13.3	13	10.7	26
Diffuse	22.4	8	19.2	13
Hypoplastic	0.4	1	1.0	0
Demarcated/Diffuse	14.5	1	14.9	3
Demarcated/Hypoplastic	0.3	0	0.7	1
Diffuse/Hypoplastic	1.0	0	1.6	2
All 3	0.6	0	1.7	0
Other	0.0	3	0.0	1
Excluded	8.5	0	7.0	0

In 2000/'02, 43.3% and 38.9% of 16-24 year-olds in the non fluoridated (Non Fl) and full fluoridated (Full Fl) groups respectively had no opacities on the ten index teeth examined and were thus classed as 'Normal'. Demarcated and diffuse opacities were more prevalent among those with water fluoridation (Full Fl) than those without (Non Fl). However, the difference was not substantial: 13.3% vs. 10.7% for demarcated opacities (p = 0.3977), and 22.4% vs. 19.2% for diffuse opacities (p = 0.3124). The prevalence of opacities increased between 1989/'90 and 2000/'02 in both groups, however the increase was greater in the 'Full Fl' group, which had fewer opacities recorded in the 1989/'90 study. In the 'Full Fl' group, the increase in diffuse opacities (from 8% to 22.4%) and combined diffuse and demarcated opacities (from 1% to 14.5%) between 1989/'90 and 2000/'02 is substantial. There was also an increase in diffuse opacities among the 'Non Fl' group, from 13% in 1989/'90 to 19.2% in 2000/'02. There was a reduction in demarcated opacities in the 'Non Fl' group, from 26% in 1989/'90 to 10.7% in 2000/'02. This was counteracted by an increase in the combined demarcated and diffuse opacities, resulting in little net change in demarcated opacities.

It should be noted that although the prevalence of opacities increased in the fluoridated group between 1989/'90 and 2000/'02, the difference in the prevalence of opacities between the full and non fluoridated groups in 2000/'02 was small (p = 0.2883).

Figure 7.1 Percentage of 16-24 year-olds with different grades of enamel fluorosis (Dean's Index) by fluoridation status
Base: Dentate
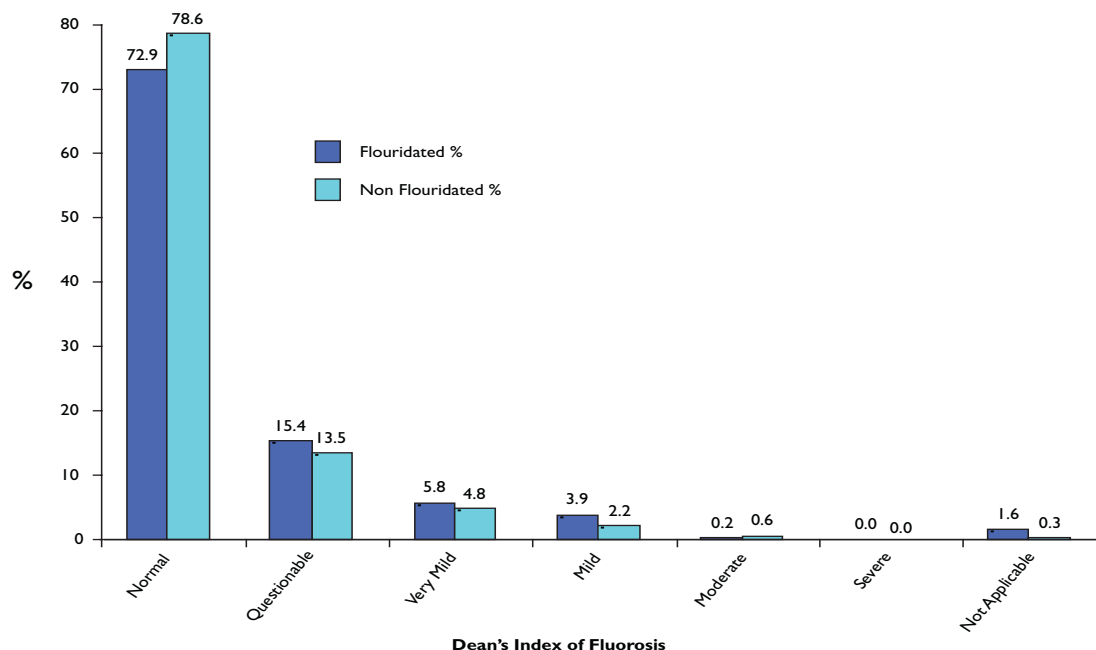
Fluorosis among 16-24 year-olds was measured using Dean's index. The prevalence amongst lifetime residents of fluoridated communities was low. According to Dean's Index, 25.3% and 21.1% of 16-24 year-olds in fluoridated and non fluoridated groups respectively had some fluorosis (Figure 7.1). The majority of those with fluorosis were in the 'Questionable' category. Figure 7.1 illustrates the trend towards a slightly higher prevalence of fluorosis among the group with domestic water fluoridation, with a higher proportion of those in the fluoridated group having fluorosis at the 'Questionable', 'Very Mild' and 'Mild' levels. However, the differences were small. In 1989/'90, 4% of the 16-24 year-old non fluoridated sample and 5.4% of the combined part and full fluoridated sample were found to have some fluorosis. Thus, the prevalence of fluorosis among this age cohort would appear to have increased since 1989/'90.

The increase in the prevalence of fluorosis between 1989/'90 and 2000/'02 is consistent with the increase in the prevalence of fluorosis reported in the 2002 North South Survey of Children's Oral Health in Ireland[4]. As fluoride has been added to the water at the same level since the early 1960s, it is reasonable to suggest that the increase in the prevalence of fluorosis seen in recent years is due to an increase in the ingestion of fluoride from toothpaste by children during the period of amelogenesis (enamel formation and maturation). Fluoridated toothpastes were introduced in the mid 1970s, and currently represent over 95% of sales. In response to the reported increase in the prevalence of fluorosis, the Forum on Fluoridation[1] published recommendations on toothpaste usage for infants and young children, and on reducing the level of fluoride in the domestic water supply to 0.6-0.8ppm, with a target of 0.7ppm. The latter change is currently in the process of implementation.

7.5 Condition of the Temporo Mandibular Joint

The condition of the Temporo Mandibular Joint (TMJ) was assessed using the Modified Helkimo Index (MHI)[5]. The index is expressed using a dysfunction score, which summarises scores for impaired movement (based on maximal opening and maximal protrusion), impaired TMJ function (based on hearing crepitus or clicking sounds, deviation or locking of the joint), muscle pain, and TMJ pain. The MHI index was not used in the 1989/'90 survey.

The distribution of adults by scores for the individual conditions is presented in Tables 7.6 to Table 7.11, followed by the distribution of the combined dysfunction score in Table 7.12.

Table 7.6 TMJ Maximal Opening Score: percentage of adults by age group and gender
Base: Dentate

MHI Score [Maximal Opening Range]	0 [≥ 40mm] %	1 [30-39mm] %	2 [< 30mm] %
16-24 year-olds:			
Male	93.4	6.4	0.2
Female	89.5	9.7	0.8
All	91.5	8.0	0.5
35-44 year-olds:			
Male	87.2	12.3	0.5
Female	80.1	18.4	1.5
All	83.6	15.4	1.0
65+ year-olds:			
Male	76.7	20.4	2.9
Female	64.0	29.1	7.0
All	70.1	24.9	5.0

Maximum opening capacity diminished with age (Table 7.6): 91.5% of 16-24 year-olds had a maximum opening capacity of ≥ 40mm compared with 70.1% of 65+ year-olds. For all age groups, more males than females had a maximum opening capacity of ≥ 40mm. The prevalence of <30mm maximal opening also increased with age, and was more common among females than males: For example, in the 65+ age group, 7.0% of females and 2.9% of males were in this category.

Table 7.7 TMJ Maximal Protrusion Score: percentage of adults by age group and gender
Base: Dentate

MHI Score [Maximal Protrusion Range]	0 [≥ 7mm] %	1 [4-6mm] %	2 [0-3mm] %
16-24 year-olds:			
Male	63.9	29.3	6.9
Female	66.8	25.6	7.5
All	65.3	27.5	7.2
35-44 year-olds:			
Male	56.3	36.2	7.5
Female	56.4	34.2	9.5
All	56.3	35.2	8.5
65+ year-olds:			
Male	48.8	27.8	23.5
Female	43.5	38.1	18.4
All	46.1	33.1	20.9

Maximal protrusion measures the ability to protrude the mandible; this indicates a dimension of joint mobility. As with maximum opening, the ability to protrude the mandible 7mm or more from the resting position decreases with age, with a lower percentage of the 65+ year-olds (46.1%) able to achieve this extent of protrusion, compared with the 35-44 year-olds (56.3%) or the 16-24 year-olds (65.3%) (Table 7.7). There was no consistency in the gender differences in this measurement.

The Impaired Movement Score is obtained by adding the scores for Maximal Opening (Table 7.6) and Maximal Protrusion (Table 7.7). Scores of 0, 1 and 2 apply when the combined scores for the two measurements were 0, 1-2 and 3-4 respectively. The distribution of the impaired movement scores is shown in Table 7.8.

Table 7.8 Impaired Movement Score (Maximal Opening Score + Maximal Protrusion Score): percentage of adults by age group and gender
Base: Dentate

Impaired Movement Score	0 [0 points] %	1 [1-2 points] %	2 [3-4 points] %
16-24 year-olds:			
Male	59.4	40.1	0.5
Female	60.6	37.7	1.7
All	60.0	38.9	1.1
35-44 year-olds:			
Male	49.9	48.3	1.8
Female	47.0	49.8	3.3
All	48.4	49.0	2.6
65+ year-olds:			
Male	44.8	45.2	10.0
Female	37.5	52.1	10.4
All	41.0	48.8	10.2

As with maximal opening and maximal protrusion, greater impaired movement (3-4 points) was more common among older adults, with 10.2% of the 65+ year-olds scoring in this category. Impairment was also found in the 16-24 year-old group, with 38.9% scoring 1-2 points and 1.1% scoring 3-4 points. Impairment was greater in the 35-44 year-old group, where the corresponding percentages were 49.0% and 2.6% respectively.

Table 7.9 Impaired TMJ Function Score: percentage of adults by age group and gender
Base: Dentate

MHI Score [Impaired TMJ Function Score]	0 [no impairment] %	1 [any sound, deviation or locking luxation] %
16-24 year-olds:		
Male	71.1	28.9
Female	65.9	34.1
All	68.5	31.5
35-44 year-olds:		
Male	76.5	23.5
Female	55.7	44.3
All	65.9	34.1
65+ year-olds:		
Male	75.4	24.6
Female	60.3	39.7
All	67.6	32.4

The TMJ was examined for clicking or crepitus sounds, deviation of the mandible on opening, locking during movement or dislocation of the condylar head (either observed or reported). The prevalence of these signs of TMJ dysfunction did not differ greatly by age group, with 31.5%, 34.1% and 32.4% of 16-24, 35-44 and 65+ year-olds respectively affected (Table 7.9). The symptoms were considerably more frequent among females in all age groups. The largest difference was in the 35-44 year-old group where 23.5% of males and 44.3% of females (almost twice as many) had at least one of the symptoms.

Three muscles of mastication, namely the Masseter, Temporalis and Lateral Pterygoid, were palpated on the right and left sides. The fingertips were used to apply gentle pressure to the Masseter and Temporalis, and the Lateral Pterygoid was checked by an indirect method. The patient was asked to report any pain during the examination, muscle pain being considered an indication of some dysfunction. The distribution of adults by age group, gender and number of muscle sites where pain was elicited is shown in Table 7.10.

Table 7.10 Muscle Pain Score: percentage of adults by age group and gender
Base: Dentate

MHI Score [Muscle Pain Score]	0 [no pain] %	1 [pain in 1-2 muscle sites] %	2 [pain in 3 or more sites] %
16-24 year-olds:			
Male	97.5	1.9	0.6
Female	92.5	7.0	0.6
All	95.0	4.4	0.6
35-44 year-olds:			
Male	96.2	3.8	0.0
Female	89.5	10.1	0.4
All	92.8	7.0	0.2
65+ year-olds:			
Male	97.4	1.4	1.2
Female	98.1	1.9	0.0
All	97.8	1.6	0.6

Pain in these muscles was most common amongst 35-44 year-olds (7.2%) and least common among 65+ year-olds (2.2%). In the 16-24 age group, 5.0% of adults were affected. Muscle pain was more common among females than males in the 16-24 year-old group (7.6% vs. 2.5%) and in the 35-44 year-old group (10.5% vs. 3.8%). Amongst those aged 65 and over, 1.9% of females and 2.6% of males had some muscle pain.

For all dentate adults, the clinical examiner palpated the TMJ both laterally and dorsally on either side, and any reported pain or tenderness was recorded. The results are presented according to age group and gender in Table 7.11.

Table 7.11 TMJ Pain Score: percentage of adults by age group and gender
Base: Dentate

MHI Score [TMJ Pain Score]	0 [no pain/tenderness on palpation] %	1 [tenderness on either side] %
16-24 year-olds:		
Male	95.1	4.9
Female	92.4	7.6
All	93.7	6.3
35-44 year-olds:		
Male	95.1	4.9
Female	90.7	9.3
All	92.8	7.2
65+ year-olds:		
Male	97.2	2.8
Female	95.3	4.7
All	96.2	3.8

Pain was most commonly reported among the 35-44 year-old group (7.2%) and least common among the 65+ group (3.8%) (Table 7.11). Females were more frequently affected than males; for example, 9.3% of females and 4.9% of males in the 35-44 year-old group reported pain on palpation of the joint.

The TMJ Dysfunction Score (Table 7.12) is a summary score intended to indicate the extent of TMJ dysfunction. To determine the TMJ Dysfunction Score, one must first calculate the Impaired Movement Score (Table 7.8). A summary Dysfunction Score (Range 0-6) is then obtained by adding the following (1+2+3+4):

(1)   Impaired Movement score (Range 0-2) (Table 7.8),
(2)   Impaired TMJ function score (Range 0-1) (Table 7.9),
(3)   Muscle pain score (Range 0-2) (Table 7.10), and
(4)   TMJ pain score (Range 0-1) (Table 7.11).

The distribution of the TMJ Dysfunction Score is presented by age group and gender in Table 7.12.

Table 7.12 TMJ Dysfunction Score (1+2+3+4): percentage of adults by age group and gender
Base: Dentate adults with a score for each component

	n	0	1	2	3	4	5	6
16-24 year-olds:								
Male	508	41.1	43.8	12.7	1.3	0.7	0.4	0.0
Female	678	35.9	43.4	15.8	4.1	0.5	0.0	0.3
All	1186	38.5	43.6	14.2	2.7	0.6	0.2	0.1
35-44 year-olds:								
Male	349	34.3	51.5	10.3	2.8	1.1	0.0	0.0
Female	590	25.5	39.6	26.3	6.0	2.4	0.2	0.0
All	939	29.8	45.4	18.5	4.4	1.8	0.1	0.0
65+ year-olds:								
Male	169	35.9	35.7	25.4	2.5	0.4	0.0	0.0
Female	167	24.7	35.7	32.5	6.6	0.6	0.0	0.0
All	336	30.1	35.7	29.1	4.6	0.5	0.0	0.0

Looking at the gender difference in TMJ dysfunction scores, females scored higher than males. The frequency of TMJ dysfunction scores ≥ 2 among male and female 16-24 year-olds was 15.1% and 20.7% respectively. For 35-44 year-old males and females, it was 14.2% and 34.9% respectively, and for 65+ year-olds, the frequency was 28.3% and 39.7% respectively. Thus, amongst the age groups studied, the frequency of TMJ dysfunction in dentate adults was highest among females aged 65 years and over.

Looking at the distribution of scores (weighted for gender) by age group in Figure 7.2, one can see that 16-24 year-olds had the highest frequency of 0 scores (38.5%), 35-44 year-olds had the highest frequency of 'score 1' (45.4%) and 65+ year-olds had the highest frequency of 'score 2' (29.1%). These figures indicate that the frequency and severity of TMJ dysfunction increases with age.

Figure 7.2 The TMJ dysfunction scores for 16-24, 35-44 and 65+ year-olds
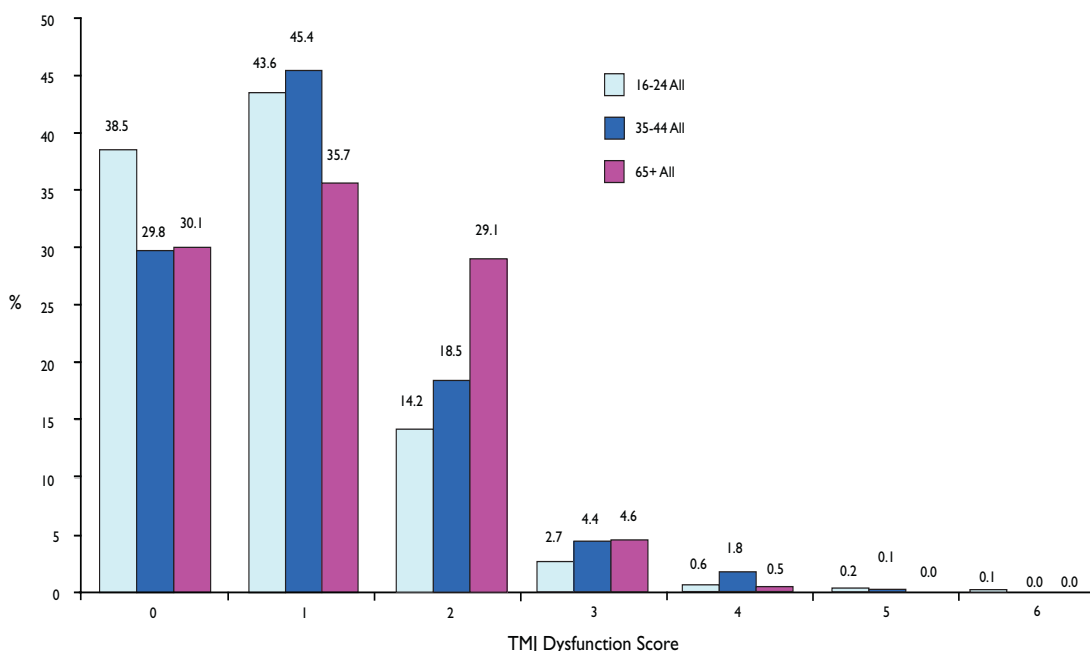
The Modified Helkimo Index (MHI) summarises a group of symptoms of TMJ dysfunction, the assumption being that the greater the number of different aspects of TMJ movement and function affected, the

greater the dysfunction. Age and gender were not associated with all variables measured. Age was not a factor in muscle or joint pain reported on palpation, and gender was not a factor in the ability to protrude the mandible. However, overall the summed scores indicated greater dysfunction with age and greater dysfunction amongst females. Further research is needed to investigate the impact of these symptoms on quality of life, and to determine the causes of these symptoms to facilitate early prevention of TMJ dysfunction.

7.6 Orthodontic treatment need (16-24 year-olds only)
The need for orthodontic treatment according to the Index of Orthodontic Treatment Need (IOTN) was recorded for 16-24 year-olds. This index grades the dentition according to aesthetics and function. The data are presented here for each component separately, followed by the proportion of the sample surveyed that needed treatment according to either classification. Table 7.13 presents the percentage frequency distribution of orthodontic treatment need according to the IOTN Aesthetic component.

Table 7.13 Percentage frequency distribution of orthodontic treatment need according to IOTN aesthetic component scores (16-24 year-olds only), by current or previous orthodontic treatment
Base: Dentate

| Treatment Status | n | Orthodontic Treatment Need on Aesthetic Grounds | | |
		No Need	Borderline Need	Definite Need
No Previous Treatment	835	73	22	6
Had Previous Treatment	277	79	14	7
Currently Undergoing Treatment	40	67	13	20
Total	1152	74	19	7

Of the 1,152 16-24 year-olds who were examined, 7% had a definite need, 19% had a borderline need, and 74% had no need for orthodontic treatment on aesthetic grounds (Table 7.13). Of those who reported having had no previous treatment, 6% had a definite treatment need and 22% had a borderline need for treatment. Of those who reported that they had previous treatment, 7% were judged to have a definite need for further orthodontic treatment, and 79% had no need of further treatment (compared to 73% of those who never had treatment). For those undergoing treatment at the time of examination, 20% were judged as still having a definite need for treatment and 13% had a borderline need for treatment on aesthetic grounds.

When comparing the need for treatment of those who had treatment in the past with those who never had treatment, it is important to remember that a high percentage of those who had treatment in the past would have been likely to have been classed in the 'Definite need' group had they never had treatment. However, the pre-treatment distribution of orthodontic treatment need, according to the aesthetic component of the IOTN, among this group of 277 adults is unknown. Similarly, those undergoing treatment would have already undergone changes that possibly moved them from the 'Definite need' category into the 'Borderline' or 'No' need categories.

Table 7.14 shows the percentages needing orthodontic treatment (aesthetic component) by responses to the question "How do you feel about the position/alignment of your teeth?"

Table 7.14 Percentage needing orthodontic treatment based on frequency distribution of IOTN Aesthetic Component scores (16-24 year-olds only), by response to question "How do you feel about the position/alignment of your teeth?"
Base: Dentate

| Response | Orthodontic Treatment Need on Aesthetic Grounds | | | |
	None (n=854)	Borderline (n=249)	Definite (n=82)	Total (n=1185)
Very Satisfied	22.7	3.2	3.7	17.3
Satisfied	54.6	36.5	18.3	48.3
Doesn't Concern Me	7.4	9.6	12.2	8.2
Dissatisfied	14.3	42.6	39.0	21.9
Very Dissatisfied	1.1	8.0	26.8	4.3

There was a strong correlation between recorded treatment need and levels of respondents' satisfaction with the position/alignment of their teeth. Approximately 77.3%, 39.7% and 22.0% of those judged to have 'None', 'Borderline' and 'Definite' treatment need respectively were either 'Very Satisfied' or 'Satisfied' with their teeth. Of those with a definite treatment need, 65.8% were either 'Dissatisfied' or 'Very dissatisfied' with their teeth compared to 15.4% of those with no treatment need.

Table 7.15 Percentage needing orthodontic treatment according to IOTN Dental Health Component scores (16-24 year-olds only), by current or previous orthodontic treatment
Base: Dentate

Treatment Status	Orthodontic Treatment Need on Dental Health Grounds		
	n	No Definite Need	Definite Need
No Previous Treatment	830	73.8	26.2
Had Previous Treatment	275	78.8	21.2
Currently undergoing Treatment	40	55.0	45.0
Total	1145	74.3	25.7

Of those who had no previous treatment, 26.2% were classified as having a 'Definite need' for treatment, compared with 21.2% of those who had previous treatment, and 45.0% of those currently undergoing treatment (Table 7.15).

The Dental Health Component of the IOTN is based on the presence of occlusal anomalies, which can impact on the normal function of the TMJ. It was therefore of interest to investigate whether there was an association between the Dental Health Component of the IOTN and the TMJ Dysfunction Score. The association is seen clearly in Figure 7.3.

Figure 7.3 Percentage of 16-24 year-olds with definite need for orthodontic treatment based on IOTN Dental Health Component by TMJ Dysfunction Score
Base: Dentate
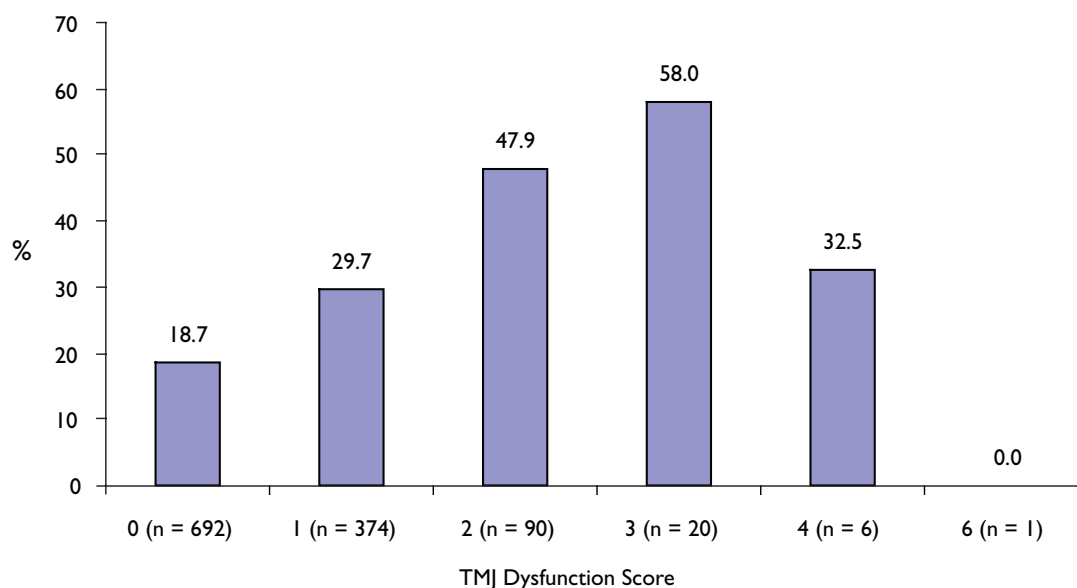
There is a clear pattern of increasing need for orthodontic treatment with increasing TMJ Dysfunction Score. The percentage of 16-24 year-olds requiring orthodontic treatment increased according to TMJ Dysfunction Score up to score 3; the number with higher scores was too small to draw inferences. Approximately 18.7% of those with a TMJ Dysfunction score of 0 were assessed as definitely needing orthodontic treatment (according to the Dental Health Component). This increased to 29.7% of those with a score of 1, and increased again to 47.9% of those with a score of 2. Of the 20 adults with a score of 3, 58.0% needed orthodontic treatment. Only six 16-24 year-olds had a TMJ score of 4, however a third of them (32.5%) needed orthodontic treatment.

One of the inclusion criteria for HSE-funded orthodontic treatment is that the overjet (horizontal difference between the upper and lower incisors) must be 10mm or greater. The overjet was measured to establish the proportion of the population that would qualify for treatment using this rule. The percentage distribution of the population according to the size of their overjet in mm is presented in Table 7.16.

Table 7.16 Percentage frequency distribution of overjet by age group and gender
Base: Dentate adults with at least some upper and lower anterior teeth

Age Group	Overjet in mm						
	<0	0	1-3	4-5	6-7	8-9	10+
16-24	1.2	2.8	59.1	24.7	8.4	2.4	1.3
35-44	2.6	4.6	55.2	31.2	5.4	1.1	0.0
65+	13.4	6.4	42.4	23.1	6.3	2.2	6.3

Under the current guideline that treatment be provided where "the horizontal overjet is equal to or greater than 10mm", 1.3% of the 16-24 year-old group would qualify for treatment (Table 7.16). This would increase to 3.7% if the cut-off point were reduced to 8mm and to 12.1% if it were reduced to 6mm.

7.7 Tooth wear and erosion
Anecdotal reports suggest that in recent years there has been an increase in the prevalence of tooth wear. There are insufficient standardised data reported in the literature to determine whether this is the case. The tooth wear data collected in this study will act as a baseline against which future changes can be monitored. The 12 upper and lower anterior teeth were examined for wear.

The index used was the same as that used in the North South Survey of Children's Oral Health in Ireland 2002[4] and in the Adult Dental Health Survey in the United Kingdom in 1998[6]. It is a descriptive index using partial recording: The labial, incisal and palatal surfaces of the upper six permanent anterior teeth were scored. On the upper incisal surfaces, wear typical of erosion was also scored if present. The condition of the most worn surface of the lower six permanent anterior teeth was also recorded[7]. Wear was recorded when it had already progressed through tooth enamel into the dentine, as considerable examiner variability has been reported when trying to record wear confined to tooth enamel[8].

The classifications 'mild', 'moderate' and 'severe' are used in this report. They are described as:
Mild: tooth wear just exposing the dentine (code 1).
Moderate: tooth wear exposing the dentine for more than one third of the individual surface (code 2).
Severe: complete loss of tooth enamel, with the pulp or secondary dentine exposed (code 3).
The code 0 was assigned when there was no wear into dentine.

An individual was reported to have tooth wear when a score of 1 or more was assigned to at least one anterior permanent tooth; the maximum score for the individual was recorded.

The levels of wear recorded are presented by age group and gender in Table 7.17.

Table 7.17 Percentage of adults with various levels of maximum tooth wear by age group and gender
Base: Dentate

	n	Slight Wear	Moderate Wear	Severe Wear	Any Wear
16-24 year-olds:					
Male	510	39.0	4.5	0.2	43.7
Female	681	31.2	0.9	0.3	32.3
All	1191	35.1	2.7	0.2	38.1
35-44 year-olds:					
Male	363	65.2	15.2	1.7	82.1
Female	596	63.0	6.5	0.8	70.3
All	959	64.1	10.8	1.2	76.2
65+ year-olds:					
Male	208	48.1	38.1	8.5	94.7
Female	198	59.8	25.8	5.7	91.3
All	406	54.1	31.8	7.1	93.0

Total:					
Male	1081	50.6	14.4	2.2	67.3
Female	1475	48.7	7.6	1.5	57.7
All	2556	49.7	11.0	1.8	62.5

As expected, tooth wear increased with age (Table 7.17): The proportion of adults for whom 'Any Wear' was recorded was 38.1%, 76.2% and 93.0% for 16-24, 35-44 and 65+ year-olds respectively. The tooth wear levels recorded are very similar to those recorded in the 1998 UK adult dental health survey[6], in which the same index was used. In the UK survey, 36% of 16-24 year-olds and 89% of 65+ year-olds had evidence of tooth wear.

For each age group, males had more wear than females. Males have higher levels of moderate and severe wear than females in the 35-44 and 65+ age groups. Approximately one in 12 males (8.5%) and one in 18 females (5.7%) aged 65+ years had wear that was so severe it exposed the secondary dentine or pulp. Although severe wear was uncommon among the 35-44 year-old group (1.2%), more than one in ten (10.8%) of this age group already had moderate tooth wear, which represents extensive exposure of dentine.

The prevalence of incisal wear and erosion are shown in Tables 7.18 and 7.19 respectively.

Table 7.18 Percentage of adults with various levels of maximum incisal wear by age group and gender
Base: Dentate

		Incisal Wear		
	n	Moderate	Severe	Any Wear
16-24 year-olds:				
Male	510	2.4	0.2	2.6
Female	681	0.7	0.1	0.8
All	1191	1.6	0.1	1.7
35-44 year-olds:				
Male	363	12.1	0.8	12.9
Female	596	4.4	0.5	4.9
All	959	8.2	0.6	8.9
65+ year-olds:				
Male	208	27.3	6.8	34.1
Female	198	18.2	3.2	21.4
All	406	22.6	5.0	27.6
Total:				
Male	1081	10.4	1.6	12.0
Female	1475	5.3	0.8	6.1
All	2556	7.9	1.2	9.1

Across all age groups, males had more incisal wear than females: For example, in the 16-24 age group, males and females had 2.6% and 0.8% any wear respectively. As in Table 7.17, incisal wear increases with age, at 1.7%, 8.9% and 27.6% for the 16-24, 35-44 and 65+ age groups respectively.

Table 7.19 Percentage of adults with various levels of maximum incisal erosion by age group and gender
Base: Dentate

		Incisal Erosion		
	n	Moderate	Severe	Any Wear
16-24 year-olds:				
Male	510	0.2	0.0	0.2
Female	681	0.1	0.3	0.4
All	1191	0.1	0.1	0.3

35-44 year-olds:				
Male	363	1.3	0.4	1.7
Female	596	0.9	0.3	1.2
All	959	1.1	0.3	1.4
65+ year-olds:				
Male	208	11.5	1.4	12.9
Female	198	3.3	2.5	5.8
All	406	7.3	2.0	9.3
Total:				
Male	1081	2.6	0.4	3.0
Female	1475	1.0	0.7	1.7
All	2556	1.8	0.5	2.3

Incisal wear was more common than erosion: For example, of the 65+ age group, 27.6% had incisal wear (Table 7.18) and 9.3% had incisal erosion (Table 7.19).

These data indicate a need for further research on tooth wear. Due to the dramatic changes in oral health which have taken place in recent decades, the elderly population are increasingly dentate. Retention of more teeth increases the importance of long-term maintenance of tooth function. Prevention of detrimental tooth wear in older life requires a life-course approach, with early identification and prevention of pathological wear. Development of acceptable 'norms' for age related levels of tooth wear compatible with good oral health would be a useful adjunct for such an approach. The data presented in this report will facilitate monitoring of population trends in tooth wear and erosion in the future.

7.8 Lesions of the oral mucosa

Table 7.20 presents the percentage of adults with lesions of the oral mucosa by lesion type and age group. A total of 2,870 adults were examined for lesions of the oral mucosa. Such lesions were less common among the 16-24 year-old group: Approximately 79.1% of this age group had no lesions compared to 70.1% and 69.6% of the 35-44 and 65+ year-old age groups respectively (Table 7.20). After cheek and lip biting (11.0%), the most common condition recorded in the 16-24 year-old group was apthous ulceration (2.8%). This condition was recorded in 2.7% of 35-44 year-olds and 1.4% of 65+ year-olds. Amongst the 35-44 year-olds and the 65+ year-olds, the most common condition was denture stomatitis (5.4% and 9.8% respectively). The other more common conditions were acute necrotising ulcerative gingivitis, which was found in 2.6%, 2.9% and 0.8% of 16-24, 35-44 and 65+ year-olds respectively. In addition, 3.4% of 65+ year-olds had flabby ridges and 1.5% of 35-44 year-olds had smoker's palate.

Table 7.20 Percentage of adults with lesions of the oral mucosa by lesion type and age group
Base: Dentate and Edentulous

Lesion of the Oral Mucosa	16-24 year-olds (n = 1192)	35-44 year-olds (n = 972)	65+ year-olds (n = 706)
None	79.1	70.1	69.6
Acute necrotising ulcerative gingivitis	2.6	2.9	0.8
Suspect oral neoplasm	0.0	0.0	0.1
Oral Lichen planus	0.0	0.1	0.0
Leukoplakia of oral mucosa	0.4	0.9	0.6
Candidiasis	0.1	0.0	1.5
Sinus associated with infected tooth	0.6	1.0	0.9
Apthous ulceration	2.8	2.7	1.4
Amalgam Tattoo	0.2	0.6	1.8
Erythroplakia	0.2	0.0	0.1
Median rhomboid glossitis	0.1	0.0	0.7
Denture stomatitis	0.3	5.4	9.8

Lesion of the Oral Mucosa	16-24 year-olds (n = 1192)	35-44 year-olds (n = 972)	65+ year-olds (n = 706)
Smoker's palate	0.6	1.5	0.3
Flabby Ridge(s)	0.0	0.4	3.4
Denture Granuloma	0.1	0.4	1.6
Cheek and Lip Biting	11.0	12.3	3.7
Geographic tongue	0.3	0.4	0.5
Frictional keratosis	0.8	0.2	0.7
Discoid Lupus Erythematosus	0.0	0.0	0.0
Leukodema	0.1	0.0	0.0
Lesions that can not be clearly identified	0.3	0.3	1.2
Other	0.6	1.0	1.3

There was a high prevalence of lesions of the oral mucosa recorded amongst the three age groups surveyed. Many of the conditions recorded (including acute necrotising ulcerative gingivitis, denture stomatitis, and candidasis) could benefit from clinical treatment. Regular dental inspection is important for the prevention and treatment of such conditions, as well as the early detection of oral cancer.

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Chapter 8
Oral Health Knowledge, Attitudes and Behaviour; Perception of Services; Oral Health Related Quality of Life

8.1 Summary

- Knowledge of the reason for water fluoridation was poorer than knowledge of the function of fluoride in toothpaste.
- The attitudes to tooth loss among the younger 16-24 and 35-44 age groups were largely similar and indicate a stronger preference for tooth retention than among the older 65+ age group.
- Approximately one third of people were dissatisfied with the colour of their teeth.
- Among 16-24 year-olds, 28.5% were dissatisfied with the position or alignment of their teeth.
- There was a lack of knowledge of entitlements, or an uncertainty around whether adults could access a dentist willing to provide treatment under their entitlements. Only 68.3% of 16-24 year-old medical card holders knew that they could obtain free emergency dental treatment, and only 63.0% knew that they could receive free routine treatment.
- The current dental services were acceptable to the vast majority of adults who reported high levels of satisfaction with dentists and dental surgeries.
- A high level of dissatisfaction with the range of treatments covered by the state run dental schemes was expressed; in particular, the PRSI scheme was found to be too limited for 35-44 year-olds.
- Most people surveyed perceived their oral health status as impacting on their quality of life. It was more common for adults to perceive the impact as positive and enhancing their lives.
- The impact of oral health on quality of life was more frequently perceived to be physical rather than social and psychological. The most common physical aspects of quality of life affected by oral health status was 'appearance'; the most common social effect was on 'smiling/laughing'; and the most common psychological effect was on confidence. The greatest positive impact was on appearance, whilst the greatest negative impact was perceived to be on finances.
- The impact of oral health on life quality was associated with age group: Adults aged 65 and over had the poorest oral health related quality of life. Males and females perceived their oral health to affect their quality of life to a similar extent. Medical card holders had poorer oral health related quality of life than adults not in receipt of medical cards.
- Oral health related quality of life was also associated with clinical oral health status. Dental caries experience ($D_{3c}MFT$), number of untreated decayed teeth ($D_{3c}T$) and number of missing teeth (MT) were associated with poorer oral health related quality of life. Periodontal treatment need was associated with oral health related quality of life. Adults with periodontal pockets had poorer oral health related quality of life than those without periodontal pockets.
- The key predictors of enhanced oral health related quality of life were medical card status and dental caries experience.

8.2 Introduction

People centeredness is one of the key principles underpinning the Irish Health Strategy. Thus, for use in this survey, a questionnaire which would ascertain people's oral health knowledge, attitudes and behaviour and their perception of the availability, accessibility and acceptability of oral health services was developed. A previously tested instrument for the measurement of oral health related quality of life was also incorporated into the questionnaire[1]. The responses to the questionnaire provide useful data on the public perception of dental services and on adults' oral health knowledge, attitudes and behaviour. They also provide information on the extent to which health service goals are currently being met. The questionnaire also assessed subjective perceptions of the current services. This chapter presents the survey findings on oral health related knowledge, attitudes and behaviour, adults' perception of dental services, and results for oral health related quality of life.

8.3 Knowledge of fluoride

The majority of piped public water supplies in Ireland have been fluoridated since the 1960s. Public awareness of the role of fluoride, and its use in water and in toothpaste, was ascertained by a series of questions.

Each person was asked:

(1)   "Have you ever heard of the substance fluoride?"
(2)   "Have you ever heard about water fluoridation i.e. fluoride being added to public water supplies?"
(3)   If 'Yes' to Q2, "Where have you heard about this?"
(4)   "What do you think is the purpose of adding fluoride to public water supplies?"
(5)   "What do you think is the purpose of adding fluoride to toothpaste?"

The responses are presented according to age group for dentate and edentulous adults in Table 8.1.

Table 8.1 Percentage of adults according to responses to questions relating to fluoride by age group and dentate or edentulous status

Have you ever heard of the substance fluoride?				
	Dentate			Edentulous
	16-24	35-44	65+	65+
Yes	91.1	93.8	88.3	80.0
No	8.9	6.2	11.7	20.0

Have you ever heard about water fluoridation i.e. fluoride being added to public water supplies?				
	Dentate			Edentulous
	16-24	35-44	65+	65+
Yes	75.5	85.0	86.7	77.7
No	24.5	15.0	13.3	22.3

If 'Yes' Where have you heard about this?				
	Dentate			Edentulous
	16-24	35-44	65+	65+
Radio/TV	48.9	78.4	75.9	81.7
Newspapers/magazines	23.6	56.8	65.2	64.2
Internet	1.2	0.5	0.0	0.0
Dentist, doctor, health care professional	7.6	7.4	7.2	8.0
Family/Friends	17.4	12.0	17.5	9.9
School	63.8	8.5	1.6	1.3
Other	0.5	1.6	1.3	2.1

What do you think is the purpose of adding fluoride to public water supplies?				
	Dentate			Edentulous
	16-24	35-44	65+	65+
To purify water	16.2	26.6	27.9	30.4
To reduce tooth decay	61.4	55.6	51.0	35.6
To improve the taste of water	3.0	3.0	2.0	2.6
Don't know	19.0	14.4	18.2	31.2
Other	0.4	0.3	0.8	0.2

What do you think is the purpose of adding fluoride to toothpaste?				
	Dentate			Edentulous
	16-24	35-44	65+	65+
To whiten teeth	8.1	9.9	7.4	10.0
To reduce tooth decay	75.9	78.1	65.2	48.2
To improve the taste of the toothpaste	1.1	1.6	1.2	2.2
Don't know	14.5	9.9	25.3	37.9
Other	0.5	0.5	0.9	1.8

The proportion of the population that had not heard of fluoride was low, ranging from 6.2% of 35-44 year-olds to 20.0% of the edentulous 65+ year-olds. Although many people had heard of fluoride, fewer knew about the addition of fluoride to public water supplies. Within Ireland, 24.5%, 15.0%, 13.3%

of dentate 16-24 year-olds, 35-44 year-olds, 65+ year-olds and 22.3% of edentulous 65+ year-olds had not heard about water fluoridation. The two most commonly cited sources of information on water fluoridation were school and radio or TV for 16-24 year-olds, and radio or TV and newspapers or magazines for the two older age groups. Thus, whilst both school and media were important sources of information for the younger age group, the older groups relied largely on the media for their information. Family and friends were reported to be a greater source of information than dentists, doctors and other health care professionals, who were a source of information for 7.6% of the 16-24 year-olds. Knowledge of the reason for water fluoridation was very poor. Only 61.4% of 16-24 year-olds, 55.6% of 35-44 year-olds, 51.0% of the dentate 65+ age group, and 35.6% of the edentulous 65+ age group knew that the purpose of adding fluoride to water is to reduce levels of dental decay. Over one quarter of adults in the 35-44 and 65+ age groups thought that fluoride was used to purify the water; this may indicate some confusion between fluoridation and chlorination. Knowledge of the purpose of adding fluoride to toothpaste was better, with 75.9% of 16-24 year-olds, 78.1% of 35-44 year-olds and 65.2% of the dentate 65+ age group stating that the purpose was to reduce tooth decay. However, only 48.2% of the edentulous adults aged 65+ gave this answer.

The general population is not well briefed on water fluoridation. Although dentists are in a position to disseminate information to the public on water fluoridation, they are not currently seen as a source of information on this important public health measure. The media are clearly the major source of information on the topic of fluoridation. Care should be taken to ensure the validity of media coverage of fluoridation, and dentists should be made aware of their role in educating the public on the issue. Because 71% of the population has domestic water fluoridation, efforts should be made to increase public awareness of its role and the rationale for adding fluoride to water.

8.4 Oral health attitudes

The questionnaire covered attitudes relating to extraction of teeth, tooth loss, denture wearing, orthodontic treatment, frequency of dental visits, and satisfaction with tooth colour and alignment. The following questions were asked:

- If you had a painful **back** tooth would you prefer it to be filled or taken out?
- How about a **front** tooth?
- How would you feel if you lost all of your natural teeth and had to wear full dentures upper and lower?
- Do you think you will always have some of your own natural teeth?
- How do you feel about the colour of your teeth?
- How do you feel about the position/alignment of your teeth?
- Would you be willing to wear a brace to straighten your teeth?
- What stops you from having orthodontic treatment: braces to straighten your teeth?

Attitudes to extractions and dentures are presented in Tables 8.2 and 8.4 respectively. The relationship between the reported attitudes and oral health status are shown for extraction of a painful back tooth in Table 8.3 and for wearing a denture in Table 8.5. These tables present the mean number of teeth, mean $D_{3c}MFT$ and the percentage with 18 or more sound, untreated natural teeth (18+SUNT) by varying attitudes and by age group. The percentage distribution of adults by responses to questions relating to colour and alignment of their teeth are presented in Table 8.6.

Table 8.2 Percentage of dentate adults according to responses to questions relating to extraction of teeth by age group (1989/'90 responses in parenthesis where available)

If you had a painful <u>back tooth</u> would you prefer it to be filled or taken out?			
	16-24	**35-44**	**65+**
Filled	65.7 (68)	70.6 (70)	57.8 (55)
Taken Out	19.3 (24)	21.5 (28)	32.6 (41)
Don't know	6.8 (8)	3.4 (2)	4.8 (5)
Wouldn't bother me. Either option okay	7.3	3.7	4.3
Taken out and replaced if possible	0.9	0.8	0.5

How about a <u>front</u> tooth?			
	16-24	**35-44**	**65+**
Filled	90.0	89.6	76.6
Taken Out	1.9	4.7	15.7
Don't know	2.9	1.1	2.9
Wouldn't bother me. Either option okay	1.6	1.0	3.6
Taken out and replaced if possible	3.5	3.6	1.1

When asked: "If you had a painful back tooth would you prefer it to be filled or taken out?", the majority of 16-24 year-olds (65.7%) and 35-44 year-olds (70.6%) opted for filling; these results are similar to the proportions making this choice in 1989/'90 (68% and 70% respectively). In contrast, fewer 65+ year-olds would opt for a filling (57.8%); approximately one third (32.6%) of this age group would opt for extraction of a painful back tooth.

The pattern was similar for choice of treatment for a painful front tooth, with more of the 65+ age group opting for extraction (15.7%) compared to 1.9% and 4.7% of the 16-24 and 35-44 year-old groups respectively. The cosmetic importance of the anterior teeth is reflected in the higher percentage opting for a filling.

Table 8.3 Number of dentate adults with different preferences for the treatment of a painful back tooth, the mean number of natural teeth present, mean $D_{3c}MFT$ and the percentage with 18+SUNT by age group
Base: Dentate

Preference	n	Number of Natural Teeth Mean	$D_{3c}MFT$ Mean	18+SUNT %
16-24 year-olds:				
Filled	836	28.2	5.1	90.3
Taken out	191	27.9	4.8	89.0
Don t know	69	28.3	3.2	93.2
No preference	80	28.9	4.6	89.4
Taken out and Replaced	10	28.8	3.3	97.0
35-44 year-olds:				
Filled	685	26.1	15.3	33.9
Taken out	197	23.9	13.7	44.4
Don t know	24	26.1	12.8	53.3
No preference	37	25.1	13.9	50.5
Taken out and Replaced	8	18.2	19.6	12.5
65+ year-olds:				
Filled	232	16.9	20.8	7.4
Taken out	124	11.9	22.1	4.3
Don t know	19	11.3	23.2	0.0
No preference	18	13.1	23.7	5.6
Taken out and Replaced	2	10.4	25.6	0.0

In Table 8.3, we see that adults who opted for filling rather than extraction of a painful back tooth tended to have more natural teeth; this was most evident in the 35-44 and 65+ age groups. In the 35-44 age group, adults opting for a filling had, on average, 26.1 teeth and those opting for removal (extraction) of the tooth had, on average 23.9 teeth. The corresponding figures for the 65+ age group were 16.9 and 11.9 teeth respectively. There were no consistent differences in either mean $D_{3c}MFT$ or the percentage with 18+SUNT according to expressed preferences for treatment.

Table 8.4 Percentage of dentate adults (non denture wearers) according to responses to questions relating to denture wearing by age group (1989/'90 responses in parenthesis where available)

Do you find the thought of wearing a partial denture:			
	16-24	**35-44**	**65+**
Very upsetting?	32.6	30.6	19.0
A little upsetting?	35.7	38.9	30.0
Not at all upsetting?	31.7	30.5	50.9
How would you feel if you lost all of your natural teeth and had to wear full dentures upper and lower?			
	16-24	**35-44**	**65+**
Very Happy	1.1	0.8	0.9
Happy	0.4	0.4	1.9
Wouldn't bother me	10.5 (15)	17.3 (25)	37.0 (39)
Upset	25.0 (21)	23.5 (22)	29.7 (29)
Very Upset	63.1 (64)	58.0 (52)	30.5 (32)
Do you think you will always have some of your own natural teeth?			
	16-24	**35-44**	**65+**
Yes (hopefully)	91.3	89.9	80.0
No	3.9	4.8	8.3
Don't know	4.7	5.4	11.7

Differences between the two younger age groups and the older age group are seen in the attitudes to wearing partial and full dentures (Table 8.4). For the subset of the sample that were dentate with no partial dentures, the thought of wearing a partial denture would be 'very upsetting' for 32.6% of 16-24 year-olds and 30.6% of 35-44 year-olds. Only 19.0% of 65+ year-olds found the thought to be 'very upsetting', and 31.7%, 30.5% and 50.9% of 16-24, 35-44 and 65+ year-olds respectively found the idea not at all upsetting. With regard to the wearing of full dentures, 88.1% of 16-24 year-olds would be either upset or very upset at the thought of losing all of their teeth and wearing full dentures. The corresponding percentages for 35-44 year-olds and 65+ year-olds were 81.5% and 60.2%. There was an increase between 1989/'90 and 2000/'02 in the percentage reporting that they would be 'upset' or 'very upset' at the idea of wearing full dentures. In 1989/'90, the percentages providing this answer were 85%, 74% and 61% for the 16-24, 35-44 and 65+ age groups respectively.

The vast majority of the dentate population thought that they would always have some of their own natural teeth (Table 8.4), accounting for 91.3%, 89.9% and 80.0% for the 16-24, 35-44 and 65+ age groups respectively.

Table 8.5 Number of dentate adults with different attitudes to wearing full dentures, the mean number of natural teeth present, mean $D_{3c}MFT$ and the percentage with 18+SUNT, by age group
Base: Dentate

Attitudes to Wearing Full Dentures	n	Number of Natural Teeth Mean	$D_{3c}MFT$ Mean	18+SUNT %
16-24 year-olds:				
Very Happy	10	29.3	2.7	100.0
Happy	4	26.9	4.4	93.3
Would Not Bother Me	118	27.8	5.8	85.2
Upset	287	28.1	4.7	88.3
Very Upset	767	28.3	4.8	91.6
35-44 year-olds:				
Very Happy	6	28.2	13.8	49.1
Happy	4	22.5	14.5	26.4
Would Not Bother Me	154	22.4	16.0	32.5
Upset	225	25.3	14.8	37.4
Very Upset	558	26.6	14.5	38.6

65+ year-olds:				
Very Happy	5	9.6	23.6	0.0
Happy	8	13.5	22.4	7.3
Would Not Bother Me	137	11.6	23.2	4.8
Upset	129	15.4	20.7	8.7
Very Upset	120	18.0	20.3	4.5

It is interesting to note that, for all three age groups, the mean number of teeth present tended to increase and the $D_{3c}MFT$ to decrease in accordance with how upset adults were at the thought of wearing full dentures (Table 8.5). For example, the 35-44 year-old group who would be 'very upset' at the thought of wearing full dentures had, on average, 26.6 natural teeth and a mean $D_{3c}MFT$ of 14.5. In this age group, those that said that the thought of wearing full dentures would not bother them had, on average, 22.4 natural teeth and a mean $D_{3c}MFT$ of 16.0. These results appear to indicate an association between concern for retaining teeth and good oral health.

There was a clear difference between the 16-24 and 35-44 year-old age groups and the 65+ age group in attitudes to tooth loss and denture wearing. The attitudes among the two younger groups were largely similar, and indicate a stronger preference for tooth retention than the older age group. This finding is perhaps due to the major change in the pattern of tooth loss seen in Ireland since 1979, when 12% of the 35-44 year-old group and 72% of the 65+ age group had no natural teeth. The percentage with no natural teeth fell to 4% and 48% respectively in 1989/'90, and 0.9% and 40.9% in 2000/'02. Thus, in 2000/'02, edentulousness was virtually non-existent among the youngest age group, very rare among 35-44 year-olds but still common amongst the 65+ age group. Attitudes are likely to be influenced by the prevalent oral health status of the age group. Those who expressed a preference for extraction of teeth, and those who said 'it would not bother me' if they lost their teeth, had poorer oral health in terms of mean number of teeth and mean $D_{3c}MFT$ than those with more favourable dental attitudes. Future expectations appear to be influenced by past experience. Thus, those providing care should be reminded that if a patient has a tooth extracted because of disease, they may be more likely to opt for extraction in the future, and therefore further compromise the integrity and function of their dentition.

Table 8.6 Percentage of adults according to responses to questions relating to colour and alignment of teeth, by age group
Base: Dentate

How do you feel about the colour of your teeth?			
	16-24	35-44	65+
Very satisfied	7.0	4.6	7.3
Satisfied	51.1	46.0	40.4
Doesn't concern me	10.9	11.4	25.2
Dissatisfied	27.8	32.3	23.2
Very Dissatisfied	3.2	5.7	3.9
How do you feel about the position/alignment of your teeth?			
	16-24	35-44	65+
Very satisfied	17.1	13.4	12.5
Satisfied	45.0	51.4	47.8
Doesn't concern me	9.4	12.2	28.7
Dissatisfied	24.1	19.2	10.3
Very Dissatisfied	4.4	3.8	0.7
Would you be willing to wear a brace to straighten your teeth?			
	16-24	35-44	65+
Yes	58.5	48.9	14.3
No	24.6	39.8	56.1
Haven't ever thought about it	8.7	11.0	29.6
Currently undergoing orthodontic treatment	8.3	0.3	0.0

What stops you from having orthodontic treatment: braces to straighten your teeth?			
	16-24	35-44	65+
Cost	38.7	27.5	1.3
Too old	27.1	54.6	85.1
Embarrassed	18.1	10.3	7.9
Other	16.0	7.7	5.7

Tooth whitening products are widely marketed in Ireland. Adults were asked whether they felt satisfied with the colour of their teeth (Table 8.6). Although only 7.0%, 4.6% and 7.3% of 16-24, 35-44 and 65+ year-olds respectively were 'very satisfied' with the colour of their teeth, 51.1%, 46.0% and 40.4% of each age group respectively were 'satisfied' (Table 8.6). The highest proportion of those who were either 'dissatisfied' or 'very dissatisfied' with the colour of their teeth was found in the 35-44 age group (38.0%). Thirty one percent of 16-24 year-olds and 27.1% of 65+ year-olds were 'dissatisfied or 'very dissatisfied' with the colour of their teeth.

It is interesting to note the high number of people who were dissatisfied with the colour of their teeth. It will be interesting to monitor these figures as tooth whitening products become more common in the marketplace.

More people were satisfied with the position/alignment of their teeth than their colour (Table 8.6). However, 28.5% of 16-24 year-olds, 23.0% of 35-44 year-olds and 11.0% of the 65+ year-old group were either 'dissatisfied or 'very dissatisfied' with the position/alignment of their teeth. The 'dissatisfied' or 'very dissatisfied' groups were asked whether they would be willing to wear a brace to straighten their teeth. The proportion willing to wear a brace declined with age, from 58.5% of the youngest group to 14.3% of the oldest group. They were then asked what was the greatest deterrent to having orthodontic treatment. Cost was the most common barrier for the 16-24 year-olds (38.7%), while age was the most frequently cited barrier by the two older groups (54.6% and 85.1% for the 35-44 and 65+ age groups respectively).

Thus, dissatisfaction with tooth alignment was common, but many of those who were dissatisfied were not willing to wear a brace. Although 58.5% of the 16-24 year-old group would have been happy to wear a brace, cost was a deterrent for many (38.7%, Table 8.6).

8.5 Oral health behaviour
There are three main oral health messages used to advise the public on prevention and control of oral disease:
- Brush your teeth and gums thoroughly at least twice a day with a fluoride toothpaste.
- Reduce the frequency of eating sweet food and drinking sweet drinks between meals.
- Visit the dentist regularly.

The first two messages are based on tackling the underlying causes of dental decay and gum disease. Thorough tooth brushing twice a day removes plaque, which causes gum disease. Use of a fluoride toothpaste increases the ambient level of fluoride in the mouth, which encourages the teeth to remineralise after an acid attack. Reducing the frequency of consumption of foods and drinks containing sugar reduces the chances of irreversible tooth demineralisation caused by the breakdown of sugars by bacteria in the mouth. The third message encourages people to attend the dentist regularly for preventive treatments and for early diagnosis and treatment of disease. There is no ideal frequency of visiting; the frequency should suit the oral health needs of the individual.

A number of questions on the practice of toothbrushing, frequency of snacking, and visits to the dentist were asked to gain insight into the oral health behaviour of adults.

8.5.1 Snacking behaviour
Adults were asked "How many times a day do you eat sweet foods or drink sweet drinks (such as biscuits, cakes, sweets, Coca-Cola, Pepsi cola, 7UP, tea with sugar etc.) between normal meals?" The responses are shown in Table 8.7.

Table 8.7 Number and percentage of adults responding to the question "How many times a day do you eat sweet foods or drink sweet drinks (such as biscuits, cakes, sweets, Coca-Cola, Pepsi cola, 7^{UP}, tea with sugar etc.) between normal meals?" by response and age group
Base: Dentate

Frequency of sweet foods/ drinks	16-24 year-olds		35-44 year-olds		65+ year-olds	
	n	%	n	%	n	%
Never	105	8.7	209	21.5	156	37.5
Once a day	368	31.1	344	37.7	127	32.4
Twice a day	335	28.2	205	21.2	66	17.6
Three times a day	190	15.7	94	9.9	24	6.3
Four times a day	97	7.9	50	4.7	8	2.4
Five times a day	41	3.6	14	1.5	5	1.6
Six times a day	13	0.9	7	1.0	1	0.1
Seven or more times a day	22	2.5	19	2.1	3	0.6
Don't know	15	1.3	5	0.3	8	1.5
Total	1186	100.0	947	100.0	398	100.0

The most striking feature of these results is that the snacking frequency decreased with age. For example, the percentage snacking three or more times a day was highest among the 16-24 year-old group. The percentage who said that they never eat sweet foods or drink sweet drinks between meals was 8.7%, 21.5% and 37.5% respectively in the 16-24, 35-44 and 65+ age groups.

Table 8.8 Mean number of natural teeth present (NT) and mean D$_{3c}$MFT for adults responding to the question "How many times a day do you eat sweet foods or drink sweet drinks (such as biscuits, cakes, sweets, Coca-Cola, Pepsi cola, 7^{UP}, tea with sugar etc.) between normal meals?" by response and age group
Base: Dentate

Frequency of sweet foods / drinks	16-24 year-olds		35-44 year-olds		65+ year-olds	
	Mean NT	Mean D$_{3c}$MFT	Mean NT	Mean D$_{3c}$MFT	Mean NT	Mean D$_{3c}$MFT
Less than three times/ day	28.2	4.8	25.8	14.7	14.9	21.3
Three to four times/ day	28.3	5.1	24.7	15.6	13.3	23.8
Five times or more/day	27.9	5.7	23.6	15.5	9.0	25.9

Both the mean number of teeth remaining in the mouth and the decay experience (as indicated by the mean D$_{3c}$MFT) are the outcome of a lifetime's dietary habits and oral hygiene practices (mediated by host factors). Thus, these results would be unlikely to demonstrate a clear association between a lifetime's experience of this multifactorial disease and a single cross-sectional measure of one of its causative factors. However, the decay experience (mean D$_{3c}$MFT) for adults who reported consuming sweet foods and drinks less than three times a day was less than that for those consuming sweet foods and drinks more often in all three age groups (Table 8.8). There was also a tendency for the less frequent sugar consumers to have more teeth (mean NT).

Frequent sugar intake is associated with dental caries. Therefore, it will be important to monitor caries levels in the adult population on an ongoing basis to determine whether the frequent snacking habit evident among the younger age group (Table 8.7) is sustained as they grow older, and whether the pattern of sugar intake amongst this cohort causes ongoing caries development with age.

8.5.2 Tooth brushing behaviour

Although, on average, the 65+ age group had more favourable snacking habits than the two younger age groups (Table 8.7), they brushed their teeth less often (Figure 8.1). Brushing twice a day or more often with fluoride toothpaste prevents more dental caries than brushing once a day or less.

Figure 8.1 Percentage of adults according to responses to the question "How often do you brush your teeth?" by frequency of brushing and age group
Base: Dentate
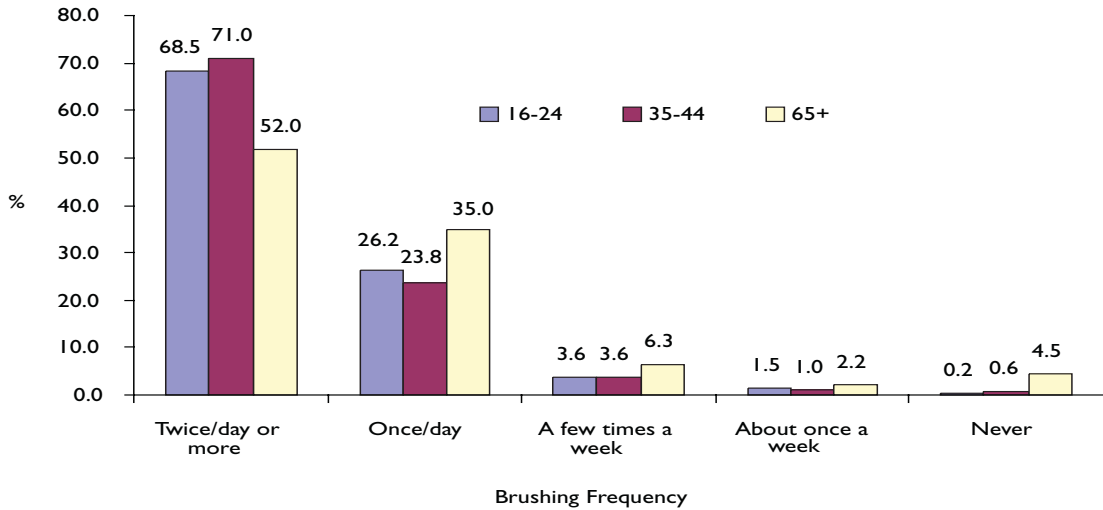
Most adults brushed their teeth twice a day or more often (Figure 8.1). Figure 8.1 shows an age effect, with 68.5%, 71.0% and 52.0% of adults in the 16-24, 35-44 and 65+ age groups brushing twice a day or more often. Whilst there is room for improvement, these statistics have improved since 1989/'90 when these percentages were 59%, 63% and 48% respectively. The second most common frequency of toothbrushing was once a day: 26.2%, 23.8% and 35.0% of 16-24, 35-44 and 65+ year-olds respectively brush once a day. Thirteen percent of the 65+ age group brushed less than once a day; this percentage was lower for 16-24 year-olds (5.3%) and 35-44 year-olds (5.2%).

Table 8.9 Number of adults (n), mean number of natural teeth present (NT), mean caries experience ($D_{3c}MFT$) and percentage with 18+SUNT by reported frequency of brushing by age group
Base: Dentate

Brushing Frequency	16-24 year-olds				35-44 year-olds				65+ year-olds			
	n	Mean NT	Mean $D_{3c}MFT$	% 18+SUNT	n	Mean NT	Mean $D_{3c}MFT$	% 18+SUNT	n	Mean NT	Mean $D_{3c}MFT$	% 18+SUNT
Twice per day	851	28.2	4.8	90.4	695	26.1	14.6	38.9	209	16.0	21.1	6.7
Once per day	269	28.2	5.1	90.5	203	24.5	15.2	34.3	138	13.3	22.4	4.6
Few times a week	49	27.9	5.4	83.5	35	23.9	14.7	33.5	27	*	*	*
Once a week	14	*	*	*	11	*	*	*	11	*	*	*
Never	4	*	*	*	7	*	*	*	16	*	*	*

* n < 30

Considering current reported brushing behaviour and the cumulative lifetime disease experience (as measured by the number of teeth, $D_{3c}MFT$ and 18+SUNT), it is interesting to note that in all age groups those who reported brushing twice a day or more often consistently had a greater number of teeth, a lower $D_{3c}MFT$ and were more likely to have 18+SUNT (Table 8.9). Those who brushed their teeth more often had better dental health.

8.5.3 Dental visiting behaviour

Adults were asked: "Over the last few years how often have you attended the dentist?" The responses have been grouped into three categories: 'more frequently than every two years', 'less frequently than

every two years', and 'never'. As the frequency of dental visiting might be affected by an adult's eligibility for dental schemes, the responses are presented according to their reported eligibility. There are two main dental schemes in Ireland: the contributory insurance scheme for employees, known as the Dental Treatment Benefit Scheme (DTBS) within the Pay Related Social Insurance scheme (PRSI), and the Dental Treatment Services Scheme (DTSS) for medical card holders (MC). There are other minor schemes in operation in Ireland but they are not considered here. The third category included in this analysis is the group with no eligibility for dental services (None); these adults pay privately for dental care.

8.5.3.1 Frequency of attendance at dentist by eligibility for dental services - dentate adults
Table 8.10 Frequency of attendance at the dentist by eligibility status and age group
Base: Dentate

Frequency of attendance	16-24 year-olds				35-44 year-olds				65+ year-olds			
	None (n =488)	PRSI (n = 204)	MC (n = 212)	All (n =1173)	None (n = 320)	PRSI (n = 377)	MC (n = 155)	All (n = 940)	None (n = 119)	PRSI (n = 58)	MC (n = 202)	All (n = 408)
More frequently than every 2 years	58.7	47.7	36.7	48.3	62.1	65.8	29.7	57.2	53.5	64.9	36.4	44.0
Less frequently than every 2 years	28.3	29.6	37.7	31.7	30.1	21.5	43.5	28.6	31.8	19.8	36.1	33.5
Never	13.0	22.7	25.6	20.0	7.8	12.7	26.8	14.2	14.7	15.3	27.5	22.4

Of those that responded to this question (All), 48.3%, 57.2% and 44.0% of 16-24, 35-44 and 65+ year-olds respectively said that they visited the dentist more frequently than every two years (Table 8.10). Twenty percent, 14.2% and 22.4% of 16-24, 35-44 and 65+ year-olds respectively said that they never visited the dentist.

Adults with medical cards attended the dentist less frequently than adults eligible for the PRSI scheme and adults who must pay privately for dental services. For example, in the 35-44 year-old age group, 29.7% of medical card holders (MC) visited the dentist more frequently than every two years, compared to 62.1% of respondents who must pay privately (None) and 65.8% for those eligible for PRSI dental benefits through the DTBS (PRSI).

8.5.3.2 Frequency of attendance at the dentist by eligibility for dental services – edentulous adults

Table 8.11 Frequency of attendance at the dentist ("over the last few years") by eligibility status and age group
Base: Edentulous

Frequency of attendance	35-44 year-olds				65+ year-olds			
	None (n = 1)	PRSI (n =1)	MC (n = 3)	All (n = 8)	None (n = 43)	PRSI (n = 29)	MC (n = 173)	All (n = 281)
More frequently than every 2 years	0.0	0.0	0.0	0.0	10.7	0.0	1.1	2.3
Less frequently than every 2 years	100.0	0.0	79.1	85.6	26.3	44.2	27.1	26.9
Never	0.0	100.0	20.9	14.4	63.0	55.8	71.8	70.8

The number of edentulous 35-44 year-olds was low (0.9%); however, those who were edentulous in this age group were infrequent attendees (Table 8.11). In the 65+ age group, 70.8% overall stated that they never went to the dentist; this behaviour was reported by 55.8% of those eligible for PRSI dental benefits and 71.8% of medical card holders.

8.5.3.3 Reasons for going to the dentist by age group

Adults aged 35-44 years were more likely to attend the dentist regularly than the other two age groups, with 42.4% going for a check up at least once a year, and a further 11.1% going for a check up at least every two years (Table 8.12). Whilst approximately one quarter of 16-24 year-olds (24.5%) and 35-44 year-olds (25.6%), and over one third (37.1%) of dentate 65+ year-olds reported attending only with pain or problems, very few dentate adults said that they never visited the dentist.

In the case of the 40.9% of Irish adults aged 65+ years who had no teeth (edentate), the data tell a different story. Almost four out of ten (39.5%) edentulous 65+ year-olds reported that they never go to the dentist, with a further 17.8% indicating that they only go when they have pain or a dental problem. The incidence of cancer of the mouth and throat increases with age and is highest in older adults, affecting more males than females[2]. Early detection of oral cancer dramatically improves survival rates. However, the low uptake of dental services among the 'at risk' group (older adults) is a worrying statistic, as it indicates that the chances of early detection of oral cancer by opportunistic screening during a dental visit are poor. Two responses to this situation could be considered. Firstly, to encourage older adults without teeth to attend the dentist for a regular check up. Secondly, to increase the awareness of other health care workers, who are likely to see older adults on a regular basis, of the need to screen for oral cancer, and to train these health care workers to carry out a simple oral mucosal examination and to recognise suspect oral lesions.

Table 8.12 Percentage of adults according to responses to question: "When you do go to the dentist, why do you normally go?" by age group

Response options for dentate adults (response options for edentulous adults in parenthesis)	Dentate			Edentulous
	16-24	35-44	65+	65+
For a check-up at least once a year (for a check up of my mouth)	30.6	42.4	29.5	1.7
For a check-up at least every two years (easing of my dentures)	15.3	11.1	8.4	8.2
When I feel I need treatment (only when I need new denture)	24.4	18.8	22.4	32.8
In pain/problem	24.5	25.6	37.1	17.8
Never	5.2	2.1	2.6	39.5

Dental clinicians advise patients to visit the dentist regularly. Optimal frequency of dental visiting is individually determined, and depends on host susceptibility to oral disease. In Chapters 3 and 4, adults with medical cards were seen to have poorer oral health than the rest of the population. Therefore, it would be reasonable to suggest that they should attend the dentist at least as frequently - if not more frequently - than the rest of the population. However, medical card holders visited the dentist less frequently than the rest of the population (Table 8.11). Older adults were less frequent attendees, and the majority of 65+ year-olds rarely (if ever) visited the dentist. This situation was not helped by their lack of awareness of the availability of free dental treatment for medical card holders. All adults aged 70 years and older are entitled to a medical card, which in turn entitles them to free dental services at a dentist of their choice. However, only 40% of medical card holders aged 65+ were aware of their entitlement to free dental services. In an earlier section (Table 3.29), we saw that 47.7% of the dentures of those aged 65+ could be considered well past their 'best before' date. It would be useful to consider a targeted oral health promotion campaign, which includes information on entitlements and the rationale for regular dental visits, for this age group.

8.5.3.4 Barriers to dental care

The reported frequency of dental visiting in the previous few years was presented in Tables 8.10 and 8.11, however these data do not indicate the reason for the dental visits. Adults were also asked "When you **do** go to the dentist, why do you normally go?" to further ascertain the nature of the dental visiting pattern (Table 8.12). The responses were dichotomised into regular and irregular visiting patterns. Those taken to have a regular visiting pattern were those that reported visiting the dentist for a check up more frequently than every two years, the rest (i.e. those that went only when they felt they needed treatment, when in pain, with a problem or never) were taken to have an irregular visiting pattern. Those with an irregular visiting pattern were asked "Why do you not visit a dentist regularly?" in an attempt to identify the major barriers to regular dental visits. They were asked to choose from a range of reasons for their infrequent dental attendance, and were allowed to give one or two main reasons. The responses were categorised by the basic nature of the reason, i.e. 'No Need', 'Fear', 'Cost' or 'Other'. The results are presented in Table 8.13 for all respondents (All), private patients (None), those eligible for dental benefit (PRSI) and medical card holders (MC). Presenting the results for

medical card holders will help to explore barriers to care because they had the most unfavourable dental visiting pattern (Tables 8.10 and 8.11).

Table 8.13 Percentage of adults citing 'No Need', 'Fear', 'Cost' and 'Other' as reasons for infrequent dental attendance by eligibility for dental services

	None	PRSI	MC	All
Base: Dentate				
No Need	67.2	55.8	73.0	67.0
Fear	29.0	34.2	24.6	27.6
Cost	21.5	15.1	10.6	17.0
Other	25.9	31.3	22.4	26.3
Base: Edentulous				
No Need	84.4	100.0	96.1	95.6
Fear	3.4	0.0	0.3	0.6
Cost	14.1	3.9	3.1	5.2
Other	19.3	6.5	4.2	6.2

The most common reason for infrequent dental attendance for all groups was a perception that there was no need to attend. This response was given by 67.0% and 95.6% of the dentate and edentulous samples respectively. In the dentate group, medical card holders were more likely to cite this reason (73.0%) than adults with PRSI (55.8%) or private patients (67.2%). Overall, 27.6% and 0.6% of dentate and edentulous adults respectively cited 'fear' as the reason for not attending; there was little difference among the eligibility groups. It is encouraging to note that cost was not a greater barrier to attendance for the dentate medical card holders compared with the PRSI group: 10.6% and 15.1% respectively gave cost as a reason for infrequent attendance. However, a greater percentage of those with no eligibility for third party funded care (None) cited cost as a reason (21.5%).

These analyses are based on the question "What, if any, dental scheme/system can you avail of?" Some 20.4% of 16-24 year-olds did not know what their eligibility was; a little over one eighth (13.9%) of these had medical cards. Responses to a further question indicated that approximately one fifth of this age group's last dental visit was to a 'school dentist'.

Tables 8.14a (16-24 year-olds), 8.14b (35-44 year-olds) and 8.14c (65+ year-olds) present the number and percentage of dentate adults, the mean number of natural teeth present, mean $D_{3c}MFT$ and the percentage with 18+SUNT for frequent attendees and for infrequent attendees according to their reasons for not visiting the dentist.

Table 8.14a Reasons for not visiting the dentist among infrequent attendees aged 16-24 years
Base: Dentate

16-24 year-olds	n	%	Number of Natural Teeth Mean	$D_{3c}MFT$ Mean	18+SUNT %
Frequent Attender	547	46.4	28.2	4.9	89.8
No Need	247	20.7	28.2	3.8	95.7
No Need/Fear	89	8.8	28.0	6.7	88.3
No Need/Cost	61	5.0	29.1	4.9	90.5
No Need/Other	118	9.9	28.3	4.1	94.4
Fear	28	2.1	27.4	6.2	78.1
Fear/Cost	18	1.4	28.1	5.5	88.9
Fear/Other	15	0.9	29.3	5.6	80.6
Cost	2	0.1	29.8	5.1	100.0
Cost/Other	29	3.0	27.9	6.2	74.3
Other	14	1.6	28.4	5.9	91.8

Table 8.14b Reasons for not visiting the dentist among infrequent attendees aged 35-44 years
Base: Dentate

35-44 year-olds	n	%	Number of Natural Teeth Mean	D$_{3c}$MFT Mean	18+SUNT %
Frequent Attender	531	54.5	26.4	15.2	35.6
No Need	103	11.8	25.1	13.3	42.5
No Need/Fear	72	8.8	24.6	14.1	44.7
No Need/Cost	41	4.1	24.8	15.6	32.8
No Need/Other	60	6.3	24.7	13.9	50.5
Fear	38	3.8	22.2	16.0	38.3
Fear/Cost	24	3.0	24.0	15.7	26.8
Fear/Other	27	3.1	25.2	16.0	29.2
Cost	6	0.4	22.1	18.2	0.0
Cost/Other	17	1.6	22.5	14.9	39.3
Other	16	2.6	25.8	14.0	30.8

Table 8.14c Reasons for not visiting the dentist among infrequent attendees aged 65+ years
Base: Dentate

65+ year-olds	n	%	Number of Natural Teeth Mean	D$_{3c}$MFT Mean	18+SUNT %
Frequent Attender	152	38.7	16.9	21.0	6.8
No Need	145	35.9	13.6	21.7	5.2
No Need/Fear	19	5.8	12.5	23.0	5.6
No Need/Cost	16	4.6	14.5	21.5	2.4
No Need/Other	37	8.8	11.5	22.4	4.8
Fear	2	0.8	14.9	26.4	0.0
Fear/Cost	7	2.0	13.6	24.9	0.0
Fear/Other	7	1.4	14.0	19.1	6.3
Cost/Other	6	1.6	10.8	21.8	0.0
Other	2	0.5	20.5	13.5	60.3

The variation in oral health according to attendance and reasons for non-attendance differs across the three age groups. There was little variation in the mean number of teeth present among the 16-24 year-old group. However, in the two older age groups, frequent attendees tended to have more teeth than those who felt that there was no need to attend (26.4 vs. 25.1 for 35-44-year-olds and 16.9 vs. 13.6 for 65+ year-olds). Among all age groups, those that did not attend because of fear tended to have higher D$_{3c}$MFT levels than others.

8.6 Perceived availability, accessibility and acceptability of dental services
One of the aims of this survey was to ascertain the perceived availability, accessibility and acceptability of dental services. These issues were reviewed according to eligibility for different dental schemes (to determine whether the experience was similar across schemes) and by age group (to determine whether the situation was similar regardless of age).

8.6.1 Availability of dental services
In reference to the dental system they accessed last, all adults were asked whether they found it difficult to find a dentist who would treat them.

Table 8.15a Percentage of 16-24 year-olds according to response to question regarding the availability of dental services by eligibility
Base: Dentate

Did you find it difficult to find a dentist who would treat you?								
16-24 year-olds	**None**		**PRSI**		**MC**		**All**	
	n	%	n	%	n	%	n	%
Yes	26	5.7	30	11.7	27	9.8	96	7.3
No	379	79.9	161	81.9	165	82.0	932	80.7
Don't care/not relevant to me	84	14.4	15	6.4	18	8.3	148	12.0

In the 16-24 year-old sample as a whole (Table 8.15a), 7.3% had difficulty finding a dentist. There was little difference according to whether adults used the PRSI scheme (11.7%) or the medical card (MC) scheme (9.8%). Of the 16-24 year-olds that went privately ('None'), a lower proportion reported difficulty finding a dentist (5.7%), but a higher proportion responded that the question was not relevant to them. There was little variation in those who did not have difficulty to find a dentist across the eligibility groups.

Table 8.15b Percentage of 35-44 year-olds according to response to question regarding the availability of dental services by eligibility
Base: Dentate

Did you find it difficult to find a dentist who would treat you?								
35-44 year-olds	**None**		**PRSI**		**MC**		**All**	
	n	%	n	%	n	%	n	%
Yes	29	10.8	68	16.1	24	13.2	134	14.0
No	245	74.4	296	79.5	122	82.5	730	77.6
Don't care/not relevant to me	49	14.9	15	4.4	10	4.2	80	8.4

Table 8.15c Percentage of 65+ year-olds according to response to question regarding the availability of dental services by eligibility
Base: Dentate

Did you find it difficult to find a dentist who would treat you?								
Dentate 65+ year-olds	**None**		**PRSI**		**MC**		**All**	
	n	%	n	%	n	%	n	%
Yes	11	8.0	5	6.8	25	11.4	44	10.0
No	87	71.5	53	93.2	167	85.5	328	82.5
Don't care/not relevant to me	21	20.5	0	0.0	8	3.1	32	7.6

Table 8.15d Percentage of 65+ year-olds according to response to question regarding the availability of dental services by eligibility
Base: Edentulous

Did you find it difficult to find a dentist who would treat you?								
Edentulous 65+ year-olds	**None**		**PRSI**		**MC**		**All**	
	n	%	n	%	n	%	n	%
Yes	6	15.9	3	12.6	14	6.6	23	7.6
No	27	67.2	24	82.3	136	81.5	216	79.5
Don't care/not relevant to me	7	16.9	2	5.1	19	12.0	37	12.9

Looking at the other age groups in Tables 8.15b (35-44 year-olds), 8.15c (dentate 65+ year-olds), and 8.15d (edentulous 65+ year-olds), the highest proportion who had difficulty finding a dentist was in the 35-44 year-old group, where 14.0% said they found it difficult (Table 8.15b). For those aged 65+ years, this figure was 10.0% among the dentate adults (Table 8.15c) and 7.6% among the edentulous adults (Table 8.15d). There was little difference in perceived accessibility across the systems in each of the 35-44 and 65+ groups. Amongst 35-44 year-olds, the proportions claiming no difficulty in finding a dentist were 82.5% for medical card (MC) holders, 79.5% for adults eligible for services under the DTBS (PRSI) and 74.4% for private patients. Amongst the dentate 65+ age group, a higher proportion (93.2%) of adults eligible for services under the DTBS (PRSI) had no difficulty finding a dentist compared to private patients (71.5%) or medical card holders (85.5%). Of all age and eligibility groups, the highest proportion with reported difficulties in finding a dentist was found among edentulous 65+ year-olds

with no eligibility for dental services (15.9%). However, this was a small group and represented only 6 adults out of 40 with no eligibility for services.

8.6.2 Accessibility to dental services

Access to services was measured in terms of free and subsidised treatment. Adults were asked three questions to determine whether they perceived they could get free emergency, or routine, dental treatment, or if they could get subsidised dental treatment. The results are presented in Tables 8.16a (16-24 year-olds), 8.16b (35-44 year-olds), 8.16c (dentate 65+ year-olds) and 8.16d (edentulous 65+ year-olds) according to responses to the questions by eligibility for dental services.

Table 8.16a Percentage of 16-24 year-olds according to responses to questions regarding the accessibility of dental services by eligibility
Base: Dentate

If you were in pain could you get free emergency dental treatment?

16-24 year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	21	6.3	26	12.8	150	68.3	217	17.7
No	282	58.5	104	47.9	12	7.5	467	41.5
Don't know	190	35.2	76	39.3	52	24.2	500	40.8

What about free routine dental treatment e.g. fillings, cleaning?

16-24 year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	17	3.8	30	15.8	140	63.0	201	15.3
No	334	68.0	118	56.2	15	7.2	548	49.0
Don't know	142	28.3	58	28.0	59	29.8	435	35.7

Can you get subsidised dental treatment (e.g. if eligible for the PRSI dental scheme)?

16-24 year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	20	3.7	189	94.2	25	12.4	254	23.7
No	337	74.8	2	0.5	132	62.3	518	45.7
Don't Know	129	21.5	15	5.3	51	25.3	395	30.6

Table 8.16b Percentage of 35-44 year-olds according to responses to questions regarding the accessibility of dental services by eligibility
Base: Dentate

If you were in pain could you get free emergency dental treatment?

35-44 year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	6	2.9	61	16.0	128	84.3	208	21.4
No	245	74.0	213	54.2	6	2.7	510	54.0
Don't know	74	23.2	107	29.7	24	13.0	235	24.6

What about free routine dental treatment e.g. fillings, cleaning?

35-44 year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	7	2.8	77	19.5	114	75.1	208	21.4
No	283	85.7	238	61.1	10	5.7	586	61.8
Don't know	35	11.5	66	19.4	34	19.2	160	16.9

Can you get subsidised dental treatment (e.g. if eligible for the PRSI dental scheme)?

35-44 year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	12	4.3	360	93.9	37	21.9	424	45.4
No	266	80.4	9	2.9	81	53.8	384	40.5
Don't Know	45	15.3	9	3.1	34	24.3	130	14.1

Table 8.16c Percentage of 65+ year-olds according to responses to questions regarding the accessibility of dental services by eligibility
Base: Dentate

If you were in pain could you get free emergency dental treatment?

Dentate 65+ year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	11	8.1	18	34.8	168	86.2	201	55.9
No	72	57.6	26	45.4	8	2.7	118	24.2
Don't know	37	34.3	13	19.8	30	11.1	93	19.9

What about free routine dental treatment e.g. fillings, cleaning?

Dentate 65+ year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	9	6.6	22	40.0	163	83.7	197	54.3
No	85	73.1	26	47.7	10	3.5	137	29.7
Don't know	26	20.4	9	12.2	32	12.8	77	15.9

Can you get subsidised dental treatment (e.g. if eligible for the PRSI dental scheme)?

Dentate 65+ year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	5	3.3	53	94.6	41	21.2	105	27.2
No	86	73.5	2	2.9	102	56.8	198	51.3
Don't Know	29	23.2	3	2.5	51	22.0	98	21.5

Table 8.16d Percentage of 65+ year-olds according to responses to questions regarding the accessibility of dental services by eligibility
Base: Edentulous

If you were in pain could you get free emergency dental treatment?

Edentulous 65+ year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	0	0.0	4	14.5	130	76.2	138	53.6
No	30	68.4	8	33.3	5	2.3	56	17.0
Don't know	13	31.6	17	52.2	40	21.5	92	29.4

What about free routine dental treatment e.g. fillings, cleaning?

Edentulous 65+ year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	0	0.0	7	23.1	132	76.9	145	55.4
No	31	70.4	7	28.7	6	2.6	55	16.5
Don't know	11	29.6	15	48.3	37	20.5	85	28.0

Can you get subsidised dental treatment (e.g. if eligible for the PRSI dental scheme)?

Edentulous 65+ year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	1	1.7	23	81.4	26	16.9	51	19.4
No	28	65.3	0	0.0	108	63.8	144	52.7
Don't Know	13	33.0	5	18.6	35	19.3	82	27.9

Adults without PRSI benefits or without a medical card must pay privately for treatment ('None' group). The percentage of adults in this category who thought that they could definitely get free emergency treatment ranged from 0.0% among edentulous 65+ year-olds (Table 8.16d) to 8.1% of dentate 65+ year-olds (Table 8.16c). Many adults in the private category ('None') did not know whether they could get free emergency treatment. Such uncertainty was found among approximately one third (35.2%) of 16-24 year-olds (Table 8.16a) and one quarter (23.2%) of 35-44 year-olds (Table 8.16b). Private patients were also uncertain about their eligibility for free routine treatment and subsidised treatment.

Adults with PRSI dental benefits can receive some free dental treatments but must pay a portion of the costs of the majority of treatments, thus their treatment is subsidised. The PRSI group had a high level

of knowledge regarding their eligibility for dental services, with over 90% of the respondents in the 16-24, 35-44 and dentate 65+ age groups responding that they could get subsidised dental treatment. The percentage was lower, at 81.4%, among the edentulous 65+ year-olds (Table 8.16d).

All medical card holders are eligible for free emergency and routine dental treatment. However, there was a high level of uncertainty regarding their entitlements. For example, in the 16-24 year-old group (Table 8.16a), only 68.3% of medical card holders knew that they could receive free emergency dental treatment, and only 63.0% knew that they could receive free routine treatment. Approximately three quarters of medical card holders in the 35-44 year-old group (75.1%) (Table 8.16b) and in the edentulous 65+ year-old group (76.9%) (Table 8.16d) were aware that they could receive free routine treatment.

These results indicate a lack of knowledge of entitlements, or an uncertainty around whether they could access a dentist willing to provide treatment under their entitlements. However, both issues could be addressed in a media campaign focused on entitlements and on availability of dentists willing to provide treatment.

8.6.3 Acceptability of dental services

Adults' opinions regarding acceptability of dental services was explored by asking questions on whether they thought dentists tried to make visits pleasant and painless, their usual levels of satisfaction when they attend for treatment or for information, whether they find the dental surgery pleasant and comfortable and clean and hygienic, satisfaction with treatment last received and with the range of treatments covered by the system. The results are presented in Tables 8.17a (16-24 year-olds), 8.17b (35-44 year-olds), 8.17c (dentate 65+ year-olds) and 8.17d (edentulous 65+ year-olds) according to responses given to the questions by eligibility for dental services.

Table 8.17a Percentage of 16-24 year-olds according to responses to questions regarding the acceptability of dental services by eligibility
Base: Dentate

Do you think dentists do all they can to make a visit pleasant and painless?

16-24 year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	364	75.3	146	72.3	159	75.5	856	73.4
No	15	3.7	4	1.6	11	5.1	40	3.5
Depends on the dentist	114	20.9	56	26.1	44	19.3	289	23.1

When you visit the dentist for treatment and information, how do you usually feel?

16-24 year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Very satisfied	124	26.4	58	29.6	47	21.7	275	23.4
Satisfied	332	66.6	123	58.3	135	63.3	774	65.2
Dissatisfied	14	2.5	10	5.8	12	4.7	47	3.6
Very dissatisfied	6	1.9	0	0.0	1	0.2	12	1.3
Never attend the dentist	17	2.6	15	6.2	19	10.1	76	6.5

Do you find the dental surgery you attend
a) A pleasant and comfortable place?

16-24 year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	446	90.6	181	85.6	176	82.4	1024	85.8
No	28	6.0	10	6.0	15	7.2	78	7.1
Never attend the dentist	19	3.4	15	8.5	21	10.3	78	7.1

b) Clean and Hygienic?

16-24 year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	473	96.5	191	92.2	188	87.8	1093	92.3
No	1	0.3	1	0.3	3	2.4	10	1.0
Never attend the dentist	18	3.2	13	7.5	20	9.8	73	6.6

Were you satisfied with the service you received last?

16-24 year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	382	80.9	173	82.4	178	85.2	953	81.2
No	21	4.0	21	12.4	15	5.9	77	7.0
Don't care/not relevant to me	86	15.1	13	5.3	17	8.9	145	11.8

To date are you satisfied with the range of treatments covered under the scheme?

16-24 year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	14	63.8	100	83.2	98	78.9	237	79.6
No	8	36.2	23	16.8	22	21.1	57	20.4

Table 8.17b Percentage of 35–44 year-olds according to responses to questions regarding the acceptability of dental services by eligibility
Base: Dentate

Do you think dentists do all they can to make a visit pleasant and painless?

35-44 year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	238	70.7	292	77.5	110	73.5	705	74.1
No	5	2.0	15	4.2	8	5.5	32	3.9
Depends on the dentist	82	27.3	72	18.3	36	21.0	210	22.0

When you visit the dentist for treatment and information, how do you usually feel?

35-44 year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Very satisfied	118	35.4	152	38.8	46	34.0	341	36.2
Satisfied	188	59.7	198	51.2	85	53.2	524	54.8
Dissatisfied	11	2.9	13	4.8	9	4.6	36	3.9
Very dissatisfied	2	0.8	5	1.8	4	3.6	12	1.8
Never attend the dentist	6	1.3	10	3.4	10	4.6	32	3.3

Do you find the dental surgery you attend
a) A pleasant and comfortable place?

35-44 year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	301	91.5	349	91.4	136	90.7	860	90.3
No	18	7.5	20	4.9	5	3.3	50	5.9
Never attend the dentist	6	1.0	9	3.6	12	6.0	34	3.8

b) Clean and Hygienic?

35-44 year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	313	96.6	369	96.4	138	91.9	900	95.3
No	7	2.6	0	0.0	3	2.1	11	1.2
Never attend the dentist	5	0.8	9	3.6	12	6.0	32	3.5

Were you satisfied with the service you received last?

35-44 year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	253	75.6	342	87.6	133	87.8	802	82.9
No	18	7.8	25	8.2	13	8.1	63	8.3
Don't care/not relevant to me	51	16.7	13	4.2	9	4.1	79	8.9

To date are you satisfied with the range of treatments covered under the scheme?								
35-44 year-olds	**None**		**PRSI**		**MC**		**All**	
	n	%	n	%	n	%	n	%
Yes	11	72.9	173	60.0	75	75.8	266	63.0
No	5	27.1	140	40.0	27	24.2	177	37.0

Table 8.17c Percentage of 65+ year-olds according to responses to questions regarding the acceptability of dental services by eligibility
Base: Dentate

Do you think dentists do all they can to make a visit pleasant and painless?								
Dentate 65+ year-olds	**None**		**PRSI**		**MC**		**All**	
	n	%	n	%	n	%	n	%
Yes	106	88.4	56	98.3	174	84.7	360	87.6
No	0	0.0	0	0.0	5	2.5	6	1.7
Depends on the dentist	14	11.6	2	1.7	27	12.7	47	10.7

When you visit the dentist for treatment and information, how do you usually feel?								
Dentate 65+ year-olds	**None**		**PRSI**		**MC**		**All**	
	n	%	n	%	n	%	n	%
Very satisfied	39	29.5	29	45.8	69	34.1	145	33.9
Satisfied	70	61.5	27	52.5	109	54.4	219	55.5
Dissatisfied	2	2.1	0	0.0	12	6.2	14	3.9
Very dissatisfied	1	1.0	0	0.0	2	1.0	4	1.4
Never attend the dentist	6	5.8	2	1.7	11	4.3	26	5.3

Do you find the dental surgery you attend a) A pleasant and comfortable place?								
Dentate 65+ year-olds	**None**		**PRSI**		**MC**		**All**	
	n	%	n	%	n	%	n	%
Yes	111	93.9	54	98.6	184	88.3	372	90.7
No	3	2.2	1	0.8	8	4.8	12	3.4
Never attend the dentist	4	3.8	1	0.6	13	6.9	24	5.9

b) Clean and Hygienic?								
Dentate 65+ year-olds	**None**		**PRSI**		**MC**		**All**	
	n	%	n	%	n	%	n	%
Yes	114	96.2	57	99.4	191	93.0	385	94.0
No	0	0.0	0	0.0	2	1.3	2	0.7
Never attend the dentist	4	3.8	1	0.6	12	5.7	23	5.2

Were you satisfied with the service you received last?								
Dentate 65+ year-olds	**None**		**PRSI**		**MC**		**All**	
	n	%	n	%	n	%	n	%
Yes	94	73.7	57	98.9	173	86.5	347	84.6
No	1	0.7	1	1.1	18	10.3	21	6.4
Don't care/not relevant to me	24	25.6	0	0.0	9	3.2	36	8.9

To date are you satisfied with the range of treatments covered under the scheme?								
Dentate 65+ year-olds	**None**		**PRSI**		**MC**		**All**	
	n	%	n	%	n	%	n	%
Yes	6	84.6	35	72.1	103	88.8	148	84.5
No	1	15.4	15	27.9	11	11.2	27	15.5

Table 8.17d Percentage of 65+ year-olds according to responses to questions regarding the acceptability of dental services by eligibility
Base: Edentulous

Do you think dentists do all they can to make a visit pleasant and painless?

Edentulous 65+ year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	34	79.1	24	78.3	143	82.5	230	80.4
No	0	0.0	2	9.9	5	3.5	11	4.7
Depends on the dentist	9	20.9	3	11.8	26	13.9	44	15.0

When you visit the dentist for treatment and information, how do you usually feel?

Edentulous 65+ year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Very satisfied	7	16.6	4	11.7	32	15.4	44	13.6
Satisfied	22	52.2	17	57.5	77	46.8	135	48.6
Dissatisfied	1	1.2	0	0.0	8	3.7	10	3.0
Very dissatisfied	1	5.8	0	0.0	2	1.8	3	1.9
Never attend the dentist	12	24.2	8	30.7	55	32.3	93	32.9

Do you find the dental surgery you attend
a) A pleasant and comfortable place?

Edentulous 65+ year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	28	72.8	20	66.8	112	63.9	180	64.1
No	0	0.0	2	8.7	3	3.1	6	3.2
Never attend the dentist	14	27.2	7	24.6	54	32.9	92	32.7

b) Clean and Hygienic?

Edentulous 65+ year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	29	75.8	21	73.6	117	67.4	188	67.7
No	0	0.0	1	3.8	1	0.3	2	0.6
Never attend the dentist	13	24.2	6	22.6	54	32.3	90	31.8

Were you satisfied with the service you received last?

Edentulous 65+ year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	29	71.5	24	84.6	140	82.9	221	80.9
No	5	11.8	2	6.3	13	6.4	21	6.6
Don't care/not relevant to me	7	16.8	3	9.1	16	10.7	35	12.5

To date are you satisfied with the range of treatments covered under the scheme?

Edentulous 65+ year-olds	None		PRSI		MC		All	
	n	%	n	%	n	%	n	%
Yes	2	100.0	19	92.7	100	96.1	124	94.2
No	0	0.0	3	7.3	6	3.9	11	5.8

Very few respondents (less than 10%) thought that dentists did not do all they can to make a visit pleasant and painless (Tables 8.17a, 8.17b, 8.17c and 8.17d). The levels of dissatisfaction with dental treatment or advice were also very low (less than 10%). Levels of satisfaction with the comfort and hygiene of dental surgeries were high across all age groups. Whilst most groups were satisfied with the service they had received last, 12.4% of 16-24 year-olds with PRSI dental benefits (Table 8.17a), and 10.3% of the dentate 65+ year-old medical card holders (Table 8.17c), responded that they were not satisfied with the service they had received last. However, there was no consistent pattern of dissatisfaction according to eligibility or age group. Dissatisfaction with the range of treatments covered under the DTBS (PRSI) was highest (40.0%) amongst the 35-44 year-old group (Table 8.17b). This may indicate the increasing complexity, and increasing cost, of patient contributions to treatments required by this age group. In the case of dentate 65+ year-olds, 27.9% (Table 8.17c) were dissatisfied with the range of treatments covered by the DTBS. Adults in this age group have considerably fewer

natural teeth remaining than the 35-44 year-old group, and hence patient contributions to treatment may not be as costly. For 16-24 year-olds eligible for the DTBS (Table 8.17a), 16.8% responded that they were dissatisfied with the range of treatments covered. However, the dental treatment needs of this age group may be less complex as oral health is considerably better amongst younger age groups. A similar distribution of dissatisfaction with the range of treatments covered was seen among the medical card holders. However, levels of dissatisfaction were not as high as for those eligible for the DTBS: For example, 21.1%, 24.2% and 11.2% of dentate 16-24, 35-44, and 65+ year-old medical card holders expressed dissatisfaction with the range of treatments covered under the DTSS.

Although a high proportion of dentists were available to deliver treatment under the DTSS (MC) and the DTBS (PRSI), many adults were uncertain about their entitlements or the availability of dentists to treat them. Media campaigns could be designed to address this. The current dental services were acceptable to the vast majority of adults who reported high levels of satisfaction with dentists and dental surgeries. However, a high level of dissatisfaction with the range of treatments covered by the state-run dental schemes was expressed. In particular, the DTBS was found to be too limited for 35-44 year-olds. Consultation of users of the various schemes, particularly in the 35-44 year-old group, when planning the future development of the scheme is advisable if levels of satisfaction with the range of treatments covered by the scheme is to be achieved.

8.7 Oral Health Related Quality of Life
The impact of oral health on life quality was assessed using the United Kingdom Oral Health related Quality of Life measure - OHQoL-UK(W)[©1]. The conceptual basis behind this measure is based on the WHO's International Classification of Functioning, Disability and Health (ICF)[3] (Figure 8.2). The International Classification of Functioning, Disability and Health focuses on the 'components of health'. It considers all aspects of health and describes them in terms of health domains and health-related domains. It incorporates the relationship between health conditions and contextual factors.

Figure 8.2 International Classification of Functioning, Disability and Health
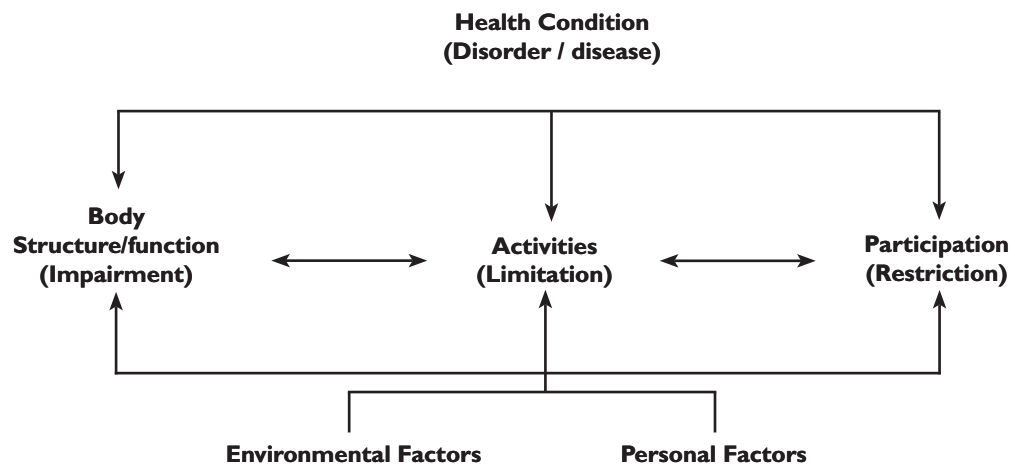
The OHQoL-UK(W)[©] model considers that health can be both positive and/or negative, and influences life quality in both enhancing and burdening ways. This conceptual model reflects a synthesis of biological and social models of illness and functioning.

OHQoL-UK(W)[©] consists of 16 items representing key areas of oral health related quality of life arranged into three domains: physical, social and psychological. The measure has been shown to be a valid (content, construct, criterion), reliable (internal and external) measure of oral health related quality of life, and responsive to changing oral health status.

Participants were first asked "In what way, if any, do you feel your teeth, gums, mouth and/or denture affects one of the 16 key areas presented in Table 8.18". The available responses were 'bad', 'none' or

'good' effect. Adults were then asked to rate the impact of the effects experienced: "How would rate the impact of this effect: 'none', 'little', 'moderate', 'great' or 'extreme'?"

Each item was scored on a 9-point Likert scale ranging from 'bad effect' of 'extreme impact' (scoring 1) to 'good effect' of 'extreme impact' (scoring 9). Overall oral health related quality of life (OHQoL-UK(W)) can be calculated by summating the responses to the 16 items. Scores can range from 16 (all bad effects of extreme impact) to 144 (all good effects of extreme impact). In addition, domain scores can be calculated by summating the responses to items within each domain: physical oral health (scores can range from 6 to 54), social oral health (scores can range from 5 to 45), and psychological oral health (scores can range from 5 to 45).

Table 8.18 The 16 key areas of oral health related quality of life

Physical domain
1. Eating or enjoyment of food
2. Appearance
3. Speech
4. Comfort
5. Breath odour
6. General health

Social domain
7. Smiling or laughing
8. Social life
9. Romantic relationships
10. Work or ability to do your usual jobs
11. Finances

Psychological domain
12. Sleep/ ability to relax
13. Confidence
14. Carefree manner
15. Mood
16. Personality

8.7.1 Impact of oral health on quality of life
Of the 2,888 interviews conducted, 2,795 were amenable to statistical analysis (97%). The other interviews were discarded from the oral health related quality of life section due to incomplete responses to the questions asked.

Fifty nine percent of those surveyed perceived their oral health as having an impact on their life quality. Over half (52.0%) reported a physical impact, over a third (37.7%) reported a social impact, and over a quarter (27.4%) reported a psychological impact.

The majority of adults reported experiencing both positive (enhancing) and negative (burdening) oral health effects (56.7%). A minority perceived their oral health's effect on life quality to be wholly positive (1.6%) or negative (0.2%).

Across all of the 16 key areas of oral health related quality of life, participants perceived that their oral health had positive effects rather than negative effects more frequently (Table 8.19). Experiences of positive effects of oral health on 'appearance' and 'smiling/laughing' were most commonly reported: 26.3% and 22.6% respectively. The most common negative effects reported were in relation to 'appearance' (12.9%), 'smiling/laughing' (11.6%) and 'breath odour' (11.7%).

Positive effects of oral health were more frequently rated as 'great' or 'extreme' compared to negative effects. Considering those aspects which were reported to have either a 'great' or 'extreme' impact on life quality, the greatest proportion (13.9%) reported was in relation to oral health's effect on 'smiling/ laughing' (Table 8.19), followed by 'appearance', as rated by 12.3% of respondents. The greatest negative impact of oral health was perceived to be its effect on 'finances', as rated by 3.9% of participants.

The mean overall OHQoL-UK(W)© weighted score was 84.2 (sd = 13.9). The mean was 31.8 (sd = 6.2) for the physical domain, 26.3 (sd = 4.6) for the social domain, and 26.1 (sd = 4.2) for the psychological domain.

Table 8.19 Effects and impacts of oral health on quality of life

	Bad effect/ Extreme impact	Bad effect/ Great impact	Bad effect/ Moderate impact	Bad effect/ Little impact	No effect/ No impact	Good effect/ Little impact	Good effect/ Moderate impact	Good effect/ Great impact	Good effect/ Extreme impact
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
Physical:									
Eating or enjoyment of food	0.4 (10)	2.0 (55)	4.1 (114)	3.8 (105)	71.4 (1995)	2.4 (68)	6.7 (187)	7.4 (208)	1.9 (53)
Appearance	1.0 (27)	2.4 (66)	5.0 (141)	4.5 (126)	60.8 (1700)	2.9 (81)	11.1 (309)	9.8 (275)	2.5 (70)
Speech	0.4 (10)	0.7 (19)	1.9 (52)	1.4 (39)	80.6 (2253)	0.8 (23)	5.7 (159)	6.5 (174)	2.4 (66)
Comfort	0.8 (23)	1.9 (52)	3.6 (100)	2.8 (78)	72.8 (2034)	1.7 (47)	6.3 (177)	7.2 (202)	2.9 (82)
Breath odour	1.4 (38)	1.9 (53)	4.6 (128)	3.8 (107)	73.3 (2048)	1.3 (35)	4.8 (133)	6.0 (169)	3.0 (84)
General health	0.3 (9)	0.8 (21)	1.1 (31)	0.5 (14)	81.5 (2278)	1.4 (38)	5.3 (148)	7.2 (201)	2.0 (55)
Social:									
Smiling or laughing	1.2 (34)	2.8 (79)	4.6 (128)	2.9 (82)	65.8 (1839)	1.2 (33)	7.6 (212)	9.3 (261)	4.5 (127)
Social life	0.5 (14)	1.1 (31)	1.3 (3.5)	0.8 (22)	79.2 (2214)	1.1 (30)	5.4 (151)	7.8 (219)	2.8 (79)
Romantic relationships	0.4 (10)	0.7 (19)	0.6 (18)	0.4 (10)	81.4 (2275)	1.1 (30)	5.1 (142)	6.7 (188)	3.7 (103)
Work or ability to do your usual jobs	0.3 (8)	0.3 (9)	0.3 (7)	0.3 (9)	88.6 (2477)	0.7 (19)	3.5 (99)	4.2 (117)	1.8 (50)
Finances	1.4 (38)	2.5 (70)	2.6 (73)	1.3 (36)	88.6 (2475)	0.4 (11)	1.1 (32)	1.6 (44)	0.6 (16)
Psychological:									
Sleep/ ability to relax	0.3 (8)	0.3 (9)	0.7 (20)	0.9 (24)	89.8 (2511)	0.5 (15)	3.0 (83)	3.2 (89)	1.3 (36)
Confidence	0.5 (15)	1.5 (41)	2.8 (79)	1.8 (50)	76.4 (2134)	1.0 (29)	5.8 (162)	7.2 (202)	3.0 (83)
Carefree manner	0.4 (11)	0.6 (18)	1.5 (43)	0.9 (26)	85.3 (2385)	0.7 (19)	4.0 (113)	4.5 (126)	1.9 (54)
Mood	0.3 (7)	0.7 (20)	1.2 (34)	0.6 (16)	88.3 (2468)	0.7 (19)	3.1 (88)	3.8 (106)	1.3 (37)
Personality	0.3 (8)	0.4 (12)	0.7 (20)	0.4 (10)	87.4 (2443)	1.0 (28)	3.8 (105)	4.6 (128)	1.5 (41)

8.7.2 Impact of oral health on quality of life and demographic factors: age, gender and medical card status

Disparities in oral health related quality of life were explored in bivariate analysis (employing t tests and ANOVA tests as appropriate).

The overall impact of oral health on quality of life (OHQoL-UK(W) score) was associated with age group (p=0.003). Younger people (16-24 and 35-44) had the highest OHQoL-UK(W) score, whilst those aged 65+ had the lowest OHQoL-UK(W) score. In both the physical and social domains, there were differences associated with age group, with 65+ year-olds having lower mean scores than those of the younger age groups.

Gender difference in the impact of oral health on quality of life were not apparent in terms of overall impact or at any domain level (p>0.05).

The impact of oral health on life quality was strongly associated with medical card status. Medical card holders (less well off) had lower overall oral health related quality of life scores (p<0.001). They also had lower physical (p<0.001), social (p<0.001), and psychological (p<0.001) scores.

Table 8.20 Mean overall, physical, social and psychological domain scores for oral health related quality of life according to age group, gender and medical card status

OHQoL-UK(W)	n	Overall Score		Physical Score		Social Score		Psychological Score	
		mean	sd	mean	sd	mean	sd	mean	sd
Age group:									
16-24	843	84.9	13.4*	32.1	5.9*	26.6	4.6*	26.2	3.9^{ns}
35-44	541	84.5	15.6	31.9	6.9	26.3	5.0	26.3	4.8
65+	417	82.7	13.9	31.1	5.4	25.8	3.7	25.8	3.6
Gender:									
Male	1169	33.3	4.8^{ns}	31.6	5.6^{ns}	26.2	4.4^{ns}	26.0	3.9^{ns}
Female	1626	33.5	5.2	32.0	6.5	26.4	4.7	26.3	4.7
Medical Card:									
Yes	895	82.2	12.3**	31.0	5.6**	25.8	3.9**	25.6	3.8**
No	1891	85.2	14.5	32.2	6.4	26.6	4.8	26.4	4.3

* p<0.01, **p<0.001, ^{ns} p>0.05

8.7.3 Association between clinical oral health status and oral health related quality of life

8.7.3.1 Dental caries and quality of life

Caries experience (D_{3c}MFT) was associated with overall quality of life (p<0.001), physical (p=0.003), social (p<0.001) and psychological (p<0.001) scores (Table 8.21). Those who had no caries experience had the highest OHQoL-UK(W) scores with an observed deterioration in scores with increasing caries experience (p<0.001). The presence of untreated decay was also associated with lower OHQoL-UK(W) scores as was the presence of one or more missing teeth (p<0.001).

Table 8.21 Clinical oral health status and oral health related quality of life

OHQoL-UK(W)	Overall Score Mean (sd)	Physical Score Mean (sd)	Social Score Mean (sd)	Psychological Score Mean (sd)
D_{3c}MFT:				
0 (n=162)	86.1 (13.0)***	32.6 (5.6)***	27.0 (4.5)***	26.5 (3.9)**
1 <10 (n=955)	85.0 (13.7)	32.2 (6.0)	26.6 (4.7)	26.4 (4.5)
10 >20 (n=902)	84.9 (15.0)	32.1 (6.6)	26.4 (4.8)	26.2 (4.0)
20 and above (n=774)	82.1 (12.7)	31.0 (5.7)	25.6 (4.0)	25.7 (4.0)
Untreated Decay:				
0 (n=1760)	85.2 (14.0)***	32.2 (6.2)***	26.6 (4.6)***	26.4 (4.2)***
1 or 2 (n=715)	83.9 (14.0)	31.6 (6.1)	26.2 (4.7)	26.1 (4.3)
3 or more (n=318)	79.8 (11.7)	29.7 (5.5)	25.1 (4.0)	25.0 (3.3)

Missing Teeth:				
0 (n=626)	86.0 (13.7)***	32.6 (6.1)***	27.0 (4.6)***	26.4 (4.0)***
1 <10 (n=1431)	85.0 (14.7)	32.2 (6.5)	26.5 (4.9)	26.3 (4.4)
10 >20 (n=278)	82.1 (11.7)	30.7 (5.4)	25.7 (3.7)	25.7 (3.5)
20 and above (n=458)	79.9 (11.9)	29.7 (5.4)	25.0 (3.8)	25.2 (4.0)
CPI:				
0 (n=241)	84.0 (12.2)**	31.8 (5.6)**	26.2 (4.0)**	25.9 (3.4)^{ns}
1 (n=283)	87.5 (14.5)	33.3 (6.7)	27.4 (4.8)	26.8 (4.1)
2 (n=1155)	84.6 (14.5)	32.0 (6.3)	26.4 (4.9)	26.2 (4.3)
3 (n=620)	83.7 (14.0)	31.6 (6.2)	26.1 (4.4)	26.0 (4.4)
4 (n=86)	83.0 (14.6)	31.0 (6.8)	26.0 (4.7)	25.9 (4.6)
Periodontal Pocket:				
No (n=1760)	85.0 (14.2)*	32.2 (6.3)*	26.5 (4.8)*	26.3 (4.2)^{ns}
Yes (n=715)	83.6 (14.0)	31.5 (6.3)	26.1 (4.4)	26.1 (4.4)

* $p<0.05$, ** $p<0.01$, *** $p<0.001$, ^{ns} $p>0.05$

8.7.3.2 Periodontal status and quality of life

Periodontal health status was rated using the maximum Community Periodontal Index (CPI) score. The CPI score was associated with OHQoL-UK(W) scores ($p<0.01$). In addition, those with periodontal pockets had lower OHQoL-UK(W) scores than those without periodontal pockets $p<0.05$ (Table 8.21).

8.7.4 Regression analysis findings

A binary variable was created from OHQoL-UK(W) scores to delineate those with 'enhanced' oral health related quality of life (1= OHQoL-UK(W) scores > 80, 0 = OHQoL-UK(W) ≤ 80). Logistic regression analysis was then conducted (forward Wald) with socio-demographic factors (age, gender, medical card status) and clinical oral health factors (caries experience and periodontal health) as dependent variables.

Medical card status and dental caries experience emerged as the key predictors of oral health related quality of life. Non medical card holders were over 40% more likely to have enhanced oral health related quality of life compared to medical card holders, accounting for age, gender and periodontal health status (odds ratio =1.41, 95% CI 1.15 to 1.73, p=0.001). For every one-unit increase in caries experience (for each additional tooth with a caries experience), the chances of having enhanced oral health related quality of life decreased by 3% (odds ratio = 0.97, 95% CI 0.96 to 0.98, p<0.001) (Table 8.22).

Table 8.22 Predictors of enhanced oral health related quality of life: regression analysis

Dependent variable	Regression Coefficient	Standard Error	Odds Ratio	95% Confidence Interval	P-value
Enhanced OHQoL-UK(W) **(0 = score ≤ 80, 1 = score > 80)**					
D$_{3c}$MFT	-0.03	0.01	0.97	0.96, 0.98	< 0.001
Medical Card **(0=no, 1=yes)**	0.34	0.11	1.41	1.15, 1.73	0.001
Gender **(0=male, 1=female)**					0.093
Age **(0 <65, 1= 65 and older)**					0.634
Periodontal Health **(0=pockets, 1= no pockets)**					0.943

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Chapter 9
Summary and Comments

9.1 Introduction

The first national survey of adult oral health in the Republic of Ireland (RoI) was conducted in 1979. It consisted of a questionnaire designed to ascertain the percentage of the population that were edentulous, and also to determine the dental knowledge, attitudes and behaviour of Irish adults[1]. The second national survey of the oral health of Irish adults was conducted in 1989/'90[2]. It included a detailed clinical examination as well as a questionnaire to determine the relationship between sociological variables and oral health status. The study described in this report is the third survey of the oral health of Irish adults and again includes detailed clinical and sociological measurements. The results of this present survey therefore facilitate an assessment of the contribution made by the various oral health treatment strategies introduced in the past 30 years and will inform the further development of oral health policy in Ireland.

Adults in RoI are eligible for dental treatment under three headings:

(a) Health Act 1970: Based on income limits, the less well-off section of the community are eligible for dental treatment under the Health Act 1970. Up to the early 1990s, responsibility for providing this care rested with the eight regional health boards which traditionally employed salaried dentists to fulfill this remit. During the 1980s, various schemes were attempted, with mixed success, to deploy private dentists to treat adult medical card holders. In 1994, the Dental Treatment Services Scheme was introduced as a choice of dentist scheme for adult medical card holders. A comprehensive package of basic dental treatments, on a fee-for-service basis, is provided to adults over 16 years of age who have medical cards. This scheme is funded by the Department of Health and Children and is administered by the Health Services Executive (HSE). Approximately 27% of adults are eligible for care under the Health Act 1970.

(b) The Social Welfare Dental Benefit Scheme: Under this scheme, workers and their spouses who have paid pay-related social insurance (PRSI) contributions for a designated period are eligible for dental treatment. Treatment is carried out by a panel of dentists who sign a contract with the Department of Social Welfare. Payment is on a fee per item of service basis with the patient paying a fixed proportion (usually about one third) for a few items including dentures. Approximately 52% of adults are eligible for treatment under the Social Welfare Dental Benefit Scheme.

(c) Private patients: Approximately 21% of the adult population are not eligible for dental treatment under (a) and (b) and make private arrangements for care with dentists.

One of the major findings of the 1989/'90 survey of adults' oral health[2] was that whilst the increased investment in health services for adults appeared to have made an impact on the level of unmet treatment need, the oral health of medical card holders - (a) above, and their accessibility to dental care was considerably less satisfactory than those eligible for care under the Social Welfare Benefit Scheme - (b) above, or under private arrangements - (c) above. Publication of the strategy document Shaping a Healthier Future[3] in 1994, and the subsequent Dental Health Action Plan, highlighted the inequality in dental treatment available to medical card holders and the remainder of the population. These developments led to the setting up of the Dental Treatment Services Scheme (DTSS). Under this national scheme, dental treatment for adults was provided henceforth by private dentists contracted to do so by the Department of Health.

It was against the above background that the third national survey of adults' oral health, described in this report, was undertaken. As to be expected, one of the main aims of this survey was to monitor the changes in the oral health of Irish adults over the last 20 years, taking account of the increased investment in this area of health, and to consider the implications of the findings from the point of view of future dental treatment patterns and the dental services in Ireland generally.

9.2 Retention of natural teeth

9.2.1 Trends over time
The findings of the 2000/'02 national survey of adults' oral health show that the percentage of adults in RoI who have lost all their natural teeth (edentulous) has declined dramatically since the first survey was conducted in 1979. For example, the percentage of 35-44 year-olds who were edentulous was 12% in 1979, 4% in 1989/'90 and 0.9% in 2000/'02. Amongst 65+ year-olds, the percentages who were edentulous were 72%, 48% and 40.9% respectively. In 2000/'02, the percentage of 65+ year-olds who were edentulous continued to be higher amongst females (45.6%) compared with males (34.6%).

Measuring tooth retention using the mean number of natural teeth present also demonstrates the fact that tooth retention increased between 1989/'90 and 2000/'02 (this measure was not recorded in the 1979 study). For example, amongst 35-44 year-olds the mean number of natural teeth present in 1989/'90 was 21 and this increased to 25.2 in the 2000/'02 study. A further indication of a changing pattern of treatment is the substantial reduction in the number of extracted teeth, particularly amongst non medical card holders.

These findings will have a dramatic effect on the pattern of treatment of adults that will be required in future years. Clearly the reduction in edentulousness will result, and indeed has resulted, in a dramatic reduction in the need for full upper and lower dentures. It is also clear that retention of natural teeth by the elderly will mean that the need for restorative and other care for these groups will increase. The fact that more adults are retaining their natural teeth has given rise to an apparent increase in the overall burden of conditions such as periodontal pocketing and gingival recession, root caries, tooth wear and tooth discolouration, with a resulting increased need and demand for the management of these conditions. Together with the increased expectations of the population (as evidenced by the results of the sociological aspects reported in this survey), this is likely to lead to an increasing demand for more sophisticated treatments when compared with the extraction option, frequently the treatment of choice 20 years ago.

9.2.2 Retention of natural teeth according to disadvantage
The retention of natural teeth continues to be substantially lower amongst the disadvantaged, as measured by the possession of a medical card. For example, amongst those aged 65 years and older in the 2000/'02 survey, the percentage edentulous was 45.6% for medical card holders and 29.4% for non medical card holders. For both 35-44 year-olds and 65+ year-olds, the mean number of natural teeth present was significantly higher amongst non medical card holders, at 25.8 and 11.6 respectively, compared with 23.4 and 7.2 respectively amongst medical card holders. Subjects eligible for the PRSI dental treatment scheme had the greatest number of teeth present and lowest treatment needs overall. Hence they would appear to have better oral health and greater access to dental treatment.

These findings are similar to those reported from surveys conducted on other medical conditions in which the less well-off sections of the population have poorer health. The introduction of the DTSS in the mid-nineties, and its subsequent recent extensions are designed to address the inequalities in oral health and access to dental services between medical card holders and non medical card holders. Given the fact that the DTSS scheme is a relatively recent addition to the health services portfolio, it is probably too early to judge the success of the scheme to date.

9.2.3 Retention of natural teeth according to fluoridation status
Exposure to water fluoridation had a statistically significant impact on the number of teeth present among 35-44 year-olds, with those in the 'part' fluoride and 'full' fluoride groups being more likely to have more teeth than those in the 'non' fluoride group. A further measure of the beneficial effects of water fluoridation is apparent when the percentage of adults with 18 or more sound untreated natural teeth present (18+SUNT) are looked at. The percentages of 16-24 and 35-44 year-olds with 18+SUNT were 87.0% and 25.2% respectively for those residing in non fluoridated communities, and 92.7% and 47.0% respectively for those residing in fluoridated communities.

A number of recent reviews have commented on the lack of data on the effects of water fluoridation on the oral health of adults. The results of this study show that, overall, residents of fluoridated communities have better dental health than residents of non fluoridated communities. In making these observations it is important to note that water fluoridation was introduced to Ireland in the mid to

late 1960s and at the time of this survey only 16-24 year-olds and some 35-44 year-olds could have been lifetime residents of fluoridated communities. Hence, the results of this survey do not give a comprehensive assessment of the long-term benefits of the water fluoridation program for adults in RoI. Nevertheless, at this stage, it would appear that the decision of the Forum on Water Fluoridation in Ireland[4] to continue with the water fluoridation program in Ireland is vindicated by these results for adults.

9.3 Denture wearing and need
The proportion of adults wearing partial (usually some natural teeth remaining) and full (no natural teeth remaining) dentures was recorded. The wearing of all types of dentures had decreased in the 35-44 year-old group. In 2000/'02, 83.6% of 35-44 year-olds did not wear a denture compared to 68.0% in 1989/'90.

More endentulous adults were wearing dentures in 2000/'02, than in 1989/'90. Amongst those aged 65 years and over with no natural teeth, 6.0% had no dentures in 2000/'02; which was an improvement over 1989/'90 when 21.4% had no dentures. Similarly, more older adults were wearing partial dentures in 2000/'02.

There were extensive unmet denture treatment needs among the adults examined in this survey, for example, a substantial proportion of older edentulous adults (47.7%) were wearing dentures that were too old (i.e at least 10-years-old). Furthermore, partial dentures were found to have had an adverse effect on the surrounding tissues of over one third of those wearing them. This situation warrants investigation to enable improvement of the quality and acceptability of dentures worn by Irish adults.

Comfortable well-fitting upper and lower dentures are important for some of the basic activities of everyday living such as eating, talking and laughing. However, a high proportion of older adults with no natural teeth reported dissatisfaction (40.8%) with the appearance, comfort or fit of their upper and/or lower denture. The problems surrounding the provision and quality of dentures need to be addressed.

9.4 Dental decay (caries)
Decay at cavitation level decreased between 1989/'90 and 2000/'02. The decrease among 16-24 year-olds was greatest at 33.8%. Females and those living in the mid-western region (MWHB) had the highest decay levels.

Decay scores were lower among fluoridated groups for all age groups. The difference was particularly noticeable among the 35-44 year-old group where those with fluoridated water supplies had, on average, 2.8 more healthy teeth than those in the non fluoridated group. This means that every 1,000 35-44 year-old adults living in fluoridated areas had 2,800 fewer decayed, missing or filled teeth than those in non fluoridated areas.

Except for the oldest age group, there was little difference in overall decay levels according to disadvantage. However, in 1989/'90, for all age groups, medical card holders tended to have a higher proportion of their decay score attributable to missing teeth and a lower proportion attributable to fillings than non medical card holders. These differences according to medical card status were not found for the 16-24 year-old group in 2000/'02, indicating success in the delivery of more equitable dental services since the introduction of the DTSS. The scheme provides an easily accessible restorative dental service for adult medical card holders through a choice of dentist system.

Infrequent tooth brushing (less than twice a day) and frequent consumption of foods and drinks sweetened with sugar (twice a day or more) were found to statistically significantly associated with high caries levels in adults. Efforts to reduce the frequency of consumption of foods and drinks sweetened with sugar have the potential to impact general health as well as oral health among Irish adults.

9.5 Periodontal health
The results show that there is a high level of periodontal inflammation and disease in the adult population in Ireland. This, together with an increased retention of natural teeth, leads to a higher burden of disease. For example, amongst 16-24, 35-44 and 65+ year-olds the percentage with shallow and deep pocketing was 11.9%, 40.2% and 49.6% respectively. Of the remainder not affected by pocketing, the majority had either gingival inflammation or calculus. It would seem therefore that dental hygienists could provide the treatment needed for periodontal conditions and diseases in Ireland. Hence the decision in 1996 to legalise the training and deployment of dental hygienists would appear to be

vindicated. Further recruitment of this category of healthcare worker by dentists providing services under the Social Welfare Dental Benefit Scheme or under the DTSS should be encouraged.

There is some evidence to suggest that medical card holders, older adults, those having mild to moderate systemic diseases, and those who smoke tobacco and/or drink alcohol have higher levels of periodontal disease. Thus health promotion efforts to improve general health and reduce the consumption of tobacco and alcohol will have a positive impact on oral health.

Whilst the successes achieved in the last 20 years in reducing the level of caries and increasing the retention of natural teeth is noteworthy, it is a cause for concern that periodontal diseases and conditions continue to be a major burden on the Irish population. The main cause of most of these conditions is inadequate plaque control. Further research is required to develop programs to remedy this deficit.

9.6 Other oral conditions

As previously reported, both in Ireland and internationally, the prevalence of trauma to permanent incisors amongst young adults continues to be considerably higher amongst males (at 24.6%) compared with females (at 15.8%). An intriguing finding in this survey was the substantial increase in trauma to incisors in this age group since 1989/'90, particularly amongst females for whom trauma has increased from 8% in 1989/'90 to 15.8% in 2000/'02. Though the proportion of trauma that is left untreated has decreased since 1989/'90, it still remains high. There is need to investigate why such a high proportion of traumatised incisors in Ireland remain untreated. There would be merit in developing a pilot system whereby all incidents of traumatised incisors would be followed over a period of years to make sure that the necessary emergency and long-term care would be provided.

The prevalence of enamel diffuse opacities and fluorosis has increased amongst 16-24 year-old adults in Ireland since 1989/'90. This finding is consistent with the results of the North South Survey of Children's Oral Health[5], which also reported an increase in these conditions between 1984 and 2002. Thus, these results are not unexpected. The likely causes of this increase, and the resulting policy decisions, have been discussed in detail in the final report of the Forum on Water Fluoridation[4].

Approximately one in 25 adults reported that they had pain when their Temperomandibular Joint (TMJ) was palpated, and a similar proportion had a maximum opening of less than 30mm. For both of these measures, these proportions were higher in females than in males. The TMJ was also examined for clicking, deviation of the jaw on opening, and locking during movement of the jaw. Again, the symptoms for these conditions were more frequent amongst females, particularly amongst 35-44 year-olds. The policy implications for these findings are difficult to assess. Certainly there is well-established anecdotal evidence that many of the symptoms of TMJ dysfunction are extremely distressing and present a serious, though relatively rare, clinical challenge for the practicing dental profession.

The need for orthodontic treatment was estimated for 16-24 year-olds: 7% had a definite need, 19% a borderline need and 74% had no need for orthodontic treatment on aesthetic grounds. On dental health grounds, 25.7% had a definite need for orthodontic treatment. These figures indicate a very high need for orthodontic care amongst this age group. It is to be expected, however, that given the substantial investment in orthodontic training and orthodontic treatment in recent years in RoI, many of the orthodontic conditions recorded in this age group will in future be treated at an earlier age. Hence orthodontic treatment need for 16-24 year-olds is likely to fall.

The prevalence of tooth surface loss was found to be high amongst Irish adults, increasing with age from 38.1% amongst 16-24 year-olds to 93.0% amongst those aged 65+. It is not unexpected that the surfaces of teeth will be lost over time due to everyday activities such as chewing fibrous food, consumption of erosive drinks and over-enthusiastic tooth brushing. However, in addition to this normal "wear and tear" there is no doubt that the levels found in this survey include some cases of severe pathological tooth loss, resulting in loss of function and occasional pain. Prevention of detrimental tooth wear in older life requires a life course approach with early identification and prevention of pathological wear. Development of acceptable "norms" for age-related levels of tooth wear compatible with good oral health would be a useful adjunct for such an approach.

9.7 Sociological aspects

An interesting general finding was that most of those completing the questionnaires perceived their oral health status as having an impact upon their quality of life, the impact being mainly positive rather than

negative. The impact was perceived to be more physical than social or psychological, with "appearance" being the most common physical aspect referred to. Those aged 65 years and older, and those who were in possession of medical cards, had the poorest oral health related quality of life; the impacts on men and women were similar. Those with high levels of dental caries and periodontal disease, those with high levels of untreated dental decay and those with a high number of missing teeth had poorer oral health related quality of life.

The adult population in Ireland is poorly briefed on the role of fluoride, including water fluoridation, in the promotion of oral health. The recommendation contained in the report on the Forum of Water Fluoridation[4] to develop strategies to increase the public's awareness on these matters is justified by these results.

9.8 Concluding comment

The results of this national survey show that there was considerable improvements in the level of oral health amongst adults in RoI between 1989/'90 and 2000/'02. These improvements reflect the considerable investment in the provision of oral health services for adults during this period. The results provide a valuable source of information, thus allowing future developments in these services to be evidence-based.

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Appendix 1 Project Group - University College Cork

Dr. Helen Whelton	Principal Investigator
Dr. Evelyn Crowley	Senior Research Fellow
Prof. Denis O' Mullane	Consultant
Ms. Theresa O' Mahony	Research Assistant
Dr. Michelle Byrtek	Statistician
Ms. Janet O'Sullivan	Statistician
Dr. Michael Cronin	Statistician
Dr. Noel Woods	Health Economist
Ms. Helena Guiney	Researcher / Report coordinator
Ms. Virginia Kelleher	Data Analyst
Ms. Maria Tobin	Projects Manager
Dr. Paul Beirne	HRB/HSR Research Fellow
Dr. Rose Kingston	Research Fellow
Mr. Denis Field	Dept. of Oral Health and Development
Mr. Tim Holland	Dept. of Oral Health and Development
Dr. Francis Burke	Dept. of Restorative Dentistry
Ms. Liz Flynn	Senior Executive Assistant
Ms. Elspeth Cameron	Senior Executive Assistant
Ms. Irene Hegarty	Senior Executive Assistant
Ms. Ann Daly	Senior Executive Assistant
Ms. Niamh Cronin	Senior Executive Assistant
Ms. Eileen McSweeney	Research Assistant
Ms. Maura Gallagher	Research Assistant
Ms. Ita Rattray	Executive Assistant
Ms. Catherine Mills	Research Assistant
Ms. Sharon Fennell	Dental Nurse
Ms. Susan O'Sullivan	Dental Nurse
Dr. Stephen Phillips	Statistician

Sample drawn by: James Williams, Economic and Social Research Institute
Quality of life section of Chapter 8 written by Dr. Colman McGrath
Editing of Chapter 5 by Dr. Denise McCarthy Dublin Dental School and Hospital,
Trinity College Dublin
Interviewing Skills Training provided by Mrs. Margaret Murphy

Appendix 2 Survey Teams

Health Board	Dental Examiner	Dental Recorder
Eastern Regional Health Authority	Dr. Elizabeth Moore	Ms. Joyce Fagan
	Dr. Vida Reynolds	Ms. Noreen Coen/
		Ms. Cora Carty
	Dr. Paul Twomey	Ms. Susan Keane
	Dr. Anna May McMahon	Ms. Margaret Carrigan
	Dr. J.P. Lee Cheong	Ms. Patricia Furey
	Dr. Joe Bergin	Ms. Darina Melling
	Dr. Robert Gallagher	Ms. Nancy Southward
	Dr. Iryna Dootson	Ms. Carmel Dowling
Midland Health Board	Dr. Joe Hynes	Mrs. Denise Todd
	Dr. Orla O'Connor-Hogan	Ms. Caroline Gallagher
Mid Western Health Board	Dr. Imelda Counihan	Ms. Geraldine Darcy
	Dr. Margie Houlihan	Ms. Michelle Geraghty
	Dr. Cora McCarthy	Ms. Deirdre McNamara
North Eastern Health Board	Dr. Des Brennan	Ms. Florence Leathem
	Dr. Carmel Parnell	Ms. Mary Carr
	Dr. Evelyn Connolly	Ms. Selena Leonard
	Dr. Salah Al Mandhari	Ms. Kathleen Smyth
North Western Health Board	Dr. Ciaran Rattigan	Ms. Barbara Lowry
	Dr. Claire Haire	Ms. Teresa Coyle
South Eastern Health Board	Dr. Margueretta Kelly	Ms. Geraldine O'Keeffe-Mackey
	Dr. Niall Murphy	Ms. Yvonne Power
	Dr. Jim O'Donoghue	Ms. Emma Norris/
		Ms. Statia Quirke
	Dr. Fiona Coyne	Ms. Elaine McMahon
Southern Health Board	Dr. Geraldine Breen	Ms. Carmel Mason/
		Ms. Helen O'Mahony
	Dr. John Jones	Ms. Joanne McGrath
	Dr. Con O'Sullivan	Ms. Ida Crowley
	Dr. Teresa Lynch	Ms. Fiona Truss
	Dr. Tom Nyhan	Ms. Eileen Hurley
	Dr. Martina Hales	Ms. Eileen Breen
Western Health Board	Dr. Matthew Walshe	Ms. Celia Naughton/
		Ms. Maria Baxter-Casey
	Dr. Catherine Waters	Ms. Patricia Reynolds
	Dr. Seamus O'Donnadhcha	Ms. Ann Murray

Appendix 3 User Group Members – Adults' Survey

Dr. Gerard Gavin, Chief Dental Officer, Department of Health and Children
Dr. Margaret Shannon, Department of Health and Children
Dr. Padraig Creedon, Principal Dental Surgeon, SEHB
Dr. Marie Tuohy, Principal Dental Surgeon, SEHB
Dr. Maurice Delaney, Principal Dental Surgeon, MWHB
Dr. Joe Green, Principal Dental Surgeon, MWHB
Dr. Maria Kenny, Principal Dental Surgeon, MHB
Dr. Daniel O'Meara, Principal Dental Surgeon, MHB
Dr. Joe Hynes, Senior Dental Surgeon, MHB
Dr. Ann O'Neill, Principal Dental Surgeon, ERHA
Dr. David Clarke, Principal Dental Surgeon, ERHA
Dr. Barney Murphy, Principal Dental Surgeon, ERHA
Dr. Mary Ormsby, Principal Dental Surgeon, ERHA
Dr. Niall Murphy, Senior Dental Surgeon and fieldworkers representative, SEHB
Dr. Matt Walshe, Principal Dental Surgeon, WHB
Dr. Joe Mullen, Principal Dental Surgeon, NWHB
Dr. John Kelly, Principal Dental Surgeon, NEHB
Dr. Mary O'Connor, Principal Dental Surgeon, SHB
Dr. John Jones, Principal Dental Surgeon, SHB
Dr. Michael Thornton, Principal Dental Surgeon, SHB

Appendix 4 Principal Trainer and Assistant Trainers

Principal Trainer
Dr. Helen Whelton, Principal Investigator, Director of the Oral Health Services Research Centre and
Senior Lecturer in Preventive Dentistry and Dental Public Health, University College Cork.

Assistant Trainers
Dr. Evelyn Crowley, Senior Research Fellow, University College Cork
Dr. Imelda Counihan, Senior Dental Surgeon – Admin, Mid Western Health Board
Dr. Gerard Gavin, Department of Health and Children
Dr. Pat Costello, Principal Dental Surgeon, Western Health Board
Dr. Matt Walshe, Principal Dental Surgeon, Western Health Board
Dr. Frank Burke, Consultant, University College Cork
Dr. Denis Field, Consultant, University College Cork
Mr. Tim Holland, Consultant, University College Cork
Dr. Donald Burden, Consultant, Queens University Belfast

Appendix 5 Direct Data Entry Software

Developer and Trainer: JacSoftware Ltd, The Old Barracks, Watergrasshill, Co. Cork
Manual compiled and IT support provided by Dr. Evelyn Crowley, University College Cork

Appendix 6 Contact Letter
Appendix 7 Subject Information
Appendix 8 Informed Consent Form
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Appendix 6 Contact Letter

HEALTH BOARD HEADED NOTEPAPER

With clinic address of examining dentist

Dear (Name)

You have been selected to participate in the *National Dental Survey*, which is being conducted by University College Cork on behalf of the Dept. of Health and Children and the Health Boards. This is a major national survey, which is only undertaken every ten years. The results of this survey are very important for directing the provision of future dental services in Ireland. By participating in this survey you will be helping to improve the level of dental care available in the future to you, your family and community.

The survey is very straightforward. A dentist will conduct a brief examination of your teeth. This is a simple examination, which does not involve any dental treatment of any kind. You will then be asked a number of questions relating to your general and dental health.

You and members of your family living at your address will be eligible to participate if aged between 16 and 24 years, 35 and 44 years and 65 years of age plus (inclusive). Adults who participate in the survey will be required to attend at their local dental clinic at a convenient time and will each receive £10 expenses towards travel costs to attend the clinic. This £10 cheque will be sent to you by University College Cork following participation in the study. In the case of adults who are unable to attend, the dentist may be able to call to your home. The total amount of time required will be less than 40 minutes.

As a thank you, University College Cork in association with the Health Boards will organize a prize draw. This draw will be limited to approximately 5,000 people. Ten lucky winners will each receive holiday vouchers to the value of £600.

The survey is conducted in a completely confidential manner. Data will be used for statistical purposes only. No individual's data will be given to any company, organisation or government department.

Your participation in this survey is very important. However you are under no legal obligation to participate. In the event that you do not wish to participate please fill out the attached card B and post it immediately, so that your name can be removed from our survey list. If you do wish to participate you can return the enclosed card A and the dental clinic will contact you in the near future or alternatively you can phone us at the above number. Otherwise, over the coming weeks you will receive a phone call or a visit from one of our dental staff to arrange a time suitable to you for conducting the survey.

Thank you for your co-operation in this important undertaking. If you have any questions regarding your involvement in the survey please do not hesitate to contact our staff at the above number.

Yours sincerely,

Name	Dr. Helen Whelton, BDS, PhD (NUI) MDPH
Principal Dental Surgeon	Senior Lecturer in Dental Public Health & Preventive Dentistry
Health Board	University College Cork

Appendix 6 Contact Letter

Appendix 7 Subject Information

National Survey of Adult Oral Health 2000-2002
Please fill in this form and return it in the freepost envelope provided
Please return this form within 10 days. Thank You
Section A
You and/or any members of your household **are eligible to participate** in the survey **if aged between 16-24 years of age and/or 35-44 years of age and/or 65 years or over**

Please give details of any members of your household who are willing to participate in the survey

Name (Block Capitals Please)	Age	Sex (M/F)	Contact Tel. No.
			H: W/Mobile:
			H: W/Mobile:
			H: W/Mobile:
			H: W/Mobile:
			H: W/Mobile:
			H: W/Mobile:

If you and/or members of your household are willing to participate in the survey, a member of the Survey Team will contact you/them to arrange a suitable time and location. Examinations are possible both during normal working hours and in the evenings. It is expected that most dental examinations will take place in dental clinics around the country. £10 expenses will be paid only to those who are examined at their local clinic. Home visits can be arranged for those people who would like to participate in the survey but who are unable to attend a clinic.

Section B
If no members of your household will be taking part in the survey, we would be very grateful if you could indicate the reason for **not** participating below. *(This information is required for statistical purposes only)*

Please tick
Relevant box

No-one in this household is aged
16-24, 35-44 or 65 years or older.   ☐

Members of this household aged
16-24, 35-44 or 65 years or older
do not wish to take part   ☐

Name:

Address:

Appendix 8 Informed Consent Form
National Survey of Adult Oral Health 2000-2002

Subject Name:_____ **Screening No:** _____

Subject No: _____

Dentist directing the Research: Dr Helen Whelton, Oral Health Services Research Centre. University Dental School and Hospital, Cork Tel 021-901210

You are being asked to participate in a research study. In order to decide whether or not you want to be a part of this research study, you should understand enough about the risks and benefits to make an informed judgement. This process is known as informed consent. This consent form gives detailed information about the research study, which will be discussed with you. Once you understand the study, you will be asked to sign this form if you wish to participate. You are being asked to participate in the National Adult Oral Health Survey of Ireland. The purpose of this study is to provide information on the dental health of adults in Ireland and what influences their dental health/general health. The results of the survey will be used to direct the provision of future dental services in Ireland. Participation in this study will involve examinations to measure dental trauma, denture status, marks/flecks on teeth, gum health, teeth alignment, the joints and muscles of the jaws, tooth wear and dental decay. You will be asked to complete medical history forms and to take part in completing an interview type questionnaire about your general health, habits, attitudes, knowledge and behaviour towards dental health, use of dental services and to give some personal information, for example your age and some information on your social circumstances. There are no risks anticipated with participation in this study. All information is strictly confidential. It should be noted that procedures conducted during this study do not replace regular dental check-ups. Also, you are free to refrain from participation in this study or to withdraw from the study at any time for any reason. If you wish to participate in this study you will be invited to have your teeth, gums and soft tissues of your mouth examined today.

Agreement to Consent

The research project and the examination procedures/interview associated with it have been fully explained to me. I have had the opportunity to ask questions concerning any and all aspects of the project and any procedures involved. I am aware that participation is voluntary and that I may withdraw my consent at any time. I am aware that my decision not to participate or to withdraw will not restrict my access to health care services normally available to me. I understand that my records may be stored on a computer programme but that confidentially of records concerning my involvement in this survey will be maintained in an appropriate manner. I understand that the investigators and sponsors have such insurance as is required by law in the event of injury resulting from this research.

I, the undersigned, hereby consent to participate as a subject in the above-described project conducted by the Health Boards. I can receive a copy of this consent form for my record if I so request. I understand that if I have any questions concerning this research or the study protocol I can contact the dentist listed above (Dr Helen Whelton). If I have any questions concerning my rights in connection with the research, I can contact the Clinical Research Ethics Committee of the Cork Teaching Hospitals at 021-345599.

After reading the entire consent form, if you have no further questions about giving consent, please sign where indicated.

Signature of Subject: _____ Date: _____

Witness: _____ Date: _____

Appendix 9 Medical Screening Form

All information is strictly confidential

Medical Screening Check – Please complete all questions
If you have any queries please ask the dentist

Name:_____

1. Have you ever had Rheumatic Fever?   **Yes**   **No**
☐   ☐

2. Do you have any artificial heart valves or a heart murmer?
Yes   **No**
☐   ☐

3. Have you ever had heart surgery?   **Yes**   **No**
☐   ☐

4. Do you have any artificial joints, such as artificial hip or knee joints?
Yes   **No**
☐   ☐

5. Have you any allergies, particularly any allergies to latex?
Yes   **No**
☐   ☐

6. Have you ever had hepatitis or jaundice?   **Yes**   **No**
☐   ☐

7. Do you have, or have had any medical condition which has caused you a problem with dental treatment in the past?
Yes   **No**
☐   ☐

Signed:_____   **Date:** _____

Appendix 10 Clinical Record Form (CRF)

Subject Name _____

HB (1) Cluster (2) Respondt (2) Person (2) (1-7)

Subject Number

Date of Birth ☐ ☐ ☐ ☐ **1** **9** ☐ ☐
D D M M Y Y Y Y (8-15)

Gender ☐ 16 ASA ☐ 17 Recorder (18-19) ☐ ☐ Examiner (20-21) ☐ ☐

Date of Exam ☐ ☐ ☐ ☐ **2** **0** ☐ ☐
D D M M Y Y Y Y (22-29)

Type of Exam ☐ *(N=new, D=duplicate)*(30) Age ☐ ☐ ☐ (31)*(Ask Subject)*(33) Location ☐ *(H=home, C=Clinic)*(34)

TRAUMA OF INCISORS
(age 16-24 years only)

UR   UL
☐ ☐ ☐ ☐ (35-38)
2 **1** **1** **2**
☐ ☐ ☐ ☐ (39-42)
LR   LL

DEVELOPMENTAL DEFECTS OF ENAMEL
(age 16-24 years only)

Tooth	1.4	1.3	1.2	1.1	2.1	2.2	2.3	2.4	3.6	4.6	
Type											(43-52)
Extent											(53-62)

DEANS INDEX ☐ (63)

DENTAL STATUS
(all age groups)

☐ (64)

0 = edentulous
1 = dentdate
2 = no uppers
3 = no lowers

DENTURE STATUS (all age groups)

Wearing   Need   Affecting

(65) ☐ Upper   (66) ☐ Upper   (67) ☐ Upper

(68) ☐ Lower   (69) ☐ Lower   (70) ☐ Lower

0 = no
1 = yes

TMJ (all dentate age groups)

Max opening   Overjet mm (age 16-24 only)   Max protrusion

☐ (71)   (72) ☐ ☐ (73)   ☐ (74)

Impaired funct   Muscle pain   TMJ pain

☐ (75)   ☐ (76)   ☐ (77)

INDEX OF ORTHODONTIC TREATMENT NEED IOTN
(age 16-24 only)

☐ (78)
Dental Health Component

☐ (79)
Aesthetic Component

Subject Number ☐ ☐ ☐ ☐ ☐ ☐ ☐ (80-86)

HB (1)   Cluster (2)   Respondt (2)   Person (2)

CPE / CALCULUS AND LOSS OF ATTACHMENT

TOOTH	1.7/1.6	1.1	2.6/2.7	3.6/3.7	3.1	4.6/4.7	
POCKETS							(87-92)
CALCULUS							(93-98)
BLEEDING							(99-104)
LOSS OF ATTACHMENT							(105-110)

TOOTH WEAR / EROSION *(all age groups)*

TOOTH (UPPER)	1.3	1.2	1.1	2.1	2.2	2.3
BUCCAL	111					116
PALATAL	117					122
INCISAL	123					134

WORST SURFACE	135					146
TOOTH (LOWER)	4.3	4.2	4.1	3.1	3.2	3.3

LESIONS OF ORAL MUCOSA *(all age groups)*

☐ (147)

Subject Number ☐ ☐☐ ☐☐ ☐☐

HB (1)   Cluster (2)   Respondt (2)   Person (2)

TOOTH		UR								UPPER JAW						UL
		8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
PRESENCE																	
SPACES																	
CROWN CONDITION	O																
	M																
	B																
	D																
	L																
ROOT CONDITION	M																
	B																
	D																
	L																
Tr Crown																	
Tr Root																	

TOOTH		UR								LOWER JAW						LL
		8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
PRESENCE																	
SPACES																	
CROWN CONDITION	O																
	M																
	B																
	D																
	L																
ROOT CONDITION	M																
	B																
	D																
	L																
Tr Crown																	
Tr Root																	

Appendix 11
National Survey of Adult Oral Health 2000 - 2002
General Health Questionnaire

Note: Results are weighted

HQ1 **Have you been a patient in hospital during the past two years?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	222	20.8	172	16.2	124	32.0	4	32.4	104	39.0
No	2	951	79.2	776	83.8	283	68.0	4	67.6	177	61.0
	All	1173	100	948	100	407	100	8	100	281	100

HQ2 **Have you been under the care of a medical doctor during the past 2 years?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	385	32.0	370	36.1	287	69.9	4	32.4	222	77.7
No	2	780	68.0	567	63.9	116	30.1	4	67.6	58	22.3
	All	1165	100	937	100	403	100	8	100	280	100

HQ3 **Have you taken any medicines or drugs during the past two years?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	491	41.3	376	42.1	241	71.6	4	32.4	181	77.4
No	2	594	58.7	467	57.9	100	28.4	4	67.6	50	22.6
	All	1085	100	843	100	341	100	8	100	231	100

HQ3_1 **If answer to HQ3 is yes, have you taken them:**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Occasionally	1	371	67.5	243	55.0	39	12.0	1	17.0	30	14.5
Less than once/day	2	66	10.5	68	15.0	75	27.2		0.0	45	21.8
More than once/day	3	110	21.9	127	30.0	171	60.8	3	83.0	138	63.7
	All	547	100	438	100	285	100	4	100	213	100

HQ3_2 **If you have ticked box 3 =more than once/day, how many different types of medicine/drugs do you take every day on average? Enter number**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
	0	3	1.5	2	2.7		0.0		0.0		0.0
	1	73	55.3	91	48.3	56	22.9	1	26.2	40	21.7
	2	41	23.9	53	33.4	64	27.7	1	45.2	39	22.1
	3	17	9.2	13	6.1	48	20.7	1	28.6	31	18.9
	4	4	2.8	12	5.6	23	10.3		0.0	19	11.7
	5	1	1.2	1	0.5	19	11.4		0.0	20	12.9
	6	1	0.2	5	2.6	6	2.6		0.0	9	5.2
	7	1	3.6		0.0	3	1.2		0.0	6	3.0
	8	1	2.2	1	0.6	2	0.7		0.0	2	0.8
	9		0.0		0.0	1	0.5		0.0		0.0
	10		0.0		0.0	1	0.7		0.0	3	2.7
	11-20		0.0		0.0	1	0.3		0.0	2	0.9
	21-30		0.0		0.0	1	0.8		0.0		0.0
	All	**142**	**100**	**178**	**100**	**225**	**100**	**3**	**100**	**171**	**100**

HQ4 **Are you pregnant at present?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	4	0.3	19	1.7		0.0		0.0		0.0
No	2	1141	99.7	884	98.3	376	100	7	100	262	100
	All	**1145**	**100**	**903**	**100**	**376**	**100**	**7**	**100**	**262**	**100**

HQ5 **Have you ever had any excessive bleeding requiring special treatment?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	20	2.0	25	2.3	21	5.3		0.0	12	3.5
No	2	1141	98.0	894	97.7	373	94.7	6	100	267	96.5
	All	**1161**	**100**	**919**	**100**	**394**	**100**	**6**	**100**	**279**	**100**

Tick any of the following which you have had or have at present:

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
heart failure	HQ6_01	5	1.0	7	0.5	17	4.4		0.0	5	1.8
heart disease or attack	HQ6_02	5	0.5	6	0.5	28	7.5		0.0	37	12.4
angina pectoris (chest pain)	HQ6_03	9	0.7	8	0.8	50	13.2	1	6.0	39	14.9
high blood pressure	HQ6_04	13	0.9	51	5.1	120	29.6	1	6.0	83	27.3
heart murmur	HQ6_05	25	1.6	42	4.8	21	4.9		0.0	12	3.7
rheumatic fever	HQ6_06	1	0.1	6	0.7	12	2.4		0.0	6	2.8
congenital heart lesions	HQ6_07	3	0.2		0.0		0.0		0.0		0.0
scarlet fever	HQ6_08	30	2.7	20	3.0	14	4.6		0.0	11	4.0
artificial heart valve	HQ6_09	1	0.1		0.0	4	0.7		0.0	3	0.7
heart pacemaker	HQ6_10	1	0.1		0.0	8	2.0		0.0	4	1.5
heart surgery	HQ6_11	4	0.3	1	0.1	18	4.8		0.0	14	5.0
artificial joint	HQ6_12		0.0		0.0	31	7.2		0.0	20	8.4
anaemia	HQ6_13	38	2.2	37	2.8	25	5.4	1	5.5	16	5.5
stroke	HQ6_14	2	0.1	1	0.1	13	3.0		0.0	13	4.9
kidney trouble	HQ6_15	33	2.1	21	2.0	20	5.0		0.0	18	6.1
ulcers	HQ6_16	31	2.1	36	4.4	32	8.4		0.0	30	10.8
gastric problems	HQ6_17	25	2.1	56	7.6	43	10.2		0.0	27	9.6
irritable bowel syndrome	HQ6_18	19	1.0	54	5.8	22	5.8		0.0	12	4.5
emphysemia	HQ6_19		0.0		0.0	5	2.0		0.0	5	1.8
cough	HQ6_20	381	29.2	156	15.2	64	14.3	1	9.5	54	16.8
tuberculosis (TB)	HQ6_21		0.0	5	0.4	12	2.7		0.0	8	3.2
asthma	HQ6_22	155	13.3	59	5.4	24	6.2		0.0	24	8.6
diabetes	HQ6_23	8	0.9	8	0.7	24	5.8		0.0	20	7.4
thyroid disease	HQ6_24	8	0.6	18	1.9	24	5.5		0.0	15	5.0
x-ray or cobalt treatment	HQ6_25	77	4.5	35	3.4	21	5.0	1	9.5	7	1.7
chemotherapy (cancer, leukemia)	HQ6_26	1	0.0	5	0.4	7	1.7		0.0	5	2.5
arthritis	HQ6_27	5	0.6	29	2.4	140	34.4		0.0	106	37.1
rheumatism	HQ6_28		0.0	6	0.5	23	5.5		0.0	21	7.0
cortisone medicine	HQ6_29	14	0.6	23	2.9	13	2.9		0.0	12	4.1
glaucoma	HQ6_30	1	0.1	3	0.3	8	2.6		0.0	6	1.5
HIV/AIDs	HQ6_31		0.0	1	0.1		0.0		0.0		0.0
Hepatitis B (Serum)	HQ6_32	1	0.1	1	0.2	2	0.8		0.0		0.0
Hepatitis C	HQ6_33	1	0.0	2	0.1		0.0		0.0		0.0
liver disease	HQ6_34	1	0.2	3	0.2	2	0.4		0.0	1	0.4
yellow jaundice	HQ6_35	28	2.2	49	4.6	31	8.8		0.0	22	6.7
blood transfusion	HQ6_36	5	0.3	25	2.2	34	7.1	1	5.5	30	11.1
drug addiction	HQ6_37	6	0.4	1	0.1		0.0		0.0		0.0
haemophilia	HQ6_38	1	0.0		0.0	1	0.6		0.0		0.0
epilepsy or seizures	HQ6_39	8	0.6	8	0.9	5	1.2		0.0	1	0.2

		n	%	n	%	n	%	n	%	n	%
fainting or dizzy spells	HQ6_40	87	6.7	35	2.9	23	5.9		0.0	14	4.3
nervousness	HQ6_41	28	1.4	33	2.6	19	5.0	1	9.5	14	6.0
psychiatric treatment	HQ6_42		0.0		0.0		0.0		0.0		0.0
sickle cell disease	HQ6_43	43			0.0		0.0	0.0	1	0.2	0.2
bruise easily	HQ6_44	61	3.7	49	3.9	38	8.6		0.0	32	10.4
All		**1184**	**100**	**954**	**100**	**413**	**100**	**8**	**100**	**289**	**100**

HQ7 Do your ankles swell during the day?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	12	1.3	46	4.8	58	16.8		0.0	57	23.1
No	2	1088	98.7	833	95.2	322	83.2	6	100	211	76.9
All		**1100**	**100**	**879**	**100**	**380**	**100**	**6**	**100**	**268**	**100**

HQ8 Have you ever been told by a doctor that you have had a heart attack or stroke?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	3	0.2	5	0.6	35	9.4		0.0	44	16.0
No	2	1170	99.8	927	99.4	365	90.6	8	100	238	84.0
All		**1173**	**100**	**932**	**100**	**400**	**100**	**8**	**100**	**282**	**100**

HQ9 Do you use more than 2 pillows to sleep?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	181	15.0	121	13.9	68	16.7	2	40.7	75	28.6
No	2	997	85.0	821	86.1	342	83.3	6	59.3	211	71.4
All		**1178**	**100**	**942**	**100**	**410**	**100**	**8**	**100**	**286**	**100**

HQ10 Have you lost or gained more than 10 pounds in the last year?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	238	21.5	218	22.2	60	14.7	3	38.3	49	17.7
No	2	929	78.5	714	77.8	345	85.3	5	61.7	236	82.3
All		**1167**	**100**	**932**	**100**	**405**	**100**	**8**	**100**	**285**	**100**

HQ11   **Do you ever wake up from sleep short of breath?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	50	4.1	38	4.3	23	8.0		0.0	30	10.3
No	2	1123	95.9	894	95.7	382	92.0	8	100	255	89.7
	All	**1173**	**100**	**932**	**100**	**405**	**100**	**8**	**100**	**285**	**100**

HQ12   **Can you walk up hills and climb up stairs?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	1074	88.6	835	86.5	333	81.6	8	100	207	70.1
No	2	102	11.4	107	13.5	72	18.4		0.0	74	29.9
	All	**1176**	**100**	**942**	**100**	**405**	**100**	**8**	**100**	**281**	**100**

HQ13   **Have you ever had a broken or fractured bone?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	388	33.8	280	32.2	127	31.1	3	60.4	78	26.2
No	2	780	66.2	649	67.8	269	68.9	5	39.6	198	73.8
	All	**1168**	**100**	**929**	**100**	**396**	**100**	**8**	**100**	**276**	**100**

HQ13a   **If yes, how many times? Enter number.**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
	0		0.0	1	0.9	1	0.5		0.0		0.0
	1	237	66.3	165	66.0	72	66.3	2	37.4	51	75.6
	2	71	19.8	44	18.3	26	24.5		0.0	11	16.0
	3	21	4.5	16	9.1	2	1.3		0.0	4	5.7
	4	11	5.2	8	2.9	4	5.6		0.0	1	2.7
	5	5	1.7	1	0.2		0.0		0.0		0.0
	6	3	1.1	4	1.2	1	0.7		0.0		0.0
	7		0.0		0.0	1	1.0		0.0		0.0
	8		0.0	2	0.4		0.0		0.0		0.0
	9	1	0.3		0.0		0.0		0.0		0.0
	10	3	0.8	2	1.1		0.0		0.0		0.0
	11-20	2	0.5	1	0.1		0.0		0.0		0.0
	21-30		0.0		0.0		0.0		0.0		0.0
	31-40		0.0		0.0		0.0	1	62.6		0.0
	All	**354**	**100**	**244**	**100**	**107**	**100**	**3**	**100**	**67**	**100**

Which bones have you broken?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Arm or Leg (long bones)?	1	196	14.9	136	15.7	52	12.5		0.0	30	9.9
Hip or spine?	2	7	0.5	5	0.5	10	1.9		0.0	11	4.0
Other e.g., hand, foot, skull, collar bone…	3	146	13.1	102	10.8	51	12.1	2	43.8	30	9.4
	All	1184	100	954	100	413	100	8	100	289	100

HQ13c   **How many years ago was your most recent fracture/break? Enter number.**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
	0		0.0		0.0	1	2.0		0.0		0.0
	1	46	10.8	15	4.2	10	7.3		0.0	7	13.5
	2	47	14.8	12	5.3	11	8.0		0.0		0.0
	3	39	10.1	8	2.1	7	5.5		0.0	5	7.5
	4	30	7.2	11	4.5	8	5.3		0.0	6	7.5
	5	44	11.9	16	5.9	13	9.8		0.0	4	5.3
	6	22	8.7	11	3.7	8	6.3		0.0	4	7.0
	7	16	5.3	2	0.7	1	0.3		0.0	3	2.9
	8	26	9.9	9	3.9	1	1.6		0.0	2	3.1
	9	7	1.4		0.0	1	0.8		0.0	1	1.1
	10	39	8.3	29	12.6	6	4.4	1	62.6	3	3.1
	11-20	42	11.2	93	34.0	24	18.2		0.0	16	20.6
	21-30	2	0.3	49	18.0	7	6.7	2	37.4	6	9.5
	31-40		0.0	12	4.6	6	4.2		0.0	4	5.1
	41-50		0.0	1	0.5	7	7.2		0.0	6	6.4
	51-60		0.0		0.0	11	8.8		0.0	3	4.6
	61-70		0.0		0.0	3	2.9		0.0	1	2.7
	71-80		0.0		0.0	1	0.6		0.0		0.0
	All	360	100	268	100	126	100	3	100	71	100

HQ13d **What was the cause of your last fracture/break?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Light fall	1	101	21.5	78	32.9	53	41.6		0.0	36	44.1
Other trauma	2	24	7.7	19	6.5	9	6.9	1	62.6	8	10.4
Spontaneous	3	6	1.0	5	1.8	1	1.1		0.0	2	2.3
Road traffic accident	4	19	5.1	43	12.5	16	14.5		0.0	3	3.2
Sports injury	5	164	45.6	79	28.9	15	11.1	2	37.4	6	7.1
Hard Fall	6	74	19.0	51	17.4	33	24.8		0.0	23	32.9
	All	388	100	275	100	127	100	3	100	78	100

HQ14 **Are you on a special diet?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	18	1.8	35	4.8	53	13.4		0.0	22	7.9
No	2	1161	98.2	907	95.2	350	86.6	8	100	263	92.1
	All	1179	100	942	100	403	100	8	100	285	100

HQ15 **Has your doctor ever said that you have a cancer tumour?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	1	0.1	6	0.5	25	6.6		0.0	11	4.7
No	2	1176	99.9	936	99.5	380	93.4	8	100	274	95.3
	All	1177	100	942	100	405	100	8	100	285	100

HQ16 **Do you have any disease, condition or problem not listed?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	51	3.8	72	8.1	43	9.9		0.0	24	7.5
No	2	1122	96.2	857	91.9	348	90.1	8	100	251	92.5
	All	1173	100	929	100	391	100	8	100	275	100

HQ17   Have you any congenital abnormality?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	8	0.4	5	0.7	4	0.8		0.0	2	0.6
No	2	1135	99.6	910	99.3	384	99.2	7	100	267	99.4
	All	1143	100	915	100	388	100	7	100	269	100

HQ18   Have any of your children who were born in the last 20 years any congenital abnormality?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	3	0.2	26	3.2	4	1.6		0.0	3	0.9
No	2	1048	99.8	886	96.8	380	98.4	7	100	271	99.1
	All	1051	100	912	100	384	100	7	100	274	100

HQ19   Do you smoke cigarettes, cigars or a pipe?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	376	32.1	280	29.4	52	14.4	5	67.6	60	21.9
No	2	798	67.9	657	70.6	356	85.6	3	32.4	224	78.1
	All	1174	100	937	100	408	100	8	100	284	100

HQ19a_D   If yes, cigarettes/cigars per day?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
	0	3	0.8	1	0.1		0.0		0.0	1	2.1
	1	8	2.4	7	3.0	2	2.2		0.0	1	1.0
	2	14	5.0	8	2.5	1	1.1		0.0		0.0
	3	13	2.9	6	2.3	4	6.9		0.0	2	2.9
	4	11	2.2	6	2.5	1	3.7		0.0		0.0
	5	51	13.9	15	5.0	1	2.0		0.0	2	1.9
	6	14	3.7	5	1.1	2	5.8		0.0	1	1.2
	7	8	1.8	1	0.6	2	5.1		0.0	2	4.1
	8	9	3.0	3	0.8	1	3.7		0.0	1	2.2
	9	1	0.1		0.0		0.0		0.0		0.0
	10	123	27.1	57	18.6	8	17.3		0.0	12	16.9

		Dentate 16-24 n	%	35-44 n	%	65+ n	%	Edentulous 35-44 n	%	65+ n	%
	11-20	107	34.1	124	43.9	15	34.9	3	74.3	27	52.2
	21-30	9	1.9	34	15.3	8	17.3	2	25.7	6	12.0
	31-40	3	1.1	8	4.0		0.0		0.0	2	3.4
	41-50		0.0	1	0.1		0.0		0.0		0.0
	All	**374**	**100**	**276**	**100**	**45**	**100**	**5**	**100**	**57**	**100**

HQ19b_W   If yes, oz's tobacco per week?

		Dentate						Edentulous			
		16-24		**35-44**		**65+**		**35-44**		**65+**	
		n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
	0	6	39.2	6	47.4	2	22.5				0.0
	1		0.0	2	5.1	3	26.2				0.0
	2	1	4.8		0.0	3	39.5				0.0
	3		0.0		0.0		0.0			2	45.1
	4	1	2.3		0.0		0.0			1	14.5
	5		0.0	1	1.2		0.0				0.0
	6		0.0		0.0		0.0				0.0
	7		0.0		0.0		0.0				0.0
	8		0.0		0.0		0.0				0.0
	9		0.0		0.0		0.0				0.0
	10		0.0	1	3.1		0.0			1	14.5
	11-20		0.0	3	18.6		0.0				0.0
	21-30	1	4.8		0.0	1	11.8				0.0
	31-40		0.0	1	1.2		0.0				0.0
	41-50	1	10.8		0.0		0.0				0.0
	51-60		0.0		0.0		0.0				0.0
	61-70	1	4.8	1	5.1		0.0				0.0
	71-80	1	10.8	1	7.0		0.0			1	25.9
	81-90	1	10.8		0.0		0.0				0.0
	91-100		0.0		0.0		0.0				0.0
	>100	2	11.5	4	11.4		0.0				0.0
	All	**15**	**100**	**20**	**100**	**9**	**100**			**5**	**100**

HQ20   Do you consume alcohol?

		Dentate						Edentulous			
		16-24		**35-44**		**65+**		**35-44**		**65+**	
		n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Yes	1	809	70.8	722	78.9	208	49.8	5	73.6	120	41.7
No	2	366	29.2	214	21.1	195	50.2	3	26.4	161	58.3
	All	**1175**	**100**	**936**	**100**	**403**	**100**	**8**	**100**	**281**	**100**

HQ20a **If yes, approx how many units per week do you consume? (Note: 1 unit = 1 glass or wine=1 small glass of spirits=1/2 pint of beer)**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
	0	3	0.2	3	0.4	2	2.0		0.0	1	0.7
	1	56	6.7	86	10.3	33	15.7		0.0	20	18.8
	2	69	6.4	84	12.1	27	14.8		0.0	17	15.4
	3	55	5.3	66	8.7	13	6.5		0.0	9	7.7
	4	84	11.4	81	12.0	20	10.2	1	22.5	14	14.4
	5	87	9.3	67	8.8	7	3.9	1	14.0	5	4.1
	6	84	11.8	65	8.7	18	9.3	2	55.3	10	12.0
	7	18	2.2	16	2.2	10	6.2		0.0	2	1.6
	8	61	6.2	44	6.7	10	5.7		0.0	3	2.1
	9	5	0.7	1	0.1	1	0.6		0.0	1	0.5
	10	88	13.3	66	10.3	12	5.1		0.0	8	6.4
	11-20	135	21.0	91	14.5	20	12.7	1	8.1	12	10.4
	21-30	25	3.4	16	2.9	4	1.7		0.0	3	2.2
	31-40	7	1.1	8	1.7	7	4.1		0.0		0.0
	41-50	4	0.7	1	0.3	3	1.4		0.0	1	1.6
	51-60	1	0.3		0.0		0.0		0.0	2	2.1
	61-70		0.0	1	0.3		0.0		0.0		0.0
	All	**782**	**100**	**696**	**100**	**187**	**100**	**5**	**100**	**108**	**100**

Appendix 12a and 12b
National Survey of Adult Oral Health 2000 - 2002
General Questionnaires for Dentate and Edentulous Adults

Note 1: Appendix 12a refers to the weighted results of the questionnaire for dentate adults, and Appendix 12b refers to the weighted results of the questionnaire for edentulous adults.

To be read out to subject **"The first section of the questionnaire has to do with fluoride"**

Q1   Have you ever heard of the substance fluoride?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	1061	91.1	867	93.8	355	88.3	6	79.1	226	80.0
No	2	118	8.9	77	6.2	56	11.7	2	20.9	57	20.0
	All	**1179**	**100**	**944**	**100**	**411**	**100**	**8**	**100**	**283**	**100**

Q2   Do you use fluoride toothpaste?

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Always	1	802	71.3	684	73.4	194	50.7
Sometimes	2	137	13.2	115	13.7	67	16.0
Never	3	12	1.0	8	0.9	32	8.6
Do not use toothpaste	4	5	0.3	16	2.4	16	4.7
Don't know what is in the toothpaste I use	5	222	13.7	115	8.6	81	17.8
I previously used a fluoride toothpaste but don't anymore	6	7	0.6	10	0.9	9	2.1
	All	**1185**	**100**	**948**	**100**	**399**	**100**

Q3   Which of these pictures shows the amount of toothpaste you use when you brush your teeth?

Show Card A		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Pea sized amount of toothpaste	1	120	10.6	138	14.4	120	30.5
Half a toothbrush amount	2	449	37.1	366	37.9	165	45.2
Full toothbrush amount	3	439	37.0	313	35.6	72	20.4
More than full toothbrush amount	4	173	15.3	122	12.1	14	3.9
	All	**1181**	**100**	**939**	**100**	**371**	**100**

Q4 **Have you ever heard about water fluoridation i.e. fluoride being added to public water supplies?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes (go to Q 5)	1	906	75.5	788	85.0	354	86.7	4	38.4	223	77.7
No (go to Q6)	2	275	24.5	157	15.0	55	13.3	4	61.6	59	22.3
	All	1181	100	945	100	409	100	8	100	282	100

Q5 **If 'Yes' to Q4, Where have you heard about this? Call out all options: Record two major sources of information.**

			Dentate						Edentulous			
			16-24		35-44		65+		35-44		65+	
			n	%	n	%	n	%	n	%	n	%
Q5a	Radio/TV	1	355	43.8	581	74.7	246	65.2	2	57.5	173	78.2
	Newspapers/ magazines	2	91	10.6	114	15.3	84	26.9	2	15.6	38	16.5
	Internet	3	7	0.7	1	0.2						
	Dentist, doctor, health care professional	4	24	3.6	26	3.2	10	2.5	1	26.9	2	1.1
	Family/Friends	5	71	11.0	28	4.2	15	5.2			9	3.6
	School	6	258	30.2	18	2.0	1	0.2			1	0.2
	Other, please specify	7	2	0.1	4	0.5	1	0.1			1	0.3
		All	808	100	772	100	357	100	4	100	224	100

			Dentate						Edentulous			
			16-24		35-44		65+		35-44		65+	
			n	%	n	%	n	%	n	%	n	%
Q5b	Radio/TV	1	102	13.9	50	8.2	40	15.8	1	38.4	13	6.8
	Newspapers/ magazines	2	158	19.1	339	61.9	154	55.7	1	61.6	109	69.7
	Internet	3	4	0.8	3	0.5						
	Dentist, doctor, health care professional	4	30	5.9	31	6.3	19	6.9			14	10.0
	Family/Friends	5	63	10.3	58	11.7	39	17.8			14	9.3
	School	6	318	49.6	48	9.7	5	2.2			2	1.6
	Other, please specify	7	5	0.4	16	1.6	8	1.7			5	2.6
		All	680	100	545	100	265	100	2	100	157	100

Q6 **What do you think is the purpose of adding fluoride to public water supplies?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
To purify water	1	175	16.2	261	26.6	108	27.9	4	64.6	87	30.4
To reduce tooth decay	2	721	61.4	492	55.6	209	51.0	3	32.4	101	35.6
To improve the taste of water	3	28	3.0	30	3.0	8	2.0			8	2.6
Don't know	4	239	19.0	154	14.4	79	18.2	1	2.9	82	31.2
Other, please specify	5	5	0.4	4	0.3	4	0.8			1	0.2
	All	1168	100	941	100	408	100	8	100	279	100

Q7 **What do you think is the purpose of adding fluoride to toothpaste?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
To whiten teeth	1	83	8.1	76	9.9	28	7.4	76		29	10.0
To reduce tooth decay	2	901	75.9	726	78.1	266	65.2	726	46.7	137	48.2
To improve the taste of the toothpaste	3	8	1.1	16	1.6	4	1.2	16	9.5	6	2.2
Don't know	4	181	14.5	117	9.9	104	25.3	117	43.8	101	37.9
Other, please specify	5	5	0.5	7	0.5	6	0.9	7		8	1.8
	All	1178	100	942	100	408	100	942	100	281	100

To be read out to subject "The next few questions have to do with tooth brushing /oral hygiene practices and diet"

Q8 **How often do you brush your teeth?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Twice/day or more	1	851	68.5	695	71.0	209	52.0
Once/day	2	269	26.2	204	23.8	138	35.0
A few times a week	3	49	3.6	35	3.6	27	6.3
About once a week	4	14	1.5	11	1.0	11	2.2
Never	5	4	0.2	7	0.6	16	4.5
	All	1187	100	952	100	401	100

Q9 **Which of these pictures best illustrates how you rinse your mouth out after brushing your teeth?**

Show Card B		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Using toothbrush	1	238	20.1	212	20.7	105	29.4
Putting mouth to tap	2	438	40.4	270	35.1	75	18.9
Cupping hands to hold water for rinsing	3	190	16.1	131	13.3	40	11.4
Using a cup or glass	4	302	23.4	322	30.9	151	40.2
	All	1168	100	935	100	371	100

Q10   **Do you regularly use any of the following to clean your teeth? Tick all that apply**

			Dentate					
			16-24		35-44		65+	
			n	%	n	%	n	%
Q10a	Toothbrush	1	1175	98.9	939	98.0	381	91.4
Q10b	Toothpicks	2	128	13.7	172	20.4	88	20.6
Q10c	Interdental brush	3	39	3.6	50	5.0	15	3.7
Q10d	Thread (Dental Floss)	4	297	25.7	334	33.0	52	12.1
Q10e	Mouthrinse	5	354	28.1	256	27.5	68	17.5
Q10f	None	6	10	0.8	9	1.0	13	3.4
		All	**1187**	**100**	**955**	**100**	**413**	**100**

Q11   **Have you ever had your teeth cleaned by a dental hygienist?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Regularly	1	30	3.3	103	9.6	20	4.7
Occasionally	2	74	6.7	111	13.1	23	6.5
Once or twice	3	214	20.1	117	12.2	36	10.0
Never	4	686	61.4	531	59.2	268	71.4
Never/ don't know what a hygienist is	5	149	8.5	65	6.0	45	7.5
	All	**1153**	**100**	**927**	**100**	**392**	**100**

Q12   **Do you drink at least once a day any of the following. Please tick all that apply.**

			Dentate					
			16-24		35-44		65+	
			n	%	n	%	n	%
Q12a	Pure fruit juice	1	526	44.8	358	37.3	141	34.9
Q12b	Fizzy soft drinks	2	664	56.5	203	23.4	53	12.9
Q12c	Carbonated water	3	188	16.0	183	21.5	57	15.5
Q12d	Other types of soft drinks	4	175	14.6	65	7.5	20	3.9
Q12e	None of the above	5	158	13.0	333	31.5	172	38.8
		All	1187		955		413	

Q13 **How many times a day do you eat sweet foods or drink sweet drinks (such as biscuits, cakes, sweets, Coca-Cola, Pepsi cola, 7UP, tea with sugar etc) between normal meals?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Never	1	105	8.7	209	21.5	156	37.5
Once a day	2	368	31.1	344	37.7	127	32.4
Twice a day	3	335	28.2	205	21.2	66	17.6
Three times a day	4	190	15.7	94	9.9	24	6.3
Four times a day	5	97	7.9	50	4.7	8	2.4
Five times a day	6	41	3.6	14	1.5	5	1.6
Six times a day	7	13	0.9	7	1.0	1	0.1
Seven or more times a day	8	22	2.5	19	2.1	3	0.6
Don't know	9	15	1.3	5	0.3	8	1.5
	All	1186	100	947	100	398	100

Q14 **When you were a child (under 16 yrs) what was your reason for going to the dentist? Call out all options.**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
For regular check-up (every 6-18 months)	1	295	28.5	154	16.7	27	7.8			7	2.5
For occasional check-up	2	146	14.8	66	8.0	17	4.5			11	5.8
When called to school dentist	3	547	39.5	397	38.6	77	18.9	3	21.0	48	15.8
Only with trouble	4	182	15.2	297	32.7	209	51.3	5	79.0	164	55.0
Never attended	5	16	2.0	39	3.9	82	17.5			55	20.9
	All	1186	100	953	100	412	100	8	100	285	100

Q15a **If you had a painful back tooth would you prefer it to be filled or taken out?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Filled	1	836	65.7	685	70.6	232	57.8
Taken Out	2	191	19.3	198	21.5	124	32.6
Don't know	3	69	6.8	24	3.4	19	4.8
Wouldn't bother me. Either option okay	4	80	7.3	37	3.7	18	4.3
Taken out and replaced if possible	5	10	0.9	8	0.8	2	0.5
	All	1186	100	952	100	395	100

Q15b **How about a front tooth?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Filled	1	1078	90.0	856	89.6	307	76.6
Taken Out	2	17	1.9	39	4.7	60	15.7
Don't know	3	34	2.9	11	1.1	13	2.9
Wouldn't bother me. Either option okay	4	17	1.6	10	1.0	14	3.6
Taken out and replaced if possible	5	40	3.5	37	3.6	6	1.1
	All	1186	100	953	100	400	100

Q16 **Does your mouth ever feel dry?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Never	1	516	40.5	493	49.9	202	47.8			123	39.9
Occasionally	2	612	54.8	397	44.1	168	41.1	6	59.3	122	47.2
Regularly	3	57	4.7	64	6.0	42	11.1	2	40.7	41	12.9
	All	1185	100	954	100	412	100	8	100	286	100

Q17a **Are your teeth sensitive?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
No(go to Q18)	1	646	55.5	458	50.8	254	65.7
Yes (go to Q17b)	2	539	44.5	487	49.2	144	34.3
	All	1185	100	945	100	398	100

Q17b **If 'Yes' to Q17 a), Are your teeth sensitive**

Q17b_1 **when drinking/eating something cold?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Yes	1	488	81.2	436	84.3	114	72.2
No	2	79	18.8	85	15.7	41	27.8
	All	567	100	521	100	155	100

Q17b_2 **when eating/drinking something hot?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Yes	1	101	20.6	129	27.8	29	17.5
No	2	426	79.4	350	72.2	118	82.5
	All	527	100	479	100	147	100

Q17b_3   **when eating/drinking something sweet?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Yes	1	130	23.4	120	24.5	29	19.4
No	2	404	76.6	361	75.5	118	80.6
	All	534	100	481	100	147	100

Q18a   **Do you have either a partial or full denture?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Yes (go to Q18b)	1	28	2.4	163	17.7	245	62.1
No (go to Q18c)	2	1120	97.6	774	82.3	154	37.9
	All	1148	100	937	100	399	100

Q18b   **If 'Yes' to Q18a), When do you wear your dentures? One answer only**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
All the time day and night	1	14	47.0	102	68.3	91	38.5
All day but not in bed	2			44	23.7	125	49.2
Only when going out	3	1	20.7	1	0.6	13	4.4
Only when at home	4					1	0.8
Only when eating	5			1	0.5	1	0.4
Only when eating and going out	6					2	1.0
Never	7	4	32.3	11	6.8	13	5.8
	All	19	100	159	100	246	100

Q18c   **If 'No' to Q18a, Do you find the thought of wearing a partial denture**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Very upsetting?	1	391	32.6	261	30.6	42	19.0
A little upsetting?	2	417	35.7	297	38.9	59	30.0
Not at all upsetting?	3	340	31.7	236	30.5	84	50.9
	All	1148	100	794	100	185	100

Question to be posed to all respondents

Q19 **How would you feel if you lost all of your natural teeth and had to wear full dentures upper and lower?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Very Happy	1	10	1.1	6	0.8	5	0.9
Happy	2	4	0.4	4	0.4	8	1.9
Wouldn't bother me	3	118	10.5	155	17.3	137	37.0
Upset	4	287	25.0	225	23.5	129	29.7
Very Upset	5	767	63.1	558	58.0	120	30.5
	All	**1186**	**100**	**948**	**100**	**399**	**100**

Q20 **Do you think you will always have some of your own natural teeth?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Yes (hopefully)	1	1095	91.3	852	89.9	325	80.0
No	2	39	3.9	47	4.8	33	8.3
Don't know	3	50	4.7	51	5.4	43	11.7
	All	**1184**	**100**	**950**	**100**	**401**	**100**

Q21 **How do you feel about the colour of your teeth?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Very satisfied	1	79	7.0	48	4.6	31	7.3
Satisfied	2	588	51.1	435	46.0	165	40.4
Doesn't concern me	3	129	10.9	93	11.4	96	25.2
Dissatisfied	4	356	27.8	326	32.3	92	23.2
Very Dissatisfied	5	34	3.2	49	5.7	13	3.9
	All	**1186**	**100**	**951**	**100**	**397**	**100**

Q22 **How do you feel about the position/alignment of your teeth?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Very satisfied (go to Q24a)	1	205	17.1	130	13.4	55	12.5
Satisfied (go to Q24a)	2	572	45.0	493	51.4	190	47.8
Doesn't concern me (go to Q24a)	3	97	9.4	100	12.2	106	28.7
Dissatisfied (go to Q23a & 23b)	4	260	24.1	181	19.2	40	10.3
Very Dissatisfied (go to Q23a & 23b)	5	51	4.4	40	3.8	3	0.7
	All	**1185**	**100**	**944**	**100**	**394**	**100**

Q23a   **Would you be willing to wear a brace to straighten your teeth?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Yes	1	257	58.5	144	48.9	11	14.3
No	2	103	24.6	113	39.8	51	56.1
Haven't ever thought about it	3	41	8.7	36	11.0	25	29.6
Currently undergoing ortho treatment (go to Q24)	4	36	8.3	3	0.3		
	All	**437**	**100**	**296**	**100**	**87**	**100**

Q23b   **What stops you from having orthodontic treatment: braces to straighten your teeth?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Cost	1	111	38.7	58	27.5	1	1.3
Too old	2	60	27.1	109	54.6	51	85.1
Embarrassed	3	60	18.1	24	10.3	3	7.9
Other, please specify	4	59	16.0	24	7.7	4	5.7
	All	**290**	**100**	**215**	**100**	**59**	**100**

Q24a   **Have you had orthodontic treatment in the past: braces or appliances to straighten your teeth?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Yes (go to Q24b)	1	277	25.6	117	13.2	10	2.8
No (go to Q25a)	2	835	70.5	797	86.7	359	97.2
Currently under ortho treatment (go to Q24b)	3	40	4.0	1			
	All	**1152**	**100**	**915**	**100**	**369**	**100**

For people who give answers 1 or 3, ask both questions 24b) and c)

Q24b   **What kind of clinic was the treatment provided at? Private or public?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Private	1	149	49.3	54	51.1	10	100
Public	2	164	50.1	59	48.9		
Can't remember	3	4	0.6				
	All	**317**	**100**	**113**	**100**	**10**	**100**

Q24c **Did you have teeth taken out for this treatment?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Yes	1	214	63.4	81	70.6	4	18.0
No	2	112	34.7	34	26.5	7	73.6
Can't remember	3	5	1.9	3	2.9	1	8.4
	All	**331**	**100**	**118**	**100**	**12**	**100**

Question to be posed to all respondents

Q25a **Did you have any teeth taken out during the past year?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes (go to Q25b)	1	101	8.9	93	9.8	48	13.0	2	49.2	8	3.3
No (go to Q26)	2	1067	91.1	843	90.2	358	87.0	6	50.8	276	96.7
	All	**1168**	**100**	**936**	**100**	**406**	**100**	**8**	**100**	**284**	**100**

Q25b **If 'Yes' to Q25a, Why was the tooth taken out?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Pain due to decay	1	58	53.8	55	58.5	29	62.3	1	76.8	9	75.9
Loose due to gum disease	2	2	1.5	18	22.2	15	32.2			1	5.1
Accident/trauma	3	4	7.4	2	2.7						
Crowding/to straighten teeth (no braces fitted)	4	8	2.7	1	0.5						
Orthodontics (braces fitted)	5	18	16.4								
Clearance or part clearance to facilitate fitting of denture	6			1	1.5	1	1.1	1	23.2	1	9.3
Painful or impacted wisdom tooth	7	12	9.3	6	10.6						
Don't know. Dentist told me to have it out	8	3	7.2	2	1.6	1	2.5				
Other, please specify	9	2	1.7	5	2.4	2	1.9			1	9.8
	All	**107**	**100**	**90**	**100**	**48**	**100**	**2**	**100**	**12**	**100**

Q26a) **When were you last at a dentist ? number of year /mts ago.**

Q26a_years   Q26a_months

Q26a tot		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
	<6 mths	114	11.3	134	13.8	46	11.7			6	1.9
	6-12 mths	485	39.9	437	46.6	155	37.7	3	58.6	18	7.3
	12-24 mths	219	19.4	158	17.4	79	18.5	1	5.5	32	10.9
	24-36 mths	108	8.2	68	7.0	33	7.7			23	9.5
	>36 mths	232	21.3	132	15.1	93	24.4	4	35.8	201	70.4
	All	**1158**	**100**	**929**	**100**	**406**	**100**	**8**	**99.9**	**280**	**100**

Q26b) **Over the last few years how often have you attended the dentist? Call out options**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Every six months or more often	1	114	9.2	127	13.3	34	8.9			1	0.2
Every 6-12 months	2	263	22.8	261	26.8	84	19.9			4	1.4
Every 12-24 months	3	183	16.2	153	17.1	60	15.3			2	0.7
Every 2 years/ more	4	130	10.7	97	10.6	34	8.3	1	37.8	17	7.0
Occasionally	5	266	21.0	174	18.0	104	25.3	4	47.8	57	19.8
Never	6	217	20.0	128	14.2	92	22.4	3	14.4	200	70.8
	All	**1173**	**100**	**940**	**100**	**408**	**100**	**8**	**100**	**281**	**100**

Q27a **When you do go to the dentist, why do you normally go? Call out all options**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
For a check-up at least once a year (go to Q28)	1	354	30.6	415	42.4	114	29.5
For a check-up at least every two yrs (go to Q28)	2	193	15.3	116	11.1	38	8.4
When I feel I need treatment (go to Q27b)	3	278	24.4	171	18.8	90	22.4
In pain/problem (go to Q27b)	4	282	24.5	222	25.6	146	37.1
Never (go to Q27b)	5	71	5.2	23	2.1	11	2.6
	All	**1178**	**100**	**947**	**100**	**399**	**100**

QED14b **When you do go the dentist, what is the reason for you going? Call out all options**

		Edentulous			
		35-44		65+	
		n	%	n	%
For a check-up of my mouth (go to Q15)	1			5	1.7
Easing of my dentures (go to Q14c)	2	1	10.3	22	8.2
Only when I need new dentures (go to Q14c)	3	4	34.5	89	32.8
In pain/problem (go to Q14c)	4	2	49.2	55	17.8
Never (go to Q14c)	5	1	6.0	105	39.5
All		**8**	**100**	**276**	**100**

Q27b) **For people who give answers 3, 4 or 5 to Question 27a, list two answers.**

Why do you not visit a dentist regularly?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Q27b_1	I have no teeth therefore I have no need to go	0					6	2.4	6	85.0	166	65.6
	I have no problem or need for treatment	1	289	47.1	127	31.5	158	59.7	2	15.0	87	28.1
	I don't know any really good dentist	2	7	2.2	8	2.5	3	1.3			4	1.8
	I become anxious at the idea of seeing a dentist	3	94	14.5	101	24.1	18	8.4			1	0.2
	I don't have the time	4	67	11.6	39	12.3	7	2.5			1	0.2
	I don't think the dental trouble I have is serious enough to go the dentist	5	85	13.4	45	11.0	34	16.9			5	1.5
	Dental treatment is too expensive	6	42	6.8	43	8.5	8	4.0			2	0.6
	I don't want to waste my money on dental care	7	1	0.1							1	0.7
	I have bad memories of my last visit	8	9	1.3	19	6.7	5	2.1				
	The dentists surgery is too far away	9	3	0.4	1	0.1					2	0.8
	Don't want to take time off work	10	9	1.4	9	1.9	3	1.1				
	Other, please specify	11	15	1.4	8	1.4	6	1.6			1	0.3

			n	%	n	%	n	%	n	%	n	%
Dentist doesn't have downstairs surgery to facilitate me	12										1	0.3
All			621	100	400	100	248	100	8	100	271	100

			Dentate						Edentulous			
			16-24		35-44		65+		35-44		65+	
			n	%	n	%	n	%	n	%	n	%
Q27b_2	I have no teeth therefore I have no need to go	0					1	0.6			16	9.4
	I have no problem or need for treatment	1	60	13.0	23	8.1	21	16.8	1	43.3	74	58.3
	I don't know any really good dentist	2	3	0.8	7	4.1	3	3.3			1	0.7
	I become anxious at the idea of seeing a dentist	3	29	7.8	37	11.4	9	6.4			1	0.4
	I don't have the time	4	49	11.7	27	8.7	14	8.6			6	3.0
	I don't think the dental trouble I have is serious enough to go the dentist	5	114	31.5	55	20.0	56	33.7			17	14.1
	Dental treatment is too expensive	6	68	15.2	45	15.5	19	13.4	1	29.7	12	8.6
	I don't want to waste my money on dental care	7	3	0.6	8	2.2	2	1.1				
	I have bad memories of my last visit	8	47	10.4	44	16.5	6	5.0			2	0.8
	The dentists surgery is too far away	9	1	0.1	9	2.7	5	3.4			3	2.2
	Don't want to take time off work	10	24	7.2	18	8.6	5	3.9	1	27.0		
	Other, please specify	11	15	1.8	14	2.2	9	3.8			1	0.2
	Dentist doesn't have downstairs surgery to facilitate me	12									3	2.2
	All		413	100	287	100	150	100	3	100	136	100

Q28 **How often do you think you should actually go to the dentist?**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Every 6-12 months	1	1003	83.9	840	87.4	298	74.7
Every 18 months	2	90	7.9	44	5.0	22	6.4
Every 2 years or less	3	34	3.1	35	3.6	22	5.1
When in pain/problem	4	25	2.4	19	2.4	44	10.1
Don't know	5	34	2.6	13	1.6	15	3.7
	All	1186	100	951	100	401	100

QED15 **How often do you think you should actually go to the dentist to have your mouth and/or dentures examined?**

		Edentulous			
		35-44		65+	
		n	%	n	%
Every 6-12 months	1	2	20.9	53	17.9
Every 18 months	2			8	3.2
Every 2 years	3	2	16.3	37	12.7
When in pain/problem	4	2	22.1	71	24.6
Don't know	5	2	40.7	75	25.1
Never	6			42	16.5
	All	8	100	286	100

Q29 **Do you think dentists do all they can to make a visit pleasant and painless?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	856	73.4	705	74.1	360	87.6	7	83.4	230	80.4
No	2	40	3.5	32	3.9	6	1.7			11	4.7
Depends on the dentist	3	289	23.1	210	22.0	47	10.7	1	16.6	44	15.0
	All	1185	100	947	100	413	100	8	100	285	100

Q30 **When you visit the dentist for treatment and information, how do you usually feel?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Very satisfied	1	275	23.4	341	36.2	145	33.9	1	8.9	44	13.6
Satisfied	2	774	65.2	524	54.8	219	55.5	5	81.5	135	48.6
Dissatisfied	3	47	3.6	36	3.9	14	3.9			10	3.0
Very dissatisfied	4	12	1.3	12	1.8	4	1.4			3	1.9
Never attend the dentist	5	76	6.5	32	3.3	26	5.3	1	9.6	93	32.9
	All	1184	100	945	100	408	100	7	100	285	100

Q31 **Do you find the dental surgery you attend**

Q31a **a) A pleasant and comfortable place?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	1024	85.8	860	90.3	372	90.7	6	90.4	180	64.1
No	2	78	7.1	50	5.9	12	3.4			6	3.2
Never attend the dentist	3	78	7.1	34	3.8	24	5.9	1	9.6	92	32.7
	All	**1180**	**100**	**944**	**100**	**408**	**100**	**7**	**100**	**278**	**100**

Q31b **b) Clean and Hygienic?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	1093	92.3	900	95.3	385	94.0	6	90.4	188	67.7
No	2	10	1.0	11	1.2	2	0.7			2	0.6
Never attend the dentist	3	73	6.6	32	3.5	23	5.2	1	9.6	90	31.8
	All	**1176**	**100**	**943**	**100**	**410**	**100**	**7**	**100**	**280**	**100**

Q32a **During the last twelve months have you consulted a person other than a dentist for advice on or treatment of your teeth or gums?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes (go to Q32b)	1	94	8.1	52	5.2	16	3.8	1	12.1	16	6.4
No (go to Q33)	2	1092	91.9	899	94.8	397	96.2	5	87.9	268	93.6
	All	**1186**	**100**	**951**	**100**	**413**	**100**	**6**	**100**	**284**	**100**

Q32b **If 'Yes' to Q32a, To whom did you turn (whose advice did you seek)?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Doctor	1	26	35.1	15	34.3	8	66.2	1	100.0	7	55.9
Nurse	2	5	3.9	2	4.1	1	4.2				
Friends	3	26	34.9	4	10.5					1	6.4
Dental Technician	4	5	6.3	3	11.3	4	29.6			4	33.8
Pharmacist	5	3	2.6	1	2.9						
Other, please specify	6	15	17.3	12	36.8					1	3.9
	All	**80**	**100**	**37**	**100**	**13**	**100**	**1**	**100**	**13**	**100**

Q33 The last time you were waiting at the dentist for your turn in the chair, how did you feel?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Relaxed	1	635	54.9	505	53.3	281	66.3	4	55.4	159	52.1
A little worried	2	293	24.7	231	26.1	79	20.7	1	18.3	40	16.4
Worried	3	123	9.5	98	9.6	30	7.8	1	16.6	18	7.2
Frightened	4	62	5.3	59	5.8	5	1.3	1	9.6	15	5.7
So frightened I perspired or felt sick	5	29	2.3	49	4.0	12	3.3			2	0.7
Cannot remember/ never attended dentist	6	40	3.3	8	1.2	3	0.5			51	18.0
All		1182	100	950	100	410	100	7	100	285	100

Q34 **If you were in pain could you get free emergency dental treatment?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	217	17.7	208	21.4	201	55.9	3	42.4	138	53.6
No	2	467	41.5	510	54.0	118	24.2	3	52.9	56	17.0
Don't know	3	500	40.8	235	24.6	93	19.9	1	4.7	92	29.4
All		1184	100	953	100	412	100	7	100	286	100

Q35 **What about free routine dental treatment e.g. fillings, cleaning?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	201	15.3	208	21.4	197	54.3	3	42.4	145	55.4
No	2	548	49.0	586	61.8	137	29.7	3	52.9	55	16.5
Don't know	3	435	35.7	160	16.9	77	15.9	1	4.7	85	28.0
All		1184	100	954	100	411	100	7	100	285	100

Q36 **Do you have a medical card?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	263	19.0	194	17.3	243	65.4	3	42.4	213	79.2
No	2	920	81.0	756	82.7	169	34.6	4	57.6	73	20.8
All		1183	100	950	100	412	100	7	100	286	100

Q37a   **Have you attended a dental practice for treatment under the medical card dental scheme?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes (go to Q37b &37c)	1	174	13.5	146	16.3	138	39.9	3	42.4	87	34.7
No (go to Q38)	2	932	86.5	694	83.7	256	60.1	4	57.6	185	65.3
	All	1106	100	840	100	394	100	7	100	272	100

Q37b   **If 'Yes' to Q37a , How many times have you used the scheme in the last 2 years?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Once	1	77	58.5	54	47.5	64	49.8	1	43.2	41	76.1
1-2 times	2	33	20.7	28	22.5	29	23.5	2	56.8	7	12.7
2-4 times	3	20	8.8	23	21.0	20	18.8			2	2.0
4+ times	4	16	12.0	10	9.0	9	8.0			6	9.3
	All	146	100	115	100	122	100	3	100	56	100

Q37c   **Did you attend for**

		Dentate					
		16-24		35-44		65+	
		n	%	n	%	n	%
Emergency treatment?	1	47	34.0	54	40.9	40	33.4
Routine treatment?	2	106	55.4	48	36.6	52	39.1
Both emergency and routine?	3	21	9.3	31	20.5	18	13.9
Denture/Denture Repair?	4	1	1.3	3	2.0	20	13.6
	All	175	100	136	100	130	100

QED25 2   **Did you attend for**

		Edentulous			
		35-44		65+	
		n	%	n	%
Examination (check-up)?	1			3	3.6
Emergency treatment, pain?	2	1	43.2	5	4.3
New dentures?	3	2	56.8	66	86.0
Repair/reline?	4			3	6.2
	All	3	100	77	100

Q38 Question to be posed to all respondents

Can you get subsidised dental treatment (e.g. if eligible for the PRSI dental scheme)?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	254	23.7	424	45.4	105	27.2	2	24.9	51	19.4
No	2	518	45.7	384	40.5	198	51.3	4	58.5	144	52.7
Don't Know	3	395	30.6	130	14.1	98	21.5	1	16.6	82	27.9
	All	1167	100	938	100	401	100	7	100	277	100

Q39 **What, if any, dental scheme/system can you avail of?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Private/can't avail of any other scheme	1	493	43.0	325	35.2	120	25.2	1	26.7	43	12.4
Own PRSI dental benefit	2	198	18.8	306	34.6	47	10.9	1	9.6	18	5.7
Spouses PRSI dental benefit	3	9	0.5	75	6.7	11	2.7			11	3.9
Employers dental service	4	3	0.3	15	2.1	3	0.7				
Armed forces	5	2	0.2	6	1.1	1	0.4				
Medical Card	6	205	15.2	137	12.9	196	52.9	3	42.4	166	63.9
Eligible for both PRSI and medical card scheme	7	9	0.6	21	1.6	10	2.9			9	2.8
Don't know	8	237	20.4	50	4.8	19	3.7	1	16.6	34	10.4
Other, please specify	9	14	1.0	10	0.9	2	0.6	1	4.7	3	0.8
	All	1170	100	945	100	409	100	7	100	284	100

Q40 **Which system/service did you last use?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Private	1	586	54.0	424	46.4	195	43.6	2	43.3	129	42.9
Medical Card dental scheme	2	153	10.4	146	14.2	143	38.6	3	42.4	103	41.1
Own PRSI dental benefit	3	118	12.3	270	28.9	51	12.2	1	9.6	27	9.0
Spouses PRSI dental benefit	4	1	0.1	59	5.4	10	2.7			8	2.2
Employers dental service	5	4	0.4	12	1.6	3	0.7	1	4.7	3	0.9
Armed forces	6	6	0.6	6	1.1						
Dental Hospital	7	10	1.0	2	0.3	3	0.8			1	0.4
School dentist	8	277	20.4	8	1.0					1	0.2
Other, please specify	9	11	0.9	17	1.2	5	1.4			12	3.3
	All	1166	100	944	100	410	100	7	100	284	100

Q41 **Are you satisfied with the availability of information on the medical card dental scheme or the PRSI dental scheme concerning (Please answer all questions)**

Q41a **a) Where to find information on the system other than from the dentist?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	221	18.0	246	26.3	174	44.5	4	64.2	113	44.3
No	2	482	42.2	443	46.2	132	32.6	1	6.0	89	31.0
Don't care/not relevant to me	3	455	39.8	243	27.5	102	22.8	3	29.8	72	24.8
	All	1158	100	932	100	408	100	8	100	274	100

Q41b **b) Which dentists operate the system?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	211	16.7	272	29.0	176	45.8	4	64.2	102	40.0
No	2	474	42.0	406	42.8	123	29.6	1	6.0	104	36.5
Don't care/not relevant to me	3	459	41.3	243	28.1	108	24.6	3	29.8	67	23.5
	All	1144	100	921	100	407	100	8	100	273	100

Q41c   **c) How to join the system?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	214	16.7	288	30.0	172	44.4	4	64.2	105	42.5
No	2	490	43.6	394	42.0	123	31.0	1	6.0	97	35.5
Don't care/not relevant to me	3	444	39.8	233	28.0	107	24.6	3	29.8	64	21.9
	All	1148	100	915	100	402	100	8	100	266	100

Q41d   **d) How your rights are protected within the system?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	148	12.2	192	23.0	131	33.5	4	64.2	89	36.5
No	2	550	47.0	481	47.5	161	40.5	1	6.0	111	38.8
Don't care/not relevant to me	3	457	40.7	256	29.5	117	26.0	3	29.8	71	24.6
	All	1155	100	929	100	409	100	8	100	271	100

Q41e   **e) Where to complain if you are not satisfied?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	153	12.4	176	21.0	108	26.1	3	58.6	85	33.8
No	2	558	47.7	503	50.6	184	47.0	2	11.5	116	41.8
Don't care/not relevant to me	3	446	39.9	252	28.4	117	26.9	3	29.8	70	24.4
	All	1157	100	931	100	409	100	8	100	271	100

Q42   **Now we would like to know whether you are satisfied with services offered by the system you accessed last?**

Q42a   **a) Were you satisfied with the service you received last?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	953	81.2	802	82.9	347	84.6	7	83.4	221	80.9
No	2	77	7.0	63	8.3	21	6.4			21	6.6
Don't care/not relevant to me	3	145	11.8	79	8.9	36	8.9	1	16.6	35	12.5
	All	1175	100	944	100	404	100	8	100	277	100

Q42b **b) Did you find it difficult to find a dentist who would treat you?**

| | | Dentate | | | | | | Edentulous | | | |
| | | 16-24 | | 35-44 | | 65+ | | 35-44 | | 65+ | |
		n	%	n	%	n	%	n	%	n	%
Yes	1	96	7.3	134	14.0	44	10.0			23	7.6
No	2	932	80.7	730	77.6	328	82.5	7	83.4	216	79.5
Don't care/not relevant to me	3	148	12.0	80	8.4	32	7.6	1	16.6	37	12.9
All		**1176**	**100**	**944**	**100**	**404**	**100**	**8**	**100**	**276**	**100**

Q42c **c) If you paid for your treatment were you satisfied with the cost of the treatment provided?**

| | | Dentate | | | | | | Edentulous | | | |
| | | 16-24 | | 35-44 | | 65+ | | 35-44 | | 65+ | |
		n	%	n	%	n	%	n	%	n	%
Yes	1	365	35.0	474	51.9	184	45.8	2	8.9	120	39.8
No	2	173	16.2	205	23.2	48	13.0	1	10.3	27	10.9
Didn't have to pay	3	504	39.4	223	22.2	133	39.0	4	43.0	114	45.2
Don't care/not relevant to me	4	112	9.4	26	2.7	10	2.3	1	37.8	11	4.1
All		**1154**	**100**	**928**	**100**	**375**	**100**	**8**	**100**	**272**	**100**

Q43 **For persons who accessed the PRSI dental scheme or the medical card dental scheme – see Q40 (Answers 2,3 and 4)**

a) To date are you satisfied with the range of treatments covered under the scheme?

| | | Dentate | | | | | | Edentulous | | | |
| | | 16-24 | | 35-44 | | 65+ | | 35-44 | | 65+ | |
		n	%	n	%	n	%	n	%	n	%
Yes(go to Q 44)	1	237	79.6	266	63.0	148	84.5	4	91.4	124	94.2
No(go to part b)	2	57	20.4	177	37.0	27	15.5	1	8.6	11	5.8
All		**294**	**100**	**443**	**100**	**175**	**100**	**5**	**100**	**135**	**100**

To be read out to subject:
"The next set of questions are about how your oral health (that is your teeth, gums, mouth and/or false teeth) may affect your quality of life. Remember there are no right or wrong answers."

Show Card C after part a) of each question. If an effect, show Card D after part b) of each question.

If no effect, do not ask part b) of the question

Q44 a)

Q44a_1 **a) What effect does your oral health have on your eating or enjoyment of food?**

| | | Dentate | | | | | | Edentulous | | | |
| | | 16-24 | | 35-44 | | 65+ | | 35-44 | | 65+ | |
		n	%	n	%	n	%	n	%	n	%
Bad effect	1	83	8.1	112	11.1	49	10.8	3	59.9	42	15.5
No effect	2	870	71.3	652	67.7	287	70.9	4	28.7	196	69.5
Good effect	3	231	20.6	181	21.2	71	18.3	1	11.4	40	15.0
All		**1184**	**100**	**945**	**100**	**407**	**100**	**8**	**100**	**278**	**100**

Q44a_2 **b) If it <u>has an effect</u>, How would you rate the impact of this effect on your quality of life?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Little impact	1	83	30.4	54	20.1	24	20.4	2	69.0	15	21.5
Moderate impact	2	112	32.5	106	35.7	52	48.1	2	31.0	29	35.0
Great impact	3	93	30.1	109	38.2	34	24.9			29	36.0
Extreme impact	4	25	6.9	23	5.9	9	6.5			7	7.5
	All	313	100	292	100	119	100	4	100	80	100

Q44 b)

Q44b_1 **a) What effect does your oral health have on your appearance?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Bad effect	1	152	13.8	144	14.1	44	10.6	2	8.9	20	5.8
No effect	2	692	57.2	528	54.5	279	67.8	5	79.7	204	75.2
Good effect	3	340	29.1	275	31.5	82	21.6	1	11.4	53	19.0
	All	1184	100	947	100	405	100	8	100	277	100

Q44b_2 **b) If it <u>has an effect</u>, How would you rate the impact of this effect on your quality of life?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Little impact	1	97	20.1	66	17.4	29	22.7	1	14.4	16	21.8
Moderate impact	2	209	45.8	166	43.1	40	36.2	1	56.1	24	31.2
Great impact	3	131	23.6	144	31.9	47	36.8	1	29.5	21	32.3
Extreme impact	4	43	10.5	37	7.6	7	4.3			8	14.6
	All	480	100	413	100	123	100	3	100	69	100

Q44 c)

Q44c_1 **a) What effect does your oral health have on your speech?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Bad effect	1	30	2.8	36	3.5	37	8.9	2	54.4	17	5.1
No effect	2	973	82.2	739	77.0	317	78.4	6	45.6	229	82.8
Good effect	3	181	15.0	171	19.5	51	12.6			31	12.1
	All	1184	100	946	100	405	100	8	100	277	100

Q44c_2 b) If it <u>has an effect</u>, How would your rate the impact of this effect on your quality of life?

		Dentate						Edentulous			
		16-24		**35-44**		**65+**		**35-44**		**65+**	
		n	%	n	%	n	%	n	%	n	%
Little impact	1	24	12.9	13	8.0	20	21.9			7	15.6
Moderate impact	2	86	43.6	84	44.9	33	39.6	2	100	13	25.2
Great impact	3	67	28.3	80	36.6	25	30.2			22	53.3
Extreme impact	4	36	15.2	28	10.4	9	8.2			3	5.9
	All	**213**	**100**	**205**	**100**	**87**	**100**	**2**	**100**	**45**	**100**

Q44d)

Q44d_1 a) What effect does your oral health have on your comfort?

		Dentate						Edentulous			
		16-24		**35-44**		**65+**		**35-44**		**65+**	
		n	%	n	%	n	%	n	%	n	%
Bad effect	1	92	7.9	86	9.3	40	10.4	4	38.4	33	10.9
No effect	2	862	72.7	665	67.7	310	75.6	4	61.6	203	73.6
Good effect	3	230	19.4	196	23.0	56	14.0			41	15.5
	All	**1184**	**100**	**947**	**100**	**406**	**100**	**8**	**100**	**277**	**100**

Q44d_2 b) If it <u>has an effect</u>, How would you rate the impact of this effect on your quality of life?

		Dentate						Edentulous			
		16-24		**35-44**		**65+**		**35-44**		**65+**	
		n	%	n	%	n	%	n	%	n	%
Little impact	1	68	23.0	32	14.5	20	21.5			8	9.1
Moderate impact	2	116	36.1	107	39.6	31	36.4	2	70.1	24	30.6
Great impact	3	94	26.3	94	33.8	33	31.8	1	15.6	33	51.8
Extreme impact	4	46	14.6	45	12.0	10	10.3	1	14.3	5	8.6
	All	**324**	**100**	**278**	**100**	**94**	**100**	**4**	**100**	**70**	**100**

Q44 e)

Q44e_1 a) What effect does your oral health have on your breath odour?

		Dentate						Edentulous			
		16-24		**35-44**		**65+**		**35-44**		**65+**	
		n	%	n	%	n	%	n	%	n	%
Bad effect	1	124	10.5	154	15.9	45	9.4			9	3.8
No effect	2	852	71.6	622	64.3	327	82.9	8	100.0	246	88.6
Good effect	3	208	17.9	171	19.8	34	7.7			22	7.6
	All	**1184**	**100**	**947**	**100**	**406**	**100**	**8**	**100**	**277**	**100**

Q44e_2 b) If it has an effect, How would you rate the impact of this effect on your quality of life?

		Dentate						Edentulous			
		16-24		35-44		65+				65+	
		n	%	n	%	n	%	n	%	n	%
Little impact	1	69	18.9	55	16.2	16	16.8			6	17.0
Moderate impact	2	126	39.1	112	37.1	18	28.3			8	29.4
Great impact	3	83	27.4	98	31.9	34	45.5			9	35.5
Extreme impact	4	51	14.5	57	14.8	10	9.4			5	18.0
	All	329	100	322	100	78	100			28	100

Q44 f)

Q44f_1 a) What effect does your oral health have on your general health?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Bad effect	1	25	2.1	32	3.6	16	3.6			4	1.0
No effect	2	966	80.6	736	76.4	343	86.8	8	100	235	85.6
Good effect	3	193	17.3	178	20.0	45	9.7			37	13.4
	All	1184	100	946	100	404	100	8	100	276	100

Q44f_2 b) If it has an effect, How would you rate the impact of this effect on your quality of life?

		Dentate						Edentulous			
		16-24		35-44		65+				65+	
		n	%	n	%	n	%	n	%	n	%
Little impact	1	34	15.7	15	10.7	9	12.6				
Moderate impact	2	78	40.4	72	32.7	17	36.0			17	40.1
Great impact	3	84	34.5	91	43.7	28	44.4			19	54.2
Extreme impact	4	25	9.4	30	12.9	6	6.9			3	5.7
	All	221	100	208	100	60	100			39	100

Q44 g)

Q44g_1 a) What effect does your oral health have on your smiling or laughing?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Bad effect	1	137	13.4	136	14.2	35	8.0	2	54.4	20	7.1
No effect	2	730	60.4	580	59.1	314	77.6	5	34.3	217	75.6
Good effect	3	317	26.1	232	26.7	57	14.5	1	11.4	46	17.3
	All	1184	100	948	100	406	100	8	100	283	100

Q44g_2   b) If it <u>has an effect</u>, How would you rate the impact of this effect on your quality of life?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Little impact	1	59	15.9	39	12.0	13	10.7			7	12.0
Moderate impact	2	150	32.3	138	41.1	23	32.9	3	100	23	36.8
Great impact	3	158	33.9	111	30.9	44	46.5			28	43.0
Extreme impact	4	79	17.9	68	16.0	11	9.9			5	8.2
	All	446	100	356	100	91	100	3	100	63	100

Q44 h)

Q44h_1   a) What effect does your oral health have on your social life?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Bad effect	1	36	3.2	45	4.8	19	3.9	2	22.6	5	2.0
No effect	2	924	77.2	721	74.5	339	84.0	6	77.4	239	84.1
Good effect	3	224	19.6	182	20.7	46	12.0			38	13.9
	All	1184	100	948	100	404	100	8	100	282	100

Q44h_2   b) If it <u>has an effect</u>, How would you rate the impact of this effect on your quality of life?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Little impact	1	23	12.5	15	9.8	11	17.8			5	17.2
Moderate impact	2	80	29.7	84	40.1	12	22.0	1	73.4	13	35.7
Great impact	3	108	37.5	88	36.4	36	54.1	1	26.6	18	34.5
Extreme impact	4	48	20.3	35	13.7	5	6.1			5	12.6
	All	259	100	222	100	64	100	2	100	41	100

Q44 i)

Q44i_1   a) What effect does your oral health have on your romantic relationships?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Bad effect	1	30	2.9	19	2.5	6	1.3	2	22.6	2	0.5
No effect	2	918	77.0	753	77.4	357	89.3	6	77.4	256	91.9
Good effect	3	235	20.1	176	20.1	37	9.4			24	7.6
	All	1183	100	948	100	400	100	8	100	282	100

Q44i_2 **b) If it <u>has an effect</u>, How would you rate the impact of this effect on your quality of life?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Little impact	1	21	8.6	12	10.4	6	15.0			3	20.0
Moderate impact	2	83	34.3	64	33.8	9	22.2	1	73.4	7	26.7
Great impact	3	94	35.3	77	38.7	25	55.3	1	26.6	11	43.8
Extreme impact	4	68	21.8	38	17.0	4	7.5			3	9.6
	All	266	100	191	100	44	100	2	100	24	100

Q44 j)

Q44j_1 **a) What effect does your oral health have on your work or ability to do your usual jobs?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Bad effect	1	12	1.4	14	1.9	6	1.3			3	1.1
No effect	2	1056	89.0	809	84.6	373	92.2	8	100.0	257	90.3
Good effect	3	115	9.6	123	13.5	28	6.6			23	8.5
	All	1183	100	946	100	407	100	8	100	283	100

Q44j_2 **b) If it <u>has an effect</u>, How would you rate the impact of this effect on your quality of life?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Little impact	1	14	11.2	10	10.2	3	6.1			3	19.5
Moderate impact	2	48	38.0	49	36.1	5	17.5			9	39.8
Great impact	3	44	34.3	53	37.4	21	62.0			9	29.3
Extreme impact	4	27	16.6	24	16.2	4	14.5			3	11.4
	All	133	100	136	100	33	100			24	100

Q44 k)

Q44k_1 **a) What effect does your oral health have on your finances?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Bad effect	1	74	6.5	108	11.9	26	5.7	3	27.7	7	2.5
No effect	2	1075	90.1	788	81.5	368	91.5	5	72.3	266	94.2
Good effect	3	34	3.4	49	6.5	13	2.8			10	3.3
	All	1183	100	945	100	407	100	8	100	283	100

Q44k_2   b) If it <u>has an effect</u>, How would you rate the impact of this effect on your quality of life?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Little impact	1	12	12.0	30	21.8	6	14.6			2	14.4
Moderate impact	2	37	36.3	52	37.0	13	32.3	1	21.6	5	33.3
Great impact	3	36	32.6	54	31.2	17	46.3	2	78.4	5	31.5
Extreme impact	4	27	19.2	22	9.9	3	6.8			2	20.8
	All	112	100	158	100	39	100	3	100	14	100

Q44 l)

Q44l_1   a) What effect does your oral health have on your ability to relax or sleep?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Bad effect	1	26	2.9	28	2.6	7	2.0			4	1.4
No effect	2	1063	88.9	827	87.5	375	92.3	8	100	264	93.1
Good effect	3	95	8.2	91	10.0	25	5.8			15	5.5
	All	1184	100	946	100	407	100	8	100	283	100

Q44l_2   b) If it <u>has an effect</u>, How would you rate the impact of this effect on your quality of life?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Little impact	1	21	18.3	18	19.2	6	19.4				
Moderate impact	2	49	40.7	43	35.1	6	19.9			9	54.6
Great impact	3	36	24.5	41	37.4	16	45.1			6	33.6
Extreme impact	4	18	16.5	18	8.4	5	15.6			3	11.8
	All	124	100	120	100	33	100			18	100

Q44 m)

Q44m_1   a) What effect does your oral health have on your confidence?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Bad effect	1	75	6.4	80	8.3	25	6.5	1	16.6	8	3.1
No effect	2	880	73.5	689	72.1	331	81.5	7	83.4	242	84.7
Good effect	3	229	20.1	177	19.6	51	12.0			31	12.1
	All	1184	100	946	100	407	100	8	100	281	100

Q44m_2 **b) If it <u>has an effect</u>, How would you rate the impact of this effect on your quality of life?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Little impact	1	48	15.7	22	10.4	12	20.5			3	10.0
Moderate impact	2	112	36.6	92	38.1	22	25.7	1	100	14	48.2
Great impact	3	101	30.8	94	35.1	35	46.9			16	31.5
Extreme impact	4	42	16.9	43	16.5	7	6.9			6	10.3
	All	303	100	251	100	76	100	1	100	39	100

Q44 n)

Q44n_1 **a) What effect does your oral health have on your carefree manner (lack of worry)?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Bad effect	1	38	3.3	52	5.7	7	1.3	1	16.6	5	2.1
No effect	2	1016	85.2	770	79.5	358	89.0	7	83.4	254	89.2
Good effect	3	128	11.5	125	14.8	41	9.7			22	8.7
	All	1182	100	947	100	406	100	8	100	281	100

Q44n_2 **b) If it <u>has an effect</u>, How would you rate the impact of this effect on your quality of life?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Little impact	1	17	8.2	24	16.7	7	16.2			1	8.2
Moderate impact	2	76	52.7	57	34.3	11	20.9	1	100	11	52.0
Great impact	3	52	22.7	58	31.3	24	51.0			11	30.3
Extreme impact	4	23	16.4	32	17.6	7	12.0			3	9.4
	All	168	100	171	100	49	100	1	100	26	100

Q44 o)

Q44o_1 **a) What effect does your oral health have on your mood?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Bad effect	1	24	2.3	37	4.1	11	2.1			8	3.2
No effect	2	1051	87.3	801	83.8	368	91.9	8	100	255	90.2
Good effect	3	103	10.4	107	12.1	26	6.1			18	6.6
	All	1178	100	945	100	405	100	8	100	281	100

Q44o_2 b) If it <u>has an effect</u>, How would you rate the impact of this effect on your quality of life?

		Dentate						Edentulous			
		16-24		35-44		65+				65+	
		n	%	n	%	n	%	n	%	n	%
Little impact	1	18	13.9	16	13.4	3	5.8			1	8.7
Moderate impact	2	46	39.5	57	39.9	12	36.7			11	40.2
Great impact	3	48	35.1	50	35.5	18	52.6			10	36.7
Extreme impact	4	17	11.5	20	11.1	3	4.8			4	14.3
	All	129	100	143	100	36	100			26	100

Q44 p)

Q44p_1 a) What effect does your oral health have on your personality?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Bad effect	1	12	1.2	28	2.9	9	1.5			3	0.9
No effect	2	1044	88.2	785	82.1	361	90.2	8	100	256	91.2
Good effect	3	121	10.6	132	15.1	35	8.3			22	8.0
	All	1177	100	945	100	405	100	8	100	281	100

Q44p_2 b) If it <u>has an effect</u>, how would you rate the impact of this effect on your quality of life?

		Dentate						Edentulous			
		16-24		35-44		65+				65+	
		n	%	n	%	n	%	n	%	n	%
Little impact	1	18	13.3	14	12.1	7	12.1			1	4.7
Moderate impact	2	50	40.4	60	32.5	8	24.3			9	46.8
Great impact	3	45	27.9	57	41.0	26	60.4			13	44.9
Extreme impact	4	20	18.3	25	14.5	2	3.2			1	3.6
	All	133	100	156	100	43	100			24	100

To be read out to subject "This is the last section and it is about you yourself. All information collected is confidential"

Q45   How long have you lived at your present address? _____Years

What is your present address?_____

_____

Q45a   Water supply of present address?

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Piped Public	1	850	80.8	705	80.1	319	82.3	7	90.5	219	82.5
Private	2	212	12.0	150	11.9	61	12.4	1	9.5	42	10.6
Group Scheme	3	87	6.9	84	8.0	25	5.3			17	6.9
Other	4	5	0.3	1							
	All	1154	100	940	100	405	100	8	100	278	100

Q45b   **Water supply of previous address?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Piped Public	1	343	88.5	631	86.8	210	82.3	4	84.3	124	79.3
Private	2	41	9.1	104	9.4	56	15.7	1	12.2	44	19.3
Group Scheme	3	18	2.4	27	3.0	6	1.3	1	3.5	2	0.7
Other	4	1	0.1	6	0.8	3	0.7			2	0.7
	All	403	100	768	100	275	100	6	100	172	100

Q45c   **Water supply of previous address?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Piped Public	1	80	76.5	324	85.1	90	71.2	1	34.7	29	45.3
Private	2	16	16.7	53	10.4	31	25.0			18	27.3
Group Scheme	3	5	5.2	10	2.6	2	2.5			14	22.9
Other	4	1	1.6	5	1.9	2	1.4	1	65.3	4	4.5
	All	102	100	392	100	125	100	2	100	65	100

Q45d   **Have you ever participated in a school fluoride mouthrinse scheme?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	198	17.1	24	3.2	1	0.2			1	0.3
No	2	858	79.0	807	90.1	359	98.4	8	100	259	98.3
Don't know	3	44	3.9	45	6.7	6	1.4			3	1.5
	All	1100	100	876	100	366	100	8	100	263	100

Q45e   **Have you ever taken a course of fluoride tablets?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	31	1.6	14	1.0	1	0.1			1	0.3
No	2	1065	97.6	868	97.9	377	99.2	7	62.2	265	99.2
Don't know	3	12	0.9	9	1.1	2	0.6	1	37.8	1	0.5
	All	1108	100	891	100	380	100	8	100	267	100

Q45f   **Interviewer, estimate total number of years exposure to fluoridated water (can be completed later by examiner)**

Q46 **Are there other adults (18+) currently living with you at your address?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes	1	1156	97.0	872	92.1	325	78.7	7	100	209	74.2
No	2	27	3.0	75	7.9	85	21.3			71	25.8
	All	**1183**	**100**	**947**	**100**	**410**	**100**	**7**	**100**	**280**	**100**

Q47 **If 'Yes' how many?**

	Dentate						Edentulous			
	16-24		35-44		65+		35-44		65+	
	n	%	n	%	n	%	n	%	n	%
0	1	0.1	3	0.2	13	3.7			2	0.6
1	92	6.8	627	68.7	176	51.5	3	49.2	125	61.1
2	320	27.8	160	18.5	79	24.4	2	22.2	56	25.5
3	365	31.1	48	6.1	24	5.8	1	11.0	12	4.5
4	244	21.4	35	5.4	19	6.5			5	2.7
5	95	7.8	6	0.8	1	0.3			6	2.2
6	32	3.0	1		2	0.4	1	17.6	1	0.5
7	15	1.4							1	0.3
8	1	0.6								
9			1	0.2						
10					1	0.7				
11			1	0.1	3	0.5			2	0.6
12	1	0.1								
13									1	0.3
14					8					
15					2					
>15					11	6.1			3	1.7
All	**1166**	**100**	**882**	**100**	**339**	**100**	**7**	**100**	**214**	**100**

Q48 **Do you have children?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Q48a Yes	1	54	5.5	784	82.3	321	80.0	6	84.5	242	85.5
No (go to Q49)	2	1103	94.5	156	17.7	82	20.0	2	15.5	40	14.5
	All	**1157**	**100**	**940**	**100**	**403**	**100**	**8**	**100**	**282**	**100**

Q48b **If 'Yes', How many children do you have?**

| | Dentate | | | | | | Edentulous | | | |
| | 16-24 | | 35-44 | | 65+ | | 35-44 | | 65+ | |
	n	%	n	%	n	%	n	%	n	%
0	48	43.7	7	1.0	5	2.0			1	0.4
1	37	42.5	91	10.6	18	5.9			17	6.2
2	9	8.1	310	40.4	47	14.9	3	29.2	40	16.2
3	4	5.8	221	28.1	61	18.1	1	44.7	38	15.4
4			105	14.6	75	23.5			49	22.0
5			39	3.6	60	18.3	2	26.1	35	13.7
6			13	1.1	32	8.9			25	9.6
7			4	0.4	11	3.3			15	5.5
8			1	0.1	6	2.0			8	2.5
9			1		5	1.0			6	3.5
10					2	0.3			2	1.0
11					3	1.2			4	1.2
12					1	0.2			2	0.8
13									2	1.5
14					1	0.6				
15									1	0.4
All	**98**	**100**	**792**	**100**	**327**	**100**	**6**	**100**	**245**	**100**

Q49 **At what level did you finish full time education?**

| | | Dentate | | | | | | Edentulous | | | |
| | | 16-24 | | 35-44 | | 65+ | | 35-44 | | 65+ | |
		n	%	n	%	n	%	n	%	n	%
Primary	1	8	0.7	43	4.4	125	29.5	2	20.9	135	50.2
During second level	2	90	7.7	252	27.1	108	27.0	3	14.4	85	32.2
After second level	3	203	20.6	402	40.9	101	24.8	3	64.7	45	13.3
Third level	4	215	19.0	243	26.7	77	18.6			16	4.3
Still in full time education	5	665	52.0	9	0.9						
All		**1181**	**100**	**949**	**100**	**411**	**100**	**8**	**100**	**281**	**100**

Q50   **If still in full time education, and between 16 and 24yrs, What are/were your parents main occupations?**

Q50_1   **1) Mother** _____

| | | Dentate | |
| | | 16-24 | |
		n	%
Managers/Administrators	1	47	6.1
Professional	2	69	9.3
Associate Professional/Technical	3	78	10.3
Clerical/Secretarial	4	80	10.4
Craft & Related	5	13	1.1
Personal & Protective Service	6	57	7.9
Sales	7	43	7.0
Plant & Machine Operatives	8	6	0.5
Other	9	44	4.0
Unemployed	Unem	337	43.4
All		**774**	**100**

Q50_2   **2) Father** _____

| | | Dentate | |
| | | 16-24 | |
		n	%
Managers/Administrators	1	204	21.3
Professional	2	77	12.1
Associate Professional/Technical	3	41	5.5
Clerical/Secretarial	4	34	4.9
Craft & Related	5	163	24.4
Personal & Protective Service	6	35	5.0
Sales	7	31	5.0
Plant & Machine Operatives	8	72	11.5
Other	9	44	5.9
Unemployed	Unem	37	4.5
All		**738**	**100**

Q51   **Are you employed at present?**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Yes, full time employee	1	348	34.0	432	50.1	9	1.5	3	51.0	3	0.7
Yes, self employed	2	11	1.5	102	12.2	23	5.0	1	6.0	9	2.1
Yes, part-time	3	143	12.5	149	14.1	12	2.5			5	1.6
No	4	100	8.9	87	9.9	25	7.7	1	9.5	22	7.7
Homemaker	5	9	0.5	159	13.0	64	16.8	3	33.5	55	19.4
Retired	6	1	0.1	1	0.2	263	66.4			172	68.5
Student	7	557	42.6	6	0.6	1	0.2				
	All	1169	100	936	100	397	100	8	100	266	100

Q52   **What is your main occupation and your partners main occupation?**

Q52_1   **1) Own Occupation_____**

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Managers/ Administrators	1	58	10.6	120	14.2	76	15.9	1	6.6	40	13.1
Professional	2	63	13.7	93	11.3	52	12.8			11	3.3
Associate Professional/Technical	3	31	4.3	92	9.9	26	6.6			12	3.7
Clerical/Secretarial	4	64	8.2	135	12.9	28	7.8	2	53.2	13	3.6
Craft & Related	5	91	14.8	83	8.9	41	11.1			31	12.4
Personal & Protective Service	6	67	11.1	80	7.8	26	6.7	1	3.2	19	7.5
Sales	7	50	8.2	54	7.3	18	5.3			5	1.6
Plant & Machine Operatives	8	28	3.0	57	6.9	29	7.6			18	5.9
Other	9	38	5.7	74	8.0	23	5.2			34	13.2
Unemployed	Unem	159	20.4	154	12.7	81	20.6	3	37.0	95	34.9
	All	649	100	942	100	400	100	7	100	278	100

Q52_2 2) Partners Occupation_____

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Managers/Administrators	1	4	11.4	136	14.1	51	17.5			43	19.2
Professional	2	3	11.3	74	11.1	18	6.6			4	1.2
Associate Professional/Technical	3	1	0.5	53	8.6	12	3.2			8	2.3
Clerical/Secretarial	4	2	1.8	84	12.5	25	8.3			6	2.4
Craft & Related	5	10	18.5	125	13.9	20	8.0	1	14.1	28	14.2
Personal & Protective Service	6	6	16.9	42	5.6	14	5.1	1	4.0	13	6.3
Sales	7	1	2.9	40	6.4	8	3.4			8	3.7
Plant & Machine Operatives	8	7	10.7	61	6.0	17	6.7	1	22.7	16	6.9
Other	9	3	8.8	53	6.0	17	6.5			28	14.4
Unemployed	Unem	10	17.1	109	15.8	106	34.7	2	59.2	69	28.0
	All	47	100	777	100	288	100	5	100	223	100

Q53 Who makes the important financial and other decisions in your house? Call out all options.

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Q53_1 I make the decisions	1	151	13.3	213	23.3	139	36.0	2	17.4	104	37.0
My partner makes the decisions	2	1	0.1	52	5.4	22	5.3			27	9.4
Joint decision	3	220	15.6	664	69.5	216	52.1	5	73.1	135	49.2
Another person in my household makes the decisions	4	776	71.0	16	1.7	26	6.6	1	9.5	11	4.4
	All	1148	100	945	100	403	100	8	100	277	100

If subject answers option 4, ask what is the occupation of this person.

Q53_2   Occupation_____

		Dentate						Edentulous			
		16-24		35-44		65+		35-44		65+	
		n	%	n	%	n	%	n	%	n	%
Managers/ Administrators	1	150	16.3	8	12.6	26	49.4			6	16.6
Professional	2	73	11.6	4	3.9	6	8.8			3	6.7
Associate Professional/ Technical	3	49	6.6	4	8.8	5	4.9			2	7.5
Clerical/ Secretarial	4	47	6.0	11	18.0	3	5.3				
Craft & Related	5	124	18.1	4	5.9	3	10.6			1	2.8
Personal & Protective Service	6	41	7.5	4	9.7					1	4.0
Sales	7	39	7.1	3	4.8						
Plant & Machine Operatives	8	41	5.6	7	11.5	1	1.1			3	16.6
Other	9	54	5.5	4	4.2	2	3.2			3	16.4
Unemployed	Unem	113	15.4	11	20.5	10	16.7	1	100	9	29.4
	All	731	100	60	100	56	100	1	100	28	100

To be read out to subject,

"The next section is about dentures"

QED6   Do you have dentures (false teeth)?

		Edentulous			
		35-44		65+	
		n	%	n	%
Yes (go to Q7)	1	8	100	265	92.9
No (go to Q11)	2			8	3.2
Full upper only (go to Q7)	3			11	3.9
Full lower only (go to Q7)	4				
	All	8	100	284	100

QED7a **When do you wear your dentures?**

		Edentulous			
		35-44		**65+**	
		n	%	n	%
All the time, day and night (Go to Q8a)	1	5	41.4	112	41.6
All day, but not in bed (Go to Q8a)	2	2	20.9	143	51.4
Only when going out (Go to Q7b)	3			6	2.6
Only when eating (Go to Q7b)	4				
Only when eating and going out (Go to Q 7b)	5			2	1.4
Mostly upper denture only (Go to Q7b)	6	1	37.8	11	2.9
Mostly lower denture only (Go to Q7b)	7				
	All	**8**	**100**	**274**	**100**

For those who don't wear their dentures most of the time
(answers other than no(s) 1 or 2)

QED7b **Why don't you wear your dentures?**

		Edentulous			
		35-44		**65+**	
		n	%	n	%
Uncomfortable	1	1	100	22	71.4
Unsatisfactory Appearance	2			1	3.4
Painful	3				
Broken	4			1	2.3
Too loose	5			6	21.0
Can't eat with them	6			1	1.9
	All	**1**	**100**	**31**	**100**

QED8a **Are you satisfied with the appearance of your upper denture?**

		Edentulous			
		35-44		**65+**	
		n	%	n	%
Yes	1	6	88.5	248	89.3
No	2	2	11.5	28	10.7
No Upper Denture	3				
	All	**8**	**100**	**276**	**100**

QED8b **Are you satisfied with the appearance of your lower denture?**

		Edentulous			
		35-44		**65+**	
		n	%	n	%
Yes	1	3	37.5	222	81.8
No	2	5	62.5	31	9.9
No Lower Denture	3			22	8.3
	All	**8**	**100**	**275**	**100**

QED9a Are you satisfied with the comfort and fit of your upper denture?

| | | Edentulous | | | |
| | | 35-44 | | 65+ | |
		n	%	n	%
Yes	1	6	88.5	240	85.0
No	2	2	11.5	38	15.0
No Upper Denture	3				
	All	**8**	**100**	**278**	**100**

QED9b Are you satisfied with the comfort and fit of your lower denture?

| | | Edentulous | | | |
| | | 35-44 | | 65+ | |
		n	%	n	%
Yes	1	2	26.1	163	58.5
No	2	6	73.9	94	33.8
No Lower Denture	3			20	7.7
	All	**8**	**100**	**277**	**100**

QED10 How old are your dentures?

| | | Edentulous | | | |
| | | 35-44 | | 65+ | |
		n	%	n	%
Two years or less	1	3	58.6	38	12.4
Two to five years	2	1	2.9	51	20.7
More than five years but less than 10	3	1	16.6	52	19.1
More than 10 years but less than 15	4	2	15.8	32	12.2
More than 15 years	5	1	6.0	104	35.5
	All	**8**	**100**	**277**	**100**

QED11b When did you finally lose all of your natural teeth?

| | | Edentulous | | | |
| | | 35-44 | | 65+ | |
		n	%	n	%
Less than 5 years ago	1	2	49.2	17	6.3
Between 5 and 10 years ago	2			14	6.2
Between 10 and 20 years ago	3	4	41.9	45	15.4
More than 20 years ago	4	2	8.9	207	72.1
	All	**8**	**100**	**283**	**100**

QED13a **Do you now ever go to the dentist to have your mouth or denture checked?**

		Edentulous			
		35-44		65+	
		n	%	n	%
No	1	5	40.1	222	80.1
Yes but only when in trouble	2	3	59.9	57	18.3
Yes, routinely, whether in trouble or not	3			6	1.6
	All	**8**	**100**	**285**	**100**

Appendix 13 Coding Sheet

Gender

Code

| 1 | M | Male |
| 2 | F | Females |

Trauma (16-24 year-olds only)

Code

0	No evidence of trauma
1	Discolouration
2	Fracture involving enamel and dentine (not restored)
3	Fracture involving enamel, dentine and pulp (not restored)
4	Missing due to trauma
5	Acid-etch composite restoration
6	Semi-permanent restorations
7	Permanent Restorations
8	Denture
B	Bridge
P	Implant
X	Assessment cannot be made

Dental Status and Denture Status (All age groups)

Code	Dental Status
0	Edentulous
1	Dentate
2	No uppers
3	No lowers

	Code	Wearing of Dentures
	0	Not possessing a denture
Metal Partial	1	Possessing and wearing
	2	Possessing and not wearing
Plastic Partial	3	Possessing and wearing
	4	Possessing and not wearing
Full Denture	5	Possessing and wearing
	6	Possessing and not wearing

Code	Need for Dentures
0	No denture needed
1	Need for denture repair
2	Need for metal partial denture
3	Need for plastic partial denture
4	Need for full Denture
5	Need for adjustment -Easing

Code	Affecting Mucosa/Teeth
0	Not affecting
1	Affecting
X	Not applicable

Developmental Defects of Enamel (DDE) (16-24 year-olds only)

Code	Type of Defect
0	Normal
1	Demarcated opacity
2	Diffuse opacity
3	Hypoplasia
4	Demarcated + diffuse
5	Demarcated + Hypoplastic
6	Diffuse + Hypoplastic
7	All 3
8	Other
X	Excluded

Code	Extent of Defect
0	Normal
1	<1/3
2	At least 1/3 < 2/3
3	At least 2/3
X	Not applicable

Deans Index

Code	
0	Normal
1	Questionable
2	Very Mild
3	Mild
4	Moderate
5	Severe
X	Not applicable

Temporomandibular joint dysfunction (Dentate subjects only)

Code	Maximal Opening
0	≥ 40mm
1	30-39mm
2	< 30mm
X	Assessment cannot be made

Overjet (16-24 year-olds only) – record exact overjet in mm (+or-)

Code	Maximal Protrusion
0	≥ 7mm
1	4-6mm
2	0-3mm
X	Assessment can not be made

Code	Impaired TMJ Function
0	No impairment
1	Any sounds, deviation or locking/luxation
X	Assessment can not be made

Code	Muscle Pain
0	No pain
1	Pain in 1-2 muscle sites
2	Pain in 3 or more muscle sites
X	Assessment can not be made

Code	TMJ Pain
0	No tenderness on palpation
1	Tenderness on either side
X	Assessment can not be made

Orthodontic Treatment Need (16-24 year-olds only)

IOTN Aesthetic Component – Codes (1-10)

Code	IOTN Dental Health Component
0	No definite treatment need
1	Definite treatment need

Periodontal Examination

Code	Pockets
2	Pocket 6mm or more
1	Pocket 4-5mm
0	No pocketing
9	Cannot be determined
X	Excluded

Code	Calculus
1	Calculus
0	No calculus
9	Can not be determined
X	Excluded

Code	Bleeding
1	Bleeding observed
0	No bleeding
9	Can not be determined
X	Excluded

Code	Attachment loss
0	Attachment loss of no more than 3mm
1	Attachment loss 4-5mm
2	Attachment loss 6-8mm
3	Attachment loss 9-11mm
4	Attachment loss 12mm or more
9	Attachment loss can not be determined
X	Excluded or missing sextant/tooth

Tooth Wear

Code	Surface	Criteria
0	All	Sound
1	All	Loss of enamel just exposing dentine
2	B, L	Loss of enamel exposing dentine > 1/3
2W	Incisal	As 2 but wear
2E	Incisal	As 2 but erosion
3	B, L	Complete loss of enamel on a surface, pulp exposure, or exposure of secondary dentine where the pulp used to be.
3W	Incisal	As 3 but wear
3E	Incisal	As 3 but erosion
8	All	Fractured tooth
9	All	Unscorable

Lesions of the Oral Mucosa

Code		Code	
0	None	11	Denture stomatitis
1	ANUG	12	Smoker's palate
2	Suspect oral neoplasm	13	Flabby ridge(s)
3	Oral Lichen planus	14	Denture Granuloma
4	Leukoplakia	15	Cheek and lip biting
5	Candidiasis	16	Geographic tongue
6	Sinus associated with infected tooth	17	Frictional Keratosis
7	Apthous ulceration	18	Discoid Lupus Erythematosus
8	Amalgam tattoo	19	Leukodema
9	Erythroplakia	20	Lesions that can not be clearly identified
10	Median rhomboid glossitis	21	Other

Tooth Status Code

Code	Existence of teeth
A	Permanent tooth present
P	Deciduous tooth present
U	Permanent tooth unerupted
E	Permanent tooth extracted due to caries
G	Permanent tooth extracted due to perio disease
M	Permanent tooth missing due to other reasons, i.e. lost due to trauma, or orthodontic extractions or congenitally absent
K	Permanent tooth extracted for unknown reasons

Space Status Code

Code	Space Status
0	No space
1	Space
2	The tooth has been replaced by a conventional cemented bridge
3	The tooth has been replaced by a resin bonded bridge
4	The tooth has been replaced by a denture or prosthetic which can be removed from the mouth
5	Implant

Condition Status - Crown

Code

R	Fissure sealant
S	No caries
V	Visual caries
D	Decayed, cavity
K	Filled Amalgam and Primary Decay
L	Filled (restoration not amalgam) and Primary Decay
Y	Filled Amalgam and Secondary Decay
Z	Filled (restoration not amalgam) and Secondary Decay
F	Filled – Amalgam Restoration
G	Filled – Non Amalgam Restoration
C	Crowned
Q	Crowned and Decayed
T	Trauma
X	Excluded

Treatment Code – for crown caries and extraction due to periodontal disease

Code

0	None
I	One surface restoration
2	Two surface restoration
3	Three surface restoration
4	Fissure sealant or preventive resin restoration
5	Crown
6	Pulp treatment required due to coronal caries followed by restoration by filling
7	Pulp treatment required due to coronal caries followed by restoration with crown
8	Extraction due to coronal disease
9	Extraction due to periodontal disease
W	Extraction due to other reasons
P	Implant required to replace tooth
R	Replacement with removable prosthesis
S	Replacement with resin bonded bandage
F	Replacement with conventional fixed bridge
V	Veneers
X	Other treatment for crown caries

Root

Code	Root Condition (one code per surface)
0	No exposed root surface
R	Recession, no decay
2	Caries, no restoration
3	Amalgam restoration present
4	Non-amalgam restoration present
5	Filled amalgam with primary decay
6	Filled non-amalgam with primary decay
7	Filled amalgam with secondary decay
8	Filled non-amalgam with secondary decay
9	Broken down tooth such that roots cannot be scored
A	Hard, arrested decay

X   Unscorable
W   Worn to a depth of 2mm or more, but with no caries or restoration

Code   Root Treatment
0   No treatment required
1   1 surface restoration
2   2 or more surface restoration
3   Pulp treatment
4   Extraction due to root caries
5   Other treatment

Appendix 14 Clinical Examination Criteria

Examination Sequence

Chair in upright position
1. Medical Screening
2. Demographic Details
3. Trauma of Permanent Incisors (16-24 year-olds only)
4. Dental Status and Denture Status
5. Enamel Defects (16-24 year-olds only)
6. TemporoMandibular Joint Assessment (all age groups, dentate subjects only)
7. Orthodontic Treatment Need (16-24 year-olds only)

Chair in reclined position
(The subject may decide on the inclination of the chair, if they wish)
8. Modified CPE/Loss of attachment
9. Tooth Wear
10. Lesions of the Oral Mucosa
11. Caries

Chair in upright position
12. General Questionnaire

Guidelines for Examiners and Diagnostic Criteria

Please refer to the Clinical Record Form (Appendix 10), General Health Questionnaire (Appendix 11), General Questionnaire for Dentate Subjects (Appendix 12a), General Questionnaire for Edentulous Subjects (Appendix 12b), Coding Sheet (Appendix 13) and Enamel Defects demonstration colour prints.

General Health Questionnaire

The Modified ASA Health Questionnaire (Appendix 11) must be completed prior to the intra oral examination.

An estimation of the health status of Irish Adults as part of an epidemiological survey of dental health will be undertaken for two reasons:
(1) To investigate any possible relationship between dental health status and general health.
(2) To comply with Section 6 of the 1960 Health (fluoridation of water supplies) Act, which requires the Minister to arrange "such surveys as appear to him to be desirable to be made as respects the health" of residents of fluoridated areas.

An index of general health is provided by the American Society of Anaesthesiologists (ASA) classification (Saklad M. Grading of patients for surgical procedures. Anesthesiology. 1941; 2(3):281-284.). Developed in 1941 as a means of estimating the medical risks of patients who were about to undergo surgery with the use of general anaesthesia, the ASA classification system can be modified so that it can be used to categorise the physical status of dental patients. Patients' health may be classified into one of four categories based on the system.

In this classification:
- ASA I is a normal healthy patient without systemic disease.
- ASA II is a patient with mild to moderate systemic disease.
- ASA III is a patient with severe systemic disease that limits activity but is not incapacitating.
- ASA IV is a patient with severe systemic disease that limits activity and is a constant threat to life.

Classification Guidelines

A medical history/physical evaluation questionnaire, which includes a systems analysis, is used as an aid to designate ASA classifications.

Designation of ASA class I is made by exclusion of systemic disease. The recording of a medical condition on the ASA health questionnaire does not necessarily exclude ASA class I. This classification can still be made provided the condition is not active or disabilitating and there are no likely adverse sequelae.

ASA designation beyond class I indicates current disease activity, adverse sequelae or significant disability, or at least the possibility of reactivation. Examples of conditions requiring ASA II classification are given below. A combination of these conditions may lead to an ASA III classification.

Examples of ASA class II physical status are a history of any of the following:

- Hepatitis B that is antigen-positive
- Arrested pulmonary tuberculosis without disability*
- Heavy smoking and chronic bronchitis without disability
- Bronchial asthma or pulmonary emphysema without disability
- Rheumatic heart disease without disability
- Congenital heart disease without disability
- Chronic glomerulonephritis or pyelonephritis without disability
- Controlled arterial hypertension without disability
- Controlled diabetes mellitus without disability
- Controlled chronic glaucoma
- Meniere disease that is currently asymptomatic.

*The phrase 'without disability' refers to the patient who can perform normal activities and who can climb a flight of stairs or walk two hundred meters at a normal pace without distress (disabling dyspnoea, pericardial pain or fatigue).

Examples of ASA class III and class IV are:

- *Bronchopulmonary disease*
  A patient with pulmonary emphysema, who has dyspnoea on exertion, and who must rest while climbing a flight of stairs or walking two hundred meters at a normal pace, is ASA class III. Dyspnoea at rest calls for ASA class IV.

- *Cardiovascular Disease*
  A patient with congestive heart failure is classified as for pulmonary emphysema.

A patient with angina pectoris who has pericardial pain while climbing a flight of stairs or walking two hundred meters at a normal pace is ASA class III. Pain at rest is ASA class IV. This may however revert to ASA class III or even ASA class II after coronary artery surgery. A patient with a myocardial infarct or cerebrovascular accident is designated ASA class IV for the first six months, but then will most likely return to ASA class III or even ASA class II.

A modified version of the ASA health questionnaire will be used in this survey (Appendix 11). If the ASA questionnaire indicates no disease, the examiner will automatically record the patients as ASA class I. However, if the patient indicated the presence of systemic disease, further verbal questioning is required to establish ASA classification. It will be noted that a patient with no medical history will answer "no" to all questions except "can you walk up hills and climb up stairs". This is a trick question designed to test the validity of the patient's answers. If the patient answers incorrectly to this question, the ASA questionnaire must be checked verbally.

The examiner will enter the appropriate ASA classification (Code 1-4) in the appropriate box on the subject's clinical record.

Certain conditions, while very relevant to anaesthetic risk or dental treatment, are not of importance. Such conditions are Penicillin allergy, labial herpes, and certain venereal diseases, hay fever or pain in jaw joints. Medication will be recorded as this may influence dental health and salivary flow.

Demographic Variables

The subjects' first and last name are recorded on the chart, together with their address, date of birth and gender (Code 1 = male, Code 2 = female). Each subject is asked his or her age to check that date of birth is correct. Each subject who participates in the study will automatically be given a unique identity number. This number comprises of 10 digits, which are related to the individual subject and to the Health Board, County and District Electoral Division and household where the subject resides. The date of the examination is automatically recorded.

In addition, each recorder and examiner will be given a unique identity number. The number of the examining dentist and the recorder will be recorded on each clinical and paper record.

Trauma of Permanent Incisors (16-24 year-olds only)

Upper and lower permanent incisors will be examined for traumatic injury.

If there is injury to any incisors, then identify the teeth involved, and code one of the following categories for each tooth:

Code

0	No evidence of trauma.
1	Discolouration.
2	Fracture involving enamel and dentine (not restored).
3	Fracture involving enamel, dentine and pulp (not restored).
4	Missing due to trauma.
5	Acid-etch composite restoration, which has been placed to repair trauma.
6	Semi-permanent restorations (treatment on-going), e.g. stainless steel crowns, pinch bands, cellulose acetate crowns, "Directa" crowns, pinned inlays.
7	Permanent Restorations (treatment complete), e.g. Porcelain bonded crown.
8	Denture provided due to traumatic loss of this tooth.
B	Bridge provided due to traumatic loss of this tooth.
P	Implant - an implant that been placed to replaced a tooth lost due to trauma.
X	Assessment cannot be made: there is no permanent incisor present and it has not been lost due to trauma.

In the case where a tooth has more than one condition/treatment, give the highest code.

Dental Status and Denture Status (All age groups)

First ask "Do you have any of your own natural teeth?" and then "do you have a denture?"

Code	Dental Status
0	Edentulous. This will automatically close off certain fields on the software programme e.g. TMJ assessment, DDE, Deans, Orthodontic Treatment Need, periodontal treatment need, crown and root condition
1	Dentate
2	No uppers
3	No lowers

Wearing of, and need for dentures

The possession and wearing of dentures should be recorded for each jaw. The following codes are provided for this:

Code 0:   Not possessing a denture.

Metal Partial:

Code 1:   Possessing and wearing a partial denture where the major component of the fitting surface is metal.

Code 2:   Possessing and not wearing a partial denture where the major component and fitting surface is metal.

Plastic Partial:

Code 3:   Possessing and wearing a partial denture where the major component is plastic.

Code 4:   Possessing and not wearing a partial denture where the major component is plastic.

Full Denture:

Code 5:   Possessing and wearing a full denture.

Code 6:   Possessing and not wearing a full denture.

A recording should be made for each jaw on the need for dentures, according to the following codes:

Code	Need for Dentures
0	No denture needed
1	Need for denture repair
2	Need for partial denture whose major component is metal
3	Need for partial denture whose major component is plastic
4	Need for full denture (edentulous or full clearance required)
5	Need for adjustment e.g. straight forward easing

The denture bearing areas are now assessed. When the subject has removed the denture, the denture bearing areas will be examined. The examiner will assess whether in his/her opinion, the denture itself is having a destructive effect on these tissues.

Both upper and lower jaw will be examined. Conditions that will be scored include: gum stripping, tilting of teeth, caries on teeth adjacent to the denture, denture stomatitis and a flabby ridge.

Code 0:   Not affecting

Code 1:   Affecting

Code X: Not applicable

Developmental Defects of Enamel (DDE) (16-24 year-olds only)

The index tooth surfaces to be examined are: the labial surfaces of the maxillary first pre-molar, canine, and incisor teeth, and the buccal surfaces of the mandibular first molars.

Three basic defects are recorded: demarcated opacities, diffuse opacities, and hypoplastic defects. If any defects do not fall into these categories they should be scored as other defects. The extent of defect is measured in increments of thirds. Colour prints will be used as part of the training material.

The codes for type and extent of defects are as follows:

Code	Type of Defect
0	Normal
I	Demarcated opacity
2	Diffuse opacity
3	Hypoplasia
4	Demarcated + diffuse
5	Demarcated + Hypoplastic
6	Diffuse + Hypoplastic
7	All 3
8	Other
X	Excluded

Code	Extent of Defect
0	Normal
I	<1/3
2	At least 1/3 < 2/3
3	At least 2/3
X	Not applicable

Clinical Examination- DDE Index

Teeth will not be cleaned prior to the examination, except for the removal of food debris with a tissue if necessary. Both natural and artificial light must be used. The teeth should be inspected first using natural light, and then using artificial light. When inspecting the teeth, the examiner should move their line of vision around. This approach will help to overcome the variability in recording due to angle of inspection and specular reflection. The teeth will be examined wet at the time of examination.

The recorder will initiate the examination by calling out first tooth and the surface to be examined, i.e. "upper right maxillary first premolar labial". The designated surface of the index tooth should be inspected visually for defects. If a hypoplastic area appears to be present, it should be tactilely explored with a CPE probe to confirm the abnormality of enamel contour. Diagnosis will usually be readily evident where a defect is obvious. However, in other instances, the most difficult decision will be whether or not an abnormality is present, i.e. the examiner may be unsure whether the enamel is defective or fully within the range of normal. When in doubt, the tooth surface should be scored normal. Defects such as palatal pits on the cingulum of incisor teeth should be considered normal. Similarly, where defects are obviously not developmental in origin i.e. white spot caries, they should be scored normal. Where an abnormality is obviously present, but cannot readily be classified into one of the listed categories of defects, it should be scored 'other' defect. Disregard any single defect on a surface, which is less than 1mm at its greatest width. However, record defects whose total greatest width is greater than 1mm.

Definition of terms used in DDE index

Opacity is defined as a qualitative defect of enamel, identified visually as an abnormality in the translucency of enamel. It is characterised by a white or discoloured (cream, brown, yellow) area, but in all cases the enamel surface is smooth and the thickness of enamel is normal, except in some instances when associated with hypoplasia.

1. Demarcated Opacity: An opacity well demarcated from the adjacent normal enamel. It may be white, cream or yellow/brown in colour.

2. Diffuse opacity: Irregular cloudy areas of opacity lacking well-defined margins or fine white distinct lines of opacity, which follow the pattern of the perikymata. Confluence of adjacent lines may be observed.

3. Hypoplasia: is defined as a quantitative defect of enamel visually and morphologically identified as involving the surface of the enamel (an external defect) and associated with a reduced thickness of enamel. The defective enamel may occur as:

  (a)   shallow or deep pits or rows of pits arranged horizontally in a linear fashion across the tooth surface or generally distributed over the whole or part of the enamel surface;

  (b)   the defective enamel may occur as small or large, wide or narrow grooves;

  (c)   in enamel over small or considerable areas of dentine.

Combinations of hypoplasia and opacities can occur on the same tooth surface. They may be quite distinct from each other, i.e. separated by normal enamel, or as a composite lesion composed of an adjacent opacity and hypoplasia.

4. Other defects: may occur which do not fulfil the specific definitions of opacity or hypoplasia, e.g. staining: These are listed under 'Other defects'.

Recording the Data

Defects of the same type show considerable variations, and it is essential they be classified with respect to the definition of the DDE Index.

Deciduous teeth occupying the tooth space, unerupted, missing, heavily restored, badly decayed, fractured teeth, and teeth (or tooth surfaces) that for any other reason cannot be classified for defects must be coded 'X'. This implies that it will be disregarded from statistical evaluation.

A surface is present, and examined for defects, provided any part of the surface has penetrated the oral mucosa. In the case of a partially erupted tooth, score the surface present as 'normal' unless there is a defect on the erupted portion. If the patient is wearing a fixed orthodontic appliance, exclude the patient from examination.

If more than two defects occur on a surface, the two defects affecting the greatest area will be scored. For the 'extent' section, the total area affected by all types of defects will form the basis of the assessment.

Dean's Index

On completion of the DDE index, the teeth should be examined for Dean's Index.

The examiner should stand in front of the patient, look at the teeth along a horizontal plane, note the distribution pattern of any defects, and decide if they are typical of fluorosis i.e. the defects in the questionable to mild scores (the most likely to occur) may consist of fine white lines or patches usually near the incisal edges or cusp tips. They are paper white or frosted in appearance, and tend to fade into the surrounding enamel. They are of a generalised nature and there is usually a definite tendency to bilateral distribution. The premolars and second molars are most frequently affected followed by the upper incisors. The mandibular incisors are least affected.

If fluorosis is present, then decide on the two most severely affected teeth. Dean's Index is scored on the condition of these two teeth. If the two teeth are not equally affected, score on the least affected. When scoring, start at the higher end of the index (i.e. severe), and eliminate each score until you arrive at the condition present. If in any doubt, the lowest score should be given.

Criteria for Dean's Classification System for Dental Fluorosis (1942)

- **Normal**
  - Code 0
  - Criteria: The enamel represents the usual translucent semivitriform type of structure. The surface is smooth, glossy and usually of pale creamy white colour.

- **Questionable**
  - (<10% of surface)
  - Code 1
  - Criteria: The enamel discloses slight (<10% of surface) aberrations from the translucency of normal enamel, ranging from a few white flecks to occasional white spots. This classification is utilised in those instances where a definite diagnosis is not warranted and a classification of 'normal' not justified.

- **Very Mild**
  - (10-25% of surface)
  - Code 2
  - Criteria: Small, opaque, paper white areas scattered irregularly over the tooth but not involved as much as approximately 25% of the tooth surface. Frequently included in this classification are teeth showing no more than about 1-2mm of white opacity at the tip of the summit of the cusps, of the bicuspids or second molars.

- **Mild**
  - (25-50% of surface)
  - Code 3
  - Criteria: The white opaque areas in the enamel of the teeth are more extensive but do involve as much as 50 percent of the tooth.

- **Moderate**
  - (100% of surface)
  - Code 4
  - Criteria: All enamel surfaces of the teeth are affected and surfaces subject to attrition show wear. Brown stain is frequently a disfiguring feature.

- **Severe**
  - (100% of surface)
  - Code 5
  - Criteria: All enamel surfaces are affected and hypoplasia is so marked that the general form of the tooth may be affected. The major diagnostic sign of this classification is discrete or confluent pitting. Brown stains are widespread and teeth often present a corroded-like appearance.

Code X – Not applicable

Temporo Mandibular Joint Dysfunction (TMJ) (Dentate patients only)
MODIFIED HELKIMO INDEX (MHI)
(MOHLIN, PILLEY & SHAW, EJO 1991)

Scores for impaired movement

(a) Maximal Opening

Code 0:   ≥ 40mm
Code 1:   30-39mm
Code 2:   < 30mm
Code X: Assessment cannot be made

(b) Overjet
(16-24 year-olds only) – record exact overjet in mm (+or-, whether a reverse or positive overjet).

(c) Maximal Protrusion

Code 0:   ≥ 7mm
Code 1:   4-6mm
Code 2:   0-3mm

Scores for impaired TMJ function

Code 0:   No impairment
Code 1:   Any sounds, deviation or locking/luxation

Scores for muscle pain

Code 0:   No pain
Code 1:   Pain in 1-2 muscle sites
Code:2   Pain in 3 or more muscle sites

Scores for TMJ Pain

Code 0:   No tenderness on palpation
Code 1:   Tenderness on either side

Maximal Opening

Method:
- The patient is asked to open the mouth as much as possible.
- Measure from the incisal edge of the lower central incisor to the incisal edge of the corresponding upper central incisor.
- Measure overbite in mm. If there is a positive overbite in the maximum interccuspal position then add both values to obtain the maximum opening (45mm). If an anterior open bite is present then subtract the open bite measurement from the inter-incisal measurement.

Overjet and maximal protrusion

Method:
- With the teeth held lightly in maximum intercuspation, measure the horizontal overjet.
- Record this measure in mm either as + (positive overjet) or - (reverse overjet for 16-24 year olds).
- Ask the patient to protrude the mandible as far forward as possible.
- If the overjet is still positive, measure it and subtract this measurement from the horizontal overjet first measurement.
- If on protrusion a reverse overjet is obtained, measure it and add it to the horizontal overjet measurement.
- If the patient achieves an edge-to-edge position of the incisors on protrusion the horizontal overjet measurement is the same as maximum protrusion.

Impaired TMJ function

Sounds (clicking or crepitus), deviation, locking, luxation
To elicit joint sounds, the patient is asked to open and close several times as joint sounds may not occur each time the jaw is opened and closed.

The patient should also be involved in the evaluation asking if and when they are aware of any noises from the TMJ.

- **Clicking:**
  Joint sounds occur usually as a single click audible or palpable either on opening or on closing. When a reciprocal click is present, clicking occurs both on opening and on closing.

- **Crepitus:**
  Multiple sounds commonly described as a grating noise, during opening or closing.

- **Deviation:**

A deviation is any transverse movement of the mandible on opening, from the maximum intercuspation to maximum opening. If the centrelines are coincident in maximum intercuspation, then these should remain coincident until maximum opening is achieved. Alternatively, when the dental centrelines are not coincident, a line is drawn on the labial surface of the upper incisor coincident with the lower dental centreline. These lines should remain coincident until maximum opening is achieved.

- **Locking:**
Locking occurs when translation of the condylar head down the articular eminence is prevented - usually by an antero-medially displaced disc. The hinge movement is unaffected and opening is restricted to 25-30mm.

- **Luxation (Dislocation):**
Luxation occurs when the condylar head is displaced out of the glenoid fossa. The dislocation may be acute, chronic or recurrent. The most common cause is excessive translation of the condyle down the eminetia articularis during yawning.

Luxation should not be confused with <u>disc displacement</u>. The latter is an altered relationship of the disc to both condyle and fossa – usually an antero-medially displaced disc.

Muscle pain
In this section, three muscles are palpated on the right and left sides. The fingertips are used to apply gentle pressure. The patient is asked to report any pain or whether there is any difference between the right and left sides.

- Technique for palpating **Masseter:** The muscle is palpated bimanually by placing the thumb intra-orally and the index finger on the cheek. The origin of the anterior two thirds of masseter is from the zygomatic arch and it is inserted into the outer aspect of the angle of the mandible. Palpate the entire masseter from origin along the inferior border of the zygomatic arch to its insertion from the angle of the mandible to the lower second molar.

- Technique for palpating **Temporalis***:** Ask the patient to clench the teeth. Digital palpation is performed between the superior and inferior temporal area situated just anteriorly and posteriorly above the ear. The anterior fibres are most commonly tender on palpation.

- Technique for palpating **Lateral Pterygoid**: This muscle is not normally accessible to manual palpation. It is possible to elicit tenderness indirectly using the method below. Since the function of the muscle is to open the mouth and move the mandible laterally tenderness can be elicited if these three movements are in turn resisted by the hand of the examiner.

    (a) The hand is placed under the patient's chin with the palm placed against the lateral surface of the body of mandible and the fingers under the chin.
    (b) The patient is asked to open against the resistance offered by the examiner's hand.
    (c) The patient will report tenderness in the pre-auricular area if there is spasm of this muscle.
    (d) The patient is then asked to move the jaw to the left and to the right.
    (e) Resistance to each movement is offered in turn and tenderness on the side being examined may be elicited.

- **Medial Pterygoid**: The palpation of this muscle is not reliable and therefore this muscle will not be examined.

TMJ pain

Palpate the joint both laterally and dorsally.

    (a) Palpation laterally over the joint. The fingers are placed over the joint laterally. Gentle pressure is exerted in a medial direction.

    (b) A finger is inserted into the external auditory meatus with the pulp of the finger facing

anteriorly. Gentle pressure is exerted in a downward and forwards direction, and a positive finding recorded if pain or tenderness is elicited.

Orthodontic Treatment Need (16- 24 year-olds only)

The Index of Orthodontic Treatment Need (IOTN) consists of two separate components:
(1) **The Aesthetic Component**, which determines the level of need for orthodontic treatment on aesthetic grounds.
(2) **The Dental Health Component**, which determines the level of need for orthodontic treatment on dental health grounds.

Each component is assessed independently; the scores from each component are not added together. Some subjects may have a definite need for orthodontic treatment on aesthetic grounds, but not on dental health grounds. Similarly, some subjects may have a need for orthodontic treatment on dental health grounds, but not on aesthetic grounds.

The following sections summarise how the IOTN scores should be recorded. The approach outlined in this document will enable the examiner to record the IOTN score for the vast majority of malocclusions.

The Aesthetic Component
(a) The anterior teeth should be rated on their dental attractiveness as seen. Stained teeth, enamel fractures and gingival inflammation should be ignored.

(b) Ask the subject to close together on his/her back teeth. Then retract the lips to expose the anterior teeth. The dental attractiveness is then rated using the 10-point Aesthetic Component scale.
   • Grades 1-4 represent no need for orthodontic treatment.
   • Grades 5-7 represent a borderline need.
   • Grades 8-10 represent a definite need for orthodontic treatment on aesthetic grounds.

(c) When using the Aesthetic Component scale, a ranking is awarded for overall dental attractiveness, rather than for specific morphological similarity to the photographs used in the index.

The Dental Health Component
(a) Only the most severe occlusal trait is recorded.
(b) The Dental Health Component is normally comprised of a 5 grade scale:
   • Grades 1-3 represent no need or borderline need for orthodontic treatment on dental health grounds.
   • Grades 4 and 5 represent a definite need for orthodontic treatment on dental health grounds.

The Dental Health Component of IOTN has been simplified for use in screening surveys. Only those occlusal traits, which have a definite need for orthodontic treatment, are recorded (grades 4 and 5). The examiner need only note that the subject has a definite need for orthodontic treatment due to increased overjet, or crowding etc.

The 'no need' or 'borderline need' categories are not recorded.

(c) A small metal ruler is used to measure overjets, crowding and open bites.
(d) Examine each subject in a systematic manner for the following five occlusal traits:
   1. Missing teeth (ectopic canines, congenital absence)
   2. Overjet (both increased and reverse overjets)
   3. Crossbite
   4. Displacement of contact points (crowding)
   5. Overbite (both increased overbite and open bite)

The acronym 'MODCO' can be constructed from the first letter of each category. This may be used to remember this scale of occlusal traits. The examiner should make a mental note of the occlusal traits, which are present in an individual subject. Often several occlusal traits are present and it is necessary to determine which is the worst.

For example, a subject may have an increased overjet and crowded lower incisors. In this case, the overjet and crowding are both measured.

Missing teeth

(a) Congenital absence/traumatic loss

The examiner must first decide if orthodontic treatment is required to either open space for a prosthesis or to close the space completely. If orthodontic treatment is required then the subject is recorded as being in the definite need category of the Dental Health Component.

(b) Ectopic teeth

Ectopic upper canines are most often recorded in this section. If an upper canine is not present in the arch (and there is no history of extraction) the examiner should examine/palpate the buccal sulcus for normal canine position i.e. a 'canine bulge' should be palpable. If no canine bulge is palpable then the canine is assumed to be palatally ectopic and a definite need for orthodontic care is recorded.

(c) Impacted teeth

Third molars are not included in this assessment.

This section usually applies to unerupted canines or second premolars. An impacted tooth is recorded in IOTN when there is 4mm or less space between adjacent erupted teeth (definite need category).

Partially erupted teeth, tipped and impacted against adjacent teeth, are also included in this category (irrespective of the space available).

During screening surveys, radiographs are not usually available; therefore, it can sometimes be difficult to determine if a tooth is congenitally missing or impacted. Congenital absence of permanent canines is rare. However, congenital absence of second premolars is more common. Careful clinical examination/palpation of the alveolus may help to confirm the presence of an unerupted second premolar.

Positive overjets

(a) Use the end of the metal ruler, which has two lines.

* 6mm

(b) Hold the metal ruler parallel to the occlusal plane.
(c) Measure to the labial aspect of the most prominent incisor. On some occasions, the lateral incisor may be the most prominent incisor.
(d) A definite need for orthodontic treatment is recorded if the overjet extends beyond the second line (6mm, red line).
(e) If the overjet falls exactly on the line, do not record in the definite need category.

Reverse overjets

(a) Use the first line of the metal ruler to measure reverse overjets (4mm, white line).

* 4mm

(b) A reverse overjet is defined as all four upper incisors in lingual occlusion.
(c) Unlike positive overjet, if the reverse overjet falls exactly on the 4mm line then record in the definite need for treatment category.
(d) A definite need for orthodontic treatment is also recorded if the subject reports eating or speaking difficulties associated and their reverse overjet is greater than 1mm.

Crossbites
(a)   Can be anterior or posterior.
(b)   The IOTN Dental Health Component need for treatment depends on the amount of transverse or antero-posterior displacement that occurs on closure. Definite Need for Treatment = > 2mm displacement.

Displacement of contact points (crowding)
(a)   Measure between the anatomical contact points of the two most crowded teeth.
(b)   Using the metal ruler, determine if any adjacent contact points are greater than 4mm apart. The first line (4mm, white) of the metal ruler is used in this assessment. If any contact points of permanent teeth are further than 4mm apart then a definite need for treatment is recorded.
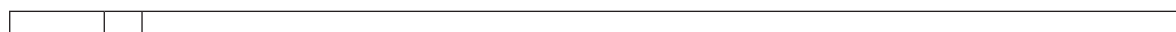
* 4mm

(c)   Only measure crowding between permanent teeth. Do not measure between deciduous teeth or between deciduous teeth and permanent teeth.
(d)   Rotations of premolar and molar teeth are not included in this section.
(e)   Hold the ruler parallel to the occlusal plane when making these measurements.

Deep overbite
A definite need for treatment is recorded if there is evidence of trauma to the gingival margin, either on the palatal aspect of the upper incisors or the buccal aspect of the lower incisors.

Open bite (anterior or posterior)
(a)   Only record 'true' open bites do not include developmental open bites.
(b)   Determine if the open bite is greater than the first line (4mm, white) - definite need for treatment.

Other points
Generalised spacing is not recorded by the Dental Health Component.

Periodontal Condition (all age groups)
Please note: Any subject with a history of rheumatic fever, heart murmur, endocarditis, valvular heart disease and the presence of any artificial joints (usually hip or knee) will not undergo the periodontal examination.

The following indicators of periodontal status are used for this assessment:
(1)   presence or absence of gingival bleeding;
(2)   supra or subgingival calculus;
(3)   periodontal pockets - subdivided into shallow (4-5mm); and
(4)   deep (6mm or more) and loss of attachment.

A specially designed lightweight probe with a 0.5mm ball tip is used, bearing a brown band between 3.5 and 5.5mm from the ball tip. This standard CPE probe has been modified for this study with 8.5 and 11.5 rings specifically for measurement of loss of attachment.

Sextants:
The mouth is divided into sextants defined by teeth numbers 18-14, 13-23, 24-18, 38-34 and 44-48. A sextant should be examined only if there are two or more teeth present and not indicated for extraction. When only one tooth remains in a sextant, it should be included in the adjacent sextant.

Index Teeth:
For subjects aged 20 years and older, the teeth to be examined are:

```
17   16  |  11  |  26   27                   7   6   1  |  6   7
------------------------------------        =        --------------------------
47   46  |  31  |  36   37                   7   6  |  1   6   7
```
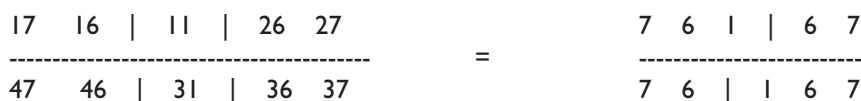
The two molars in each posterior sextant are paired for recording, and if one is missing, there is no replacement. If no index teeth or tooth is present in a sextant qualifying for examination, all the remaining teeth in that sextant are examined and the highest score is recorded as the score for the sextant.

For those aged 16-19 years, only six teeth (16, 11, 26, 36, 31 and 46) are examined.

Sensing gingival pockets and calculus
An index tooth should be probed, using the specially designed probe as a "sensing" instrument to determine pocket depth and to detect calculus and bleeding response. The sensing force used should be no more than 20 grams. A practical test for establishing this force is to place the probe point under the thumbnail, parallel to the long axis of the thumb, and press until blanching occurs. For sensing *subgingival* calculus, the lightest possible force that will allow movement of the probe ballpoint along the tooth surface should be used.

When inserting the probe, the ballpoint should follow the anatomical configuration of the surface of the tooth root. If the patient feels pain during probing, this is indicative of the use of too much force.

The probe tip should be inserted gently into the gingival pocket and the depth of the insertion read against the colour coding. The total extent of the pocket should be explored: the probe is placed in the pocket at the disto-buccal surface of the second molar, as close as possible to the contact point with the third molar, keeping the probe parallel to the long axis of the tooth. The probe is then moved gently with short up and down movements through the buccal pocket to the mesial contact area of the second molar and from the disto-buccal pocket of the first molar towards the contact area with the premolar. A similar procedure is carried out for the lingual surfaces, starting distolingually to the second molar.

Modified CPE/Calculus and loss of attachment

Tooth	1.7/1.6	1.1	2.6/2.7	3.7/3.6	3.1	4.6/4.7
Pockets Code 0/1/2						
Calculus Code 0/1						
Bleeding Code 0/1						
Loss of Attachment						

Modified CPE codes are as follows:

Pockets

Code 2:	Pocket 6mm or more (brown band on the probe not visible)
Code 1:	Pocket 4-5mm (gingival margin within the brown band on the probe)
Code 0:	No pocketing
Code 9:	Cannot be determined
Code X:	Excluded

Calculus

Code 1:	Calculus
Code 0:	Any calculus detected during probing but all of the brown band of the probe is visible.
Code 9:	Cannot be determined
Code X:	Excluded

Bleeding

Code 1:	Bleeding observed (directly or by using mouth mirror) after sensing
Code 0:	No bleeding
Code 9:	Cannot be determined
Code X:	Excluded

All scores found in a sextant will be recorded. If there are not at least two teeth remaining and not indicated for extraction in a sextant, the appropriate box should be cancelled by a cross (X). Code 9 is placed in the appropriate box when it is not possible to make a reliable recording (e.g. large accumulations of calculus prohibiting proper probing of pockets).

Loss of attachment
Loss of attachment will be recorded in addition to the modified CPE score, in order to obtain an estimate of the lifetime accumulated destruction of the periodontal attachment. Probing pocket depths gives some indication of attachment loss. However, this measurement becomes inadequate when recession of the gingiva becomes apparent (the CEJ becomes visible). When shallow pocketing of 4-5 mm (modified CPE score 1) is recorded as the highest score for a sextant, and no recession is visible, the estimated maximum attachment loss for that sextant is, apart from exceptional cases, no more than 3mm, and no separate record of attachment loss is made. When deep pockets (6mm or more, equal to modified CPE score 2) are recorded or when recession of the gingiva is apparent (the CEJ is visible), the examiner shall assess and record the maximum attachment loss at the index teeth in the same sextant with the same probe. The most reliable way of doing this is to record loss of attachment in each sextant immediately after recording the CPE score for that particular sextant.

The following codes for loss of attachment are used:

Attachment loss
Code 0:   Attachment loss of no more than 3mm
Code 1:   Attachment loss 4-5mm (CEJ within brown band)
Code 2:   Attachment loss 6-8mm (CEJ on probe section between upper limit of brown band and 8.5 mm ring)
Code 3:   Attachment loss 9-11mm (CEJ on probe section between 8.5-11.5mm ring)
Code 4:   Attachment loss 12mm or more (CEJ beyond 11.5mm ring)
Code 9:   Attachment loss cannot be determined (CEJ not visible or detectable)
Code X: Excluded or missing sextant/tooth

Tooth Wear/Erosion (all age groups)

The assessment of tooth wear is a part-mouth examination.

The teeth should be inspected in good light, from the upper right canine to the upper left canine, and then left canine to right canine in the lower arch. Each tooth should be assessed looking at each coronal surface (root surfaces have been recorded during the examination for roots). Scores are recorded on three surfaces per tooth for the six upper teeth, the buccal, incisal and palatal. For the lower teeth, the worst surface score is the one recorded and this will almost always be the incisal score, but if buccal or lingual surfaces are worse, then this is recorded. In many cases there will be very heavily restored teeth or crowns: these cannot be scored, but are not missing and should be coded as unscorable.

Tooth Wear

Tooth	1.3	1.2	1.1	2.1	2.2	2.3
Buccal						
Palatal						
Incisal						

Worst Surface						
Tooth	4.3	4.2	4.1	3.1	3.2	3.3

Codes and Criteria

Code	Surface	Criteria
0	All	Sound, any wear is restricted to the enamel and does not extend into dentine
I	All	Loss of enamel just exposing dentine
2	B, L	Loss of enamel exposing dentine for more than an estimated one third of the individual surface area but not exposing secondary dentine or pulp (B, L).
2W	Incisal	Loss of enamel and extensive loss of dentine, where the surface of both enamel and dentine is flat and in continuity (this is tooth wear) but not exposing secondary dentine or pulp. On incisal surfaces this will mean exposed dentine facets with a bucco-lingual dimension 2mm or greater at the widest point.
2E	Incisal	Loss of enamel and extensive loss of dentine, where the surface of the dentine is surrounded by a higher periphery of enamel (called erosion) but not exposing secondary dentine or pulp.
3	B, L	Complete loss of enamel on a surface, pulp exposure, or exposure of secondary dentine where the pulp used to be. Frank pulp exposure is most unlikely.
3W	Incisal	Loss of enamel and extensive loss of dentine, where the surface of both enamel and dentine is flat and in continuity (this is tooth wear) and where there is pulpal exposure or exposure of secondary dentine.
3E	Incisal	Loss of enamel and extensive loss of dentine, where the surface of the dentine is surrounded by a higher periphery of enamel (called erosion) and exposing secondary dentine or pulp.
8	All	Fractured tooth - clear evidence of traumatic loss of tooth substance rather than wear.
9	All	Unscorable. >75% of surface obscured and no remaining incisal edge/tip, which can be coded. **If any incisal edge/tip is present and a score may be given, this should be done.** All crowns and bridge abutments are given this code including missing teeth.

Notes:
(1) Bridge pontics are coded as missing.
(2) Code 2 is the most difficult to judge. Use the CPI probe (shaded band) to measure the diameter of any exposed dentine facet if necessary.
(3) Where wear is severe, it can often be contiguous from palatal onto incisal, such that it is difficult to distinguish the surfaces. In these instances, code both the same.
(4) Frank pulpal exposure is very rare, but exposure of secondary dentine (where the pulp used to be) usually appearing as a small translucent area in the centre of a wide area of dentine exposure, is not uncommon in older people.

Lesions of the Oral Mucosa (All age groups)

(Adaptation of the criteria used in Oral Health Surveys, 1987)

A screening examination of the oral mucosa and the hard and soft tissues in and around the mouth should be made on every adult subject examined. The examination should be thorough and systematic; it should begin with the lips, and proceed to the upper and lower labial sulci, upper and lower buccal sulci, retromolar areas. The palatal mucosa, hard and soft palate should then be inspected. The examiner should ask the subject to say 'Aha' in order to inspect the soft palate. The tongue should then be examined. This should include the surface, margins and mobility of the tongue. The subject should be asked to protrude their tongue and the degree of mobility should be assessed including any deviations to one side. Finally, the inferior surface of the tongue and the floor of the mouth should be examined. Examination of the oral mucosa is facilitated by the use of the mouth mirror. Mucosa or facial tissues that seem to be abnormal, as well as the submandibular, sublingual, and cervical lymph nodes, should be palpated.

Conditions or diseases of the oral mucosa should be classified as follows:

Code		Code	
0	None	11	Denture stomatitis
1	Acute necrotizing ulcerative gingivitis	12	Smoker's palate
2	Suspect oral neoplasm	13	Flabby ridge(s)
3	Oral Lichen planus	14	Denture Granuloma
4	Leukoplakia of oral mucosa	15	Cheek and lip biting
5	Candidiasis	16	Geographic tongue
6	Sinus associated with infected tooth	17	Frictional Keratosis
7	Apthous ulceration	18	Discoid Lupus Erythematosus
8	Amalgam tattoo	19	Leukodema
9	Erythroplakia	20	Lesions that can not be clearly identified
10	Median rhomboid glossitis	21	Other

If there are more than two lesions present, the more severe condition is recorded.

<u>Caries</u>

The examination for caries is largely a visual one. The teeth are examined wet and a CPI probe is used to remove food debris. The CPI probe may also be used to confirm cavitation.

The examiner should commence examinations on the upper right, upon the call of the upper right 8 by the recorder. He/she should call the status for each tooth or space following the recorder's call from the upper right 8 (tooth number 1.8) continuing to the upper left (tooth number 2.8). The examiner should then call the status for each lower tooth or space beginning at the lower left 8 (3.8) and proceed to the lower right 8 (4.8). It should be noted that although the FDI international system of numbering teeth has been used the recorder might call 8, 7, 6 etc. to retain simplicity without causing confusion. The examiner may have to use clinical judgement regarding tooth morphology, and take into account the subjects previous dental history if doubt exists as to the correct notation for a particular tooth. However when such doubt exists where there are missing molar teeth the third molar should be assumed to be unerupted rather than recording first or second molar teeth missing due to caries. This will result in an underscoring of caries prevalence rather than an over scoring.

Tooth Status Code

Code	Existence of teeth
A	Permanent tooth present
P	Deciduous tooth present
U	Permanent tooth unerupted
E	Permanent tooth extracted due to caries
G	Permanent tooth extracted due to perio disease
M	Permanent tooth missing due to other reasons, i.e. lost due to trauma, or orthodontic extractions or congenitally absent
K	Permanent tooth extracted for reason unknown, i.e. not extracted due to caries, periodontal disease, trauma or orthodontic reasons or congenitally absent (it is considered that this code will be rarely used)

Space Status Code

If tooth is present leave column blank

Code	Space Status
0	No space: This category will be used when the remaining space is equal or less than 1/2 the width of the missing tooth, for all missing 3rd molars and for cases where tooth space is closed and space is distributed among other teeth.
1	Space
2	The tooth has been replaced by a conventional cemented bridge
3	The tooth has been replaced by a resin bonded bridge
4	The tooth has been replaced by a denture or prosthetic, which can be removed from the mouth
5	Implant

Preface to Surface Conditions Coding

A condition code will be given to each surface of each tooth present. The crown has four surfaces: mesial, distal, buccal and lingual, in the case of incisors and canines. Premolars and molars have an extra surface (occlusal). It will be noted, some tooth codes exclude a need for surface condition coding e.g. if a tooth has been extracted or is congenitally missing the surface condition code will be left blank.

In the case of a partially erupted tooth, score all surfaces present and sound unless there is caries on the erupted portion.

No distinction need be made between a deciduous and permanent tooth in the surface condition fields.

Condition Status - Crown

The teeth will be examined visually. The CPI probe may be used to confirm a diagnosis of cavitation to check for sealants or to remove food debris.

- Code R - Fissure sealant

A fissure sealant is recorded to be present when it is detectable on a surface and when there is no probeable caries on the same surface.

- Code S - No Caries

A surface should be considered sound if it shows no evidence of treated or untreated caries, or if it is at the doubtful stage. These scores will also apply in the case of defects not to be counted as caries:

(a) white and/or chalky spots
(b) discoloured or rough spots
(c) stained pits or fissures in the enamel that catch the explorer but do not have a detectably softened floor, visibly undermined enamel or softening of the walls
(d) Dark, shiny, hard pitted areas of enamel in a tooth showing signs of moderate to severe fluorosis.

- Code V - Visual Caries

Visual caries is recorded when there is definite evidence of caries into dentine, but where there is no probable cavity through the enamel. The appearance may vary but will usually look like grey or creamy white shadowing under enamel. Where there is any doubt, score 'sound'.

- Code D - Decayed, cavity

Caries will be considered to be present in a surface when any lesion has a detectably softened floor, undermined enamel, or softened wall. On an approximal surface, the lesion must be visible and the probe point must enter a lesion with certainty. Where any doubt exists, caries should not be diagnosed as being present. It must be emphasised that clinical caries is a stage in the process of dental caries. Dental caries proceeds from a microscopic lesion, which cannot be diagnosed positively by present clinical methods, to a cavity (or clinical caries) which can be diagnosed by clinical examination. The upper limit for this category is the complete destruction of the crown. Where only roots remain for deciduous teeth, decayed is recorded only when no permanent successor has erupted.

Dental caries affecting enamel only, such as white spot lesions and other conditions should be deliberately excluded because they cannot be diagnosed positively and reliably.

Decay is recorded where a surface contains a temporary filling requiring further treatment, or where a complete filling is lost (see 'filled or defective filling'). For a primary surface, decay is recorded even though it is about to be exfoliated.

- Code K - Filled Amalgam and Primary Decay
- Code L - Filled (restoration not amalgam) and Primary Decay

A surface should be classified 'filled and primary decay' when a surface has been filled and another area is carious.

- Code Y - Filled Amalgam and Secondary Decay
- Code Z - Filled (restoration not amalgam) and Secondary Decay

Surface should be classified filled and secondary decay when there is recurrent caries in contact with a filling (either an amalgam restoration or a non-amalgam restoration).

- Code F - Filled - Amalgam Restoration
- Code G - Filled - Non Amalgam Restoration

Surfaces should be considered filled whenever a filling or any permanent material is present, and there is no discreet or recurrent caries. A defective filling where there is no discreet or recurrent caries e.g. cracked or partly missing is scored F or G, with the appropriate treatment code indicating the replacement restoration required. A tooth with a three-quarter crown should also be recorded as filled even if it is a bridge abutment.

- Code C - Crowned

All surfaces should be placed in this category if a tooth has full crown (intended total crown coverage) in a permanent material and including bridge abutments except where the reason for the crown is trauma. Code C should only be used for crowned teeth due to caries. When a tooth is crowned for a reason of trauma code T for all surfaces.

- Code Q - Crowned and Decayed

A surface should be scored as 'crowned and decayed' when caries is contiguous with the crown.

- Code T - Trauma

A permanent surface should be recorded 'trauma' if part of its substance is missing for reasons other than treated or untreated caries and the latter condition is not present. T is the score for all surfaces where a crown is present due to trauma.

- Code X - Excluded

This category should be used for teeth which cannot be properly examined (i.e. impacted teeth, or teeth which have been banded for orthodontic reasons).

Treatment Code for Crown

If no tooth is present, this box should be left blank.

Coronal treatment need for crown caries and extraction due to periodontal disease should be recorded following the assessment of the crown condition. Many conditions are exclusive to the whole tooth rather than separate for the crown and the root, i.e. extraction due to coronal caries excludes the need for any treatment for root caries. Therefore, in this situation, the code for extraction due to coronal caries will be placed in the relevant box for treatment code for the crown, and the treatment code for the root will be left blank. Thus, root and coronal disease may be recorded independently or double coded as required.

Many treatment plans will be possible for each tooth space, and the examiners clinical judgement must be relied upon to select which of these scored apply in individual cases. It is noted that there may be a consistent difference between local examiners and recorders in allotment of these scores.

It will be noted that not all surface defects require treatment need. It is intended only to provide information on the significance of defects as a clinical problem.

For example, defects not having a restorative need or appearance problem need not be identified as requiring treatment. A defect on the buccal surface of an upper anterior tooth may require cosmetic treatment, whereas the same defect on a posterior tooth would best remain untreated.

Treatment codes for crown caries and extraction due to periodontal disease

Code 0:   None. This code is used when it is considered that a tooth requires no treatment.

Code 1:   One surface restoration

Code 2:   Two surface restoration

Code 3:   Three surface restoration

Code 4:   Fissure sealant or preventive resin restoration

Depending on the surface coverage, these codes should be used to designate treatment required to remove caries lesions (primary or secondary) to repair trauma, or replace unsatisfactory fillings, in consideration of both function and appearance. Replacement of a filling is adjudged necessary, in the absence of untreated caries or after a condition score of 0, when there is one or more of:

(a) A deficient margin which, in the examiner's judgement on the evidence of insertion of an explorer, or deep staining, allows leakage at least to dentine.
(b) An overhanging margin of a dimension at least equal to the thickness of a standard precast crown.
(c) A deficient contact point between normally spaced teeth or a deficient marginal ridge allowing, or facilitating food impact.
(d) A fracture of defect in a filling allowing leakage at least to dentine.
(e) A discolouration or disharmony of shape or colour of an existing filling
(f) A clinical decision to fill in case of doubt, e.g. 'sticky fissure' or to restore tooth defects.

• Code 5 - Crown
A decision to restore a tooth with a crown must be made by clinical judgement. Discolouration of a tooth due to trauma or a pulp condition may be a reason for restoration replacement of a crown is adjudged necessary in the absence of untreated caries after a condition score of 0, when there is one or more of:

(a) A deficient margin which, in the examiner's judgement on the evidence of insertion of an explorer, or deep staining, allows leakage at least to dentine.
(b) An overhanging margin of a dimension at least equal to the thickness of a standard precast crown.
(c) A deficient contact point between normally spaced teeth or a deficient marginal ridge allowing, or facilitating food impact.
(d) A fracture of defect in a crown allowing leakage at least to dentine. A discolouration or disharmony of shape colour of an existing crown.

• Code 6 - Pulp treatment required due to coronal caries followed by restoration by filling.
• Code 7 - Pulp treatment required due to coronal caries followed by restoration with crown.
• Code 8 - Extraction due to coronal caries
These scores are used when there is obvious pulp involvement or when more than 2/3 of tooth structure has been lost, and restoration with crown is deemed inappropriate. The examiner's clinical judgement must be relied upon to select which of these scores (5, 6 or 7) apply in individual cases, and it is noted that there may be a consistent difference between local examiners and rovers in allotment of those scores.

• Code 9 - Extraction due to periodontal disease
A tooth should be placed in this category when periodontal disease has advanced so far that the tooth is loose or functionless and, in the clinical judgement of the examiner cannot be restored to a firm and functional state. Such teeth would normally score 4 in the periodontal disease condition measurement.

• Code W - Extraction due to other reasons
• Code P - Implant required to replace tooth
• Code R - Replacement with removable prosthesis
• Code S - Replacement with resin bonded bridge
• Code F - Replacement with conventional fixed bridge
• Code V – Veneers
• Code X - Other treatment for Crown Caries
   This score is used for any other treatment of teeth not covered, and specifically for recontouring and repairing restorations.

Condition Status - Root

If no tooth is present then this box should be left blank.
On no account should you try to examine the roots at the same time as the crowns.

Having completed the coronal surfaces the examiner should return to examine the roots in the same order as was used for those surfaces. There is no need for the recorder to mark out missing teeth, this will have been done automatically, but it is important that you keep the recorder orientated. You should call out which teeth you are on as you progress or, at the very minimum, you should indicate when the midline is reached.

Diagnosis of root caries is different from that for coronal caries, and requires the use of a sharpened probe. Textural changes are at the heart of diagnosis. A sharp root probe will be used in confirming the diagnosis. Note that the root probe is used for no other surface. The probe should be used on the surface of the roots to determine texture or detect cavitated defects. *Do not try to push the tip hard into dentine.* You will get some indication of the texture by dragging it across the surface, and gently feeling for any softness. Do this if there is any question of decay.

Anything exposed apical to the cemento-enamel junction is regarded as root surface. Each root may have four surfaces but in reality often only one or two will be exposed and in younger participants the number of exposed teeth will be rather low. However all four surfaces must be examined (mesial, distal, buccal and lingual or palatal), to ensure complete coverage of the root surface.

Codes and criteria

Each root surface of every tooth should be examined and four codes per tooth will be recorded using the codes below.

Remember if in doubt, score low (i.e. least disease).

Condition Status - Root (one code per surface)

Code	Root Condition
0	No exposed root surface
R	Recession, no decay: Exposed root surface present but no evidence of current or past disease
2	Caries, no restoration
3	Amalgam restoration present
4	Non-amalgam restoration present
5	Filled amalgam with primary decay
6	Filled non-amalgam with primary decay
7	Filled amalgam with secondary decay
8	Filled non-amalgam with secondary decay
9	Broken down tooth such that roots cannot be scored. Code 9 indicates that the root is present but is grossly carious and broken down.
A	Hard, arrested decay. The surface should be glossy and hard, despite being discoloured. There has been decay, but it is now arrested. See above for "caries".
X	Unscorable
W	Worn to a depth of 2mm or more, but with no caries or restoration

Code X should be used sparingly, and only if it is not clear whether or not there is any root exposure. This is most likely where there are very large deposits of calculus around lower incisors. If there is any visible root it should be coded with the appropriate letter. If there is no root surface exposed then a code 0 should be used. Only if the examiner suspects an exposed root surface, but cannot examine it should a code X be entered.

Caries: This is any caries, which is believed to be active on the basis of texture. An active root lesion can be almost any colour from yellow or tan through to almost black. In some circumstances it can even be very difficult to tell caries from extrinsic staining. The texture is very important and the probe

must be used to try to determine this. Anything that shows evidence of softening or frank cavitation should be coded as carious. Shiny dark areas are much less likely to be actively carious and more likely to be arrested; such areas should be coded as '10'. Usually stained calculus and extrinsic staining will be fairly obvious, but if there is any doubt the texture is critical.

3mm Rule

Most restorations are clearly either crown or root restorations, but some restorations and lesions straddle the CEJ and these are difficult to call. Here the 3mm rule will apply. This goes as follows:

- If the restoration is clearly a coronal restoration which encroaches on to the root, it should ONLY be coded as a root restoration as well as a coronal restoration if it extends 3mm or more beyond the CEJ and onto the root surface. The distal section of the CPI probe (above the ball end) can be used to measure this if necessary.
- If there is frank caries at the margin of the filling extending from the coronal onto the root surface then this will count as caries on the root, even where the restoration does not extend 3mm. In this case the condition of the coronal portion of the filling will be coded independently according to the condition of this part of the tooth.
- If a root restoration extends onto the crown, the same 3mm rule applies in reverse (i.e. there must be 3mm beyond the CEJ on to the crown to count as a coronal restoration), but any caries occurring on the coronal portion of a root restoration is recorded as coronal caries, whilst the root restoration is scored according to it's condition.
- Some lesions and some fillings are smaller, they straddle the CEJ and it is difficult to be sure whether they are primarily on the root or the crown and do not extend 3mm onto either. In this case they should be recorded as root as this is the more vulnerable surface if it is exposed.
- Artificial crowns cause a particular problem because it is often impossible to identify the CEJ. Where there is a crown and the CEJ is covered, the margin of the crown should be considered the same as the CEJ, unless the contour of the crown indicates where the CU lies in which case the extension of the crown beyond this can be measured. On the rare occasion where this extends 3mm or more on to the root surface, the surface should be recorded as filled.

Notes:

- Root surfaces are examined in a separate single sweep of the mouth, examining the teeth in the same order as for crowns
- You must use the sharp probe to assess texture
- In younger patients the examination will usually be very easy and quick

Treatment Codes - Root

When a lesion involves both root and crown only the likely sites of origin, i.e. the site diagnosed as carious, should be scored to require treatment. If the origin can not be decided then, as for the diagnosis, both crown and root are scored as requiring treatment. Over hanging and deficient margins and fractured restorations apply as for coronal caries.

Code	Root Treatment
0	No treatment required
1	1 surface restoration
2	2 or more surface restoration
3	Pulp treatment
4	Extraction due to root caries
5	Other treatment

Reporting Pathology

The dental examiners normally do not make any comment about what they see during the examination. But If the subject asks about their dental treatment need, or for example questions relating to the standard of previous dental care, the examiner may respond as follows "that the survey is not designed to collect the sort of information on which a treatment can be planned, and that visiting a general dental practitioner is the best way of ensuring a thorough dental check-up".

If after the examination the subject wishes to know about the condition of their mouth, the examiner may give a broad indication of whether there is room for improvement in terms of the general oral

hygiene/cleanliness. If there are obvious signs of neglect, the dentist may advice them that they should have a check up with a dentist in the near future.

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; the incidence of these lesions is very low.

Protocol: reporting serious pathology

In the extremely unlikely event that such a lesion is noted, the examiner is obliged to follow a set protocol, which is designed to make sure that the subject's general medical practitioner is informed, whilst not causing the participant unnecessary worry.

The examiner should inform the subject using an appropriate form of words. The dentist will usually want to introduce the subject by asking whether or not the lesion causes any discomfort, and then state that it is study policy that a brief report of any ulcers or inflamed areas is passed to subject's family doctor. If the subject agrees, the name and address of the general medical practitioner is recorded and follow up procedures instituted immediately.

General Questionnaire (Appendices 12a and 12b)

The general questionnaire is to be completed by the examiner or recorder. Alternatively, each team may employ a third person to administer the interview questionnaire. **If the examiner conducts the interview then this should always take place after the oral examination.** If a third person or the recorder conducts the interview then the interview can take place either before or after the oral examination. The subject will be asked the questions verbally and the relevant code(s) will be recorded in the appropriate column. A separate questionnaire is to be used for dentate (12a) and edentulous subjects (12b). Please note: Questions 34a) to 34p) (dentate questionnaire and the equivalent questions in the edentulous questionnaire) (Quality of Life measure) are a copyright instrument- OHQol-UK(W)© and are been used with the kind permission of Dr. Colman McGrath.

Social Class
On completion of the general questionnaire the interviewer will classify the subjects or proxy occupation using the standard Occupational Classification handbook of the Office of Population Censuses and Surveys, UK. Each examiner will obtain a copy of this classification of occupations.

Special Acknowledgements

Fulfilling the aims of the survey required the clinical examination of 2,888 adults. The scale of the survey required contributions from a large number and wide variety of people from many different disciplines and sectors of society. We would like to thank everybody who contributed to the survey and to the production of this report. This survey would not have been possible without the generous contribution of time and effort and the kind cooperation of the adults themselves.

Special thanks to Brigadier General David Taylor, Officer Commanding, The 1st Southern Brigade, Collins Barracks and Lieutenant Colonel David Prendergast, Officer Commanding 4th Infantry Battalion and Collins Barracks and the 4th Infantry Battalion at Collins Barracks and their troops for their participation in the training and calibration exercises for the survey fieldwork.

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