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The dental workforce in New Zealand

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Doctor of Philosophy
At the University of Otago, Dunedin,
New Zealand

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Abstract

Each of the seven investigations described in this thesis relates to the dental workforce in New Zealand (NZ). A variety of approaches were used to identify key trends in the NZ dental workforce, with particular emphasis on comparing dental therapists, dental hygienists and dentists, and determining differences among dentists according to gender and immigrant status.

Nation-wide postal surveys of dentists, dental therapists, and dental hygienists were undertaken to determine the working practices and career satisfaction of each type of oral health professional. A longitudinal analysis of the dentist workforce was then undertaken to elucidate changes in the NZ dentist workforce over time. An investigation of the job stressors and coping strategies of New Zealand dentists followed. This led to a qualitative study of the experiences of immigrant dentists in NZ, which sought further detail regarding the concerns raised by the study of occupational stress. The final investigation was a survey of the self-reported occupational health of NZ dentists, which built upon and extended the findings of the preceding studies.

There were substantial differences in the working practices of male and female dentists. A greater proportion of female dentists had taken a career break of six weeks or more, usually to care for children. Larger proportions of women worked as employees or practice associates, and worked part-time. Women also planned to retire earlier than male respondents. Men were more active in continuing professional education and had higher career satisfaction.

Dental therapists and dental hygienists were similar in their career satisfaction, but dental therapists were much less satisfied with their income, and few felt that they were a valued part of the dental community. Although many dental hygienists had taken substantial career breaks for childrearing, they were shorter than those taken by dental therapists. More therapists than hygienists planned to retire within the next 10 years.
Over the nine-year period from 1997 to 2005, there was a significant increase in the number of women and overseas-trained dentists in the workforce. The proportion of dentists working in small towns decreased, and the percentage working part-time increased. Dentists' involvement in continuing professional development increased during that time.

There was considerable variation in the number of stressors experienced by dentists, with overseas-qualified practitioners reported experiencing more stressors more frequently than did those trained in NZ. There were differences in the strategies used by male and female dentists to manage stress.

Most immigrant dentists had found the dental registration examination process to be difficult and stressful. Key factors were uncertainty about the content of the examination and the high costs involved. Contact with practising dentists during this time was found to be helpful.

Overall, most dentists had good general health, but physical fitness levels were not ideal. Hand dermatoses and musculoskeletal problems were common, with around 60% of dentists experiencing pain or discomfort. Workplace bullying was reported by one in five dentists, and more than one-quarter had experienced a violent or abusive incident.

There is a need for ongoing monitoring of the workforce, particularly as its gender distribution (and societal trends and expectations) continues to change. Further support systems for immigrant dentists would be beneficial. Female and rural dentists also have unique circumstances and increased risk of professional isolation. Researchers and the professions will watch with interest the changes which are likely to occur over the next decade as dual-qualified auxiliaries enter the dental workforce and public dental services are redeveloped.
Acknowledgments

A PhD thesis is a major undertaking and a great deal of support is required. I am very grateful to everyone who played a part in helping me to reach the finish line!

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# Table of Contents

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title page</td>
<td>I</td>
</tr>
<tr>
<td>Declaration</td>
<td>II</td>
</tr>
<tr>
<td>Abstract</td>
<td>III</td>
</tr>
<tr>
<td>Acknowledgements</td>
<td>V</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>VIII</td>
</tr>
<tr>
<td>List of Tables</td>
<td>XIX</td>
</tr>
<tr>
<td>List of Figures</td>
<td>XXI</td>
</tr>
<tr>
<td>List of Abbreviations</td>
<td>XXII</td>
</tr>
<tr>
<td>List of Appendices</td>
<td>XXIII</td>
</tr>
</tbody>
</table>

VIII
## Chapter 1 Introduction

1.1 Introduction .......................... 2  
1.2 Rationale for the studies ........... 2  
1.3 Aims of the studies .................. 3  
1.4 Thesis layout ......................... 3

## Chapter 2 Review of the Literature

2.1 Introduction to the Chapter ........... 4  
2.2 The New Zealand Health and Disability Workforce  
   2.2.1 Background .................. 4  
   2.2.2 Global influences on the health and disability workforce  
   2.2.3 Other influences on the health and disability workforce  
   2.2.4 Priorities for workforce development in New Zealand  
   2.2.5 Maori and Pacific workforce capacity  
   2.2.6 Maldistribution of the health and disability workforce  
2.3 Structure, finance and regulation of dental services in New Zealand  
   2.3.1 The provision of oral health care in New Zealand  
   2.3.2 Regulation of dentistry in New Zealand  
   2.3.3 Key stakeholders influencing oral health provision in New Zealand  
   2.3.4 Organised dentistry in New Zealand  
   2.3.5 Other influences on the New Zealand dental workforce  
2.4 The New Zealand Oral Health Workforce  
   2.4.1 Introduction ................ 15  
   2.4.2 Recent changes impacting on the oral health workforce in New Zealand  
   2.4.3 Current changes being implemented - Reorientation of the school dental service  
2.5 Gender issues ....................... 19  
   2.5.1 Gender and the workplace ....... 19  
   2.5.2 Gender differences among dentists .... 22

IX
2.6 Job satisfaction 24
2.7 Continuing professional development 26
2.8 Retirement from the dental profession 29
2.9 Monitoring the New Zealand dentist workforce over time 30
2.10 Stress and dentistry 31
2.11 Immigrant Dentists 33
2.12 Occupational health of dentists 34
2.13 The dental therapy workforce 35
2.13 The dental hygienist workforce 38

Chapter 3 Methods

3.1 Introduction to the Chapter 40
3.2 Research methodology 41
3.2.1 Introduction 41
3.2.2 Maximising response rates to postal questionnaires 42
3.2.3 Measuring ethnicity 43
3.2.4 Measuring career satisfaction 45
3.2.5 Qualitative research in dental public health 46
3.2.6 In-depth interviews 48
3.3 The working practices and job satisfaction of male and female dentists in New Zealand - the Gender Study 50
3.3.1 Ethical approval 50
3.3.2 Study method 50
3.3.3 Career satisfaction scale 50
3.3.4 Statistical analysis 51
3.4 The working practices and job satisfaction of dental therapists in New Zealand - the Therapist Study 51
3.4.1 Ethical approval 51
3.4.2 Study method 51
3.4.3 Career satisfaction scale 52
3.4.4 Statistical analysis 52
3.5 The working practices and job satisfaction of dental hygienists in New Zealand - the Hygienist Study
3.5.1 Ethical approval
3.5.2 Study method
3.5.3 Career satisfaction scale
3.5.4 Statistical analysis

3.6 Changes in the New Zealand dentist workforce over a nine-year period - the Longitudinal Study
3.6.1 Ethical approval
3.6.2 Study method
3.6.3 Definitions
3.6.4 Statistical analysis

3.7 Job stressors of New Zealand dentists and their coping strategies - the Stress Study
3.7.1 Ethical approval
3.7.2 Study method
3.7.3 Inventory of Job Stressors
3.7.4 Statistical analysis

3.8 A qualitative investigation of the experiences of immigrant dentists working in New Zealand - the Immigrant Dentist Study
3.8.1 Ethical approval
3.8.2 Study method
3.8.3 Data analysis

3.9 The occupational health of dentists working in New Zealand - the Occupational Health Study
3.9.1 Ethical approval
3.9.2 Study method
3.9.3 The questionnaire
3.9.4 Statistical analysis

3.10 Summary of the Chapter
Chapter 4  Results

4.1  Introduction to the Chapter  61

4.2  The working practices and job satisfaction of male and female dentists in New Zealand - the Gender Study  61
   4.2.1  Response rate  61
   4.2.2  Socio-demographic characteristics  61
   4.2.3  Current career breaks  63
   4.2.4  Previous career breaks  64
   4.2.5  Current working practices  65
   4.2.6  Continuing education practices  67
   4.2.7  Career satisfaction  69

4.3  The working practices and job satisfaction of dental therapists in New Zealand - the Therapist Study  72
   4.3.1  Response rate  72
   4.3.2  Characteristics of the respondents  72
   4.3.3  Current working practices  72
   4.3.4  Clinical duties  74
   4.3.5  Current career breaks  76
   4.3.6  Previous career breaks  77
   4.3.7  Continuing education  77
   4.3.8  Career satisfaction  77

4.4  The working practices and job satisfaction of dental hygienists in New Zealand - the Hygienist Study  80
   4.4.1  Response rate  80
   4.4.2  Characteristics of the respondents  80
   4.4.3  Hygienist training and qualifications  80
   4.4.4  Current career breaks  81
   4.4.5  Current working practices  82
   4.4.6  Previous career breaks  85
   4.4.7  Continuing education  85
   4.4.8  Job satisfaction  86
4.5 Changes in the New Zealand dentist workforce over a nine-year period - the Longitudinal Study

4.5.1 Introduction
4.5.2 Socio-demographic characteristics
4.5.3 Practising characteristics
4.5.4 Continuing professional development
4.5.5 Specialist status
4.5.6 Gender
4.5.7 Country of graduation

4.6 Job stressors of New Zealand dentists and their coping strategies – the Stress Study

4.6.1 Introduction
4.6.2 Socio-demographic characteristics
4.6.3 Job-related stressors
4.6.4 Strategies for managing stress

4.7 A qualitative investigation of the experiences of immigrant dentists working in New Zealand - the Immigrant Dentist Study

4.7.1 Interviewees
4.7.2 Reasons for moving to New Zealand
4.7.3 NZDREX
4.7.4 Employment and expenses while studying for NZDREX
4.7.5 Revision course
4.7.6 Peer contact
4.7.7 Working as a dentist in NZ
4.7.8 Difficulties of working as an immigrant dentist
4.7.9 Fitting in to the NZ community
4.7.10 NZDA and DCNZ
4.7.11 Mentors
4.7.12 Advice to dentists immigrating to NZ and suggestions for improvements to the NZDREX process
Chapter 5  Discussion

5.1  Introduction to the Chapter  

5.2  The working practices and job satisfaction of male and female dentists in New Zealand - the Gender Study  

5.2.1  Introduction  

5.2.2  Strengths and weaknesses of the study  

5.2.3  Career breaks  
   5.2.3.1  Current career breaks  
   5.2.3.2  Previous career breaks  
   5.2.3.3  Difficulties returning to work  

5.2.4  Current working practices  
   5.2.4.1  Practice ownership  
   5.2.4.2  Hours of work  
   5.2.4.3  Influence of children on working practices  

5.2.5  Student loans  

5.2.6  Postgraduate education  

5.2.7  Continuing professional development (CPD)  
   5.2.7.1  Overview  
   5.2.7.2  CPD and gender  
   5.2.7.3  CPD and rural practitioners  

XIV
5.2.8 Career satisfaction
   5.2.8.1 Overview 145
   5.2.8.2 Career satisfaction and gender 146
   5.2.8.3 Career satisfaction and specialisation 147
5.2.9 Retirement from dentistry 147
5.2.10 Implications of the findings 148

5.3 The working practices and job satisfaction of dental therapists
   in New Zealand - the Therapist Study
   5.3.1 Introduction 149
   5.3.2 Strengths and weaknesses of the study 149
   5.3.3 Characteristics of the respondents 150
   5.3.4 Current working practices 150
   5.3.5 Clinical duties 151
   5.3.6 Continuing professional development (CPD) 151
   5.3.7 Career breaks 152
   5.3.8 Career satisfaction 152
   5.3.9 Potential changes following the HPCA Act 154
   5.3.10 Workforce implications 154

5.4 The working practices and job satisfaction of dental hygienists
   in New Zealand - the Hygienist Study
   5.4.1 Introduction 155
   5.4.2 Limitations of the study 156
   5.4.3 Characteristics of the respondents 156
   5.4.4 Current working practices 157
   5.4.5 Clinical duties 158
   5.4.6 Career breaks 160
   5.4.7 Continuing professional development 160
   5.4.8 Career satisfaction 161
   5.4.9 Retirement 162
   5.4.10 Workforce implications 162
5.5 Comparison of the working practices and job satisfaction of dentists, dental therapists and dental hygienists

5.5.1 Introduction
5.5.2 Socio-demographic characteristics
5.5.3 Working practices
5.5.4 Career breaks
5.5.5 Continuing professional development
5.5.6 Career satisfaction
5.5.7 Retirement

5.6 Changes in the New Zealand dentist workforce over a nine-year period - the Longitudinal Study

5.6.1 Introduction
5.6.2 Strengths and weaknesses of the study
5.6.3 Socio-demographic characteristics
5.6.4 Location of practice
5.6.5 Non-practising dentists
5.6.6 Hours of work
5.6.7 Reasons for working part-time
5.6.8 Continuing professional development
5.6.9 Overseas-trained dentists

5.7 Job stressors of New Zealand dentists and their coping strategies – the Stress Study

5.7.1 Introduction
5.7.2 Strengths and weaknesses of the study
5.7.3 Job-related stressors
5.7.4 Variation in stressors among dentists
5.7.5 Medical emergencies
5.7.6 Overseas-qualified dentists
5.7.7 Coping strategies
5.7.8 Implications of the findings
5.8 A qualitative investigation of the experiences of immigrant dentists working in New Zealand - the Immigrant Dentist Study

5.8.1 Introduction

5.8.2 The qualitative method

5.8.3 Experiences of the immigrant dentists

5.8.4 Bridging programme

5.8.5 Changes to NZDREX

5.8.6 Recommendations resulting from this study

5.9 The occupational health of dentists working in New Zealand – the Occupational Health Study

5.9.1 Introduction

5.9.2 Strengths and weaknesses of the study

5.9.3 General health

5.9.4 Sick days

5.9.5 Physical fitness

5.9.6 General wellbeing

5.9.7 Stress

5.9.8 Pain, discomfort and medication use

5.9.9 Ocular health

5.9.10 Needlestick injuries

5.9.11 Workplace bullying and aggression

5.9.12 Dermatitis

5.9.13 Headaches

5.9.14 Musculoskeletal symptoms

5.9.15 Influence of gender

5.9.16 Influence of BMI

5.9.17 Future research
Chapter 6 Conclusions

6.1 Summary of findings 196
6.2 Implications of the research 197
6.3 Recommendations arising from this research 197

Chapter 7 References 201

Appendices
# List of Tables

## Chapter 3: Methods

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 3.1</td>
<td>Comparison between qualitative and quantitative research</td>
<td>49</td>
</tr>
<tr>
<td>Table 3.2</td>
<td>A summary of the methodology of the investigations</td>
<td>60</td>
</tr>
</tbody>
</table>

## Chapter 4: Results

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 4.1</td>
<td>Demographic characteristics of dentists by gender</td>
<td>62</td>
</tr>
<tr>
<td>Table 4.2</td>
<td>Information about dentists’ previous career breaks by gender</td>
<td>64</td>
</tr>
<tr>
<td>Table 4.3</td>
<td>Current working practices of dentists</td>
<td>66</td>
</tr>
<tr>
<td>Table 4.4</td>
<td>Continuing professional education practices of dentists by gender</td>
<td>68</td>
</tr>
<tr>
<td>Table 4.5</td>
<td>Indicators of career satisfaction with dentistry among male and female dentists</td>
<td>70</td>
</tr>
<tr>
<td>Table 4.6</td>
<td>Career satisfaction scores by dentists’ sociodemographic characteristics</td>
<td>71</td>
</tr>
<tr>
<td>Table 4.7</td>
<td>Working circumstances of practising dental therapists by age-group</td>
<td>73</td>
</tr>
<tr>
<td>Table 4.8</td>
<td>Duties regularly performed by dental therapists in their working practice</td>
<td>75</td>
</tr>
<tr>
<td>Table 4.9</td>
<td>Information relating to dental therapists currently taking a career break, together with information on intentions to return to dental therapy</td>
<td>76</td>
</tr>
<tr>
<td>Table 4.10</td>
<td>Dental therapists’ career satisfaction, interests and intentions</td>
<td>78</td>
</tr>
<tr>
<td>Table 4.11:</td>
<td>Logistic regression model for career satisfaction</td>
<td>79</td>
</tr>
<tr>
<td>Table 4.12</td>
<td>Dental qualifications held by dental hygienist respondents</td>
<td>81</td>
</tr>
<tr>
<td>Table 4.13:</td>
<td>Working circumstances of dental hygienists currently employed as hygienists by age-group</td>
<td>83</td>
</tr>
<tr>
<td>Table 4.14:</td>
<td>Duties regularly performed by dental hygienists in their working</td>
<td>84</td>
</tr>
</tbody>
</table>
practice, by age group

Table 4.15 Dental hygienists' career satisfaction, interests and intentions

Table 4.16 Sociodemographic characteristics of the active New Zealand dentist workforce from 1997 to 2005

Table 4.17 Practising characteristics of the active New Zealand dentist workforce from 1997 to 2005

Table 4.18 Practice characteristics of dentists who were working in NZ in all three years

Table 4.19. Sociodemographic and practising characteristics of dentists who were working in NZ in all three years by practitioner status

Table 4.20 Key sociodemographic and practising characteristics of dentists who were working in NZ in all three years by gender

Table 4.21 Comparison of respondents' sociodemographic and degree characteristics with those of the actively-practising NZ dental profession as a whole

Table 4.22 Frequency of stressors reported “very often” or “all of the time” among general dental practitioners

Table 4.23 Number reporting job stressors “very often” or “all the time” by graduating cohort

Table 4.24 Number reporting job stressors “very often” or “all the time” by practice setting

Table 4.25 Number reporting job stressors “very often” or “all the time”, by country of primary dental qualification

Table 4.26 Strategies most commonly used for coping with stress, by demographic and practising characteristics

Table 4.27 Comparison of respondents' sociodemographic and degree characteristics with those of the actively-practising NZ dental profession as a whole

Table 4.28 Dentists’ practising characteristics

Table 4.29 Self-reported general health

Table 4.30 Factors relating to dentists’ ocular health

Table 4.31 Practitioners’ experience of work-related adverse health events
Table 4.32  Prevalence of practitioners’ dermatitis-type conditions 132
Table 4.33  Practitioners’ experience of headaches and temporomandibular joint pain 133
Table 4.34. Musculoskeletal symptoms experienced by respondents 134

Chapter 5  Discussion

Table 5.1  Comparison of socio-demographic characteristics of oral health professionals 164

List of Figures

Chapter 5  Discussion

Figure 5.1  Comparison of the prevalence of musculoskeletal symptoms among dentists and dental therapists¹ in New Zealand 192
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC</td>
<td>Accident Compensation Corporation</td>
</tr>
<tr>
<td>APC</td>
<td>Annual Practising Certificate</td>
</tr>
<tr>
<td>AUT</td>
<td>Auckland University of Technology</td>
</tr>
<tr>
<td>BMI</td>
<td>Body Mass Index</td>
</tr>
<tr>
<td>BOH</td>
<td>Bachelor of Oral Health</td>
</tr>
<tr>
<td>CAL</td>
<td>Computer Assisted Learning</td>
</tr>
<tr>
<td>CDA</td>
<td>Combined Dental Agreement</td>
</tr>
<tr>
<td>CME</td>
<td>Continuing Medical Education</td>
</tr>
<tr>
<td>CPD</td>
<td>Continuing Professional Development</td>
</tr>
<tr>
<td>DClinDent</td>
<td>Doctor of Clinical Dentistry</td>
</tr>
<tr>
<td>DCNZ</td>
<td>Dental Council of New Zealand</td>
</tr>
<tr>
<td>DHAS</td>
<td>Doctors' Health Advisory Service</td>
</tr>
<tr>
<td>DHB</td>
<td>District Health Board</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>HPCA Act</td>
<td>Health Practitioners Competence Assurance Act</td>
</tr>
<tr>
<td>KITS</td>
<td>Keeping in Touch Scheme</td>
</tr>
<tr>
<td>MoH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Government Organisation</td>
</tr>
<tr>
<td>NHS</td>
<td>National Health Service</td>
</tr>
<tr>
<td>NZ</td>
<td>New Zealand</td>
</tr>
<tr>
<td>NZDA</td>
<td>New Zealand Dental Association</td>
</tr>
<tr>
<td>NZDHA</td>
<td>New Zealand Dental Hygienists' Association</td>
</tr>
<tr>
<td>NZDREX</td>
<td>New Zealand Dental Registration Examination</td>
</tr>
<tr>
<td>NZDTA</td>
<td>New Zealand Dental Therapists' Association</td>
</tr>
<tr>
<td>NZIDT</td>
<td>New Zealand Institute of Dental Technologists</td>
</tr>
<tr>
<td>SDS</td>
<td>School Dental Service</td>
</tr>
<tr>
<td>TMJ</td>
<td>Temporomandibular joint</td>
</tr>
<tr>
<td>TT</td>
<td>Trinidad and Tobago</td>
</tr>
<tr>
<td>UK</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
</tr>
</tbody>
</table>
List of Appendices

Appendix 1. Publications resulting from the thesis research


Appendix 2: The Gender Study

A2.1 Investigation of women in the dental workforce – Cover letter
A2.2 Investigation of women in the dental workforce – Reminder letter
A2.3 Women in the New Zealand dental workforce – Questionnaire
A2.4 Gender and the New Zealand Dental Workforce – Cover letter
A2.5 Gender and the New Zealand Dental Workforce – Reminder letter
A2.6 Men in the New Zealand dental workforce - Questionnaire

Appendix 3: The Therapist Study

A3.1 Working patterns and career satisfaction of dental therapists – Cover letter
A3.2 Working patterns and career satisfaction of dental therapists – Reminder letter
A3.3 The career development of dental therapists – Questionnaire

Appendix 4: The Hygienist Study

A4.1 Working patterns and career satisfaction of dental hygienists – Cover letter
A4.2 Working patterns and career satisfaction of dental hygienists – Reminder letter
A4.3 The career development of dental hygienists – Questionnaire

Appendix 5: The Stress Study

A5.1 Dentist Survey 2006

Appendix 6: The Immigrant Dentist Study

A6.1 Immigrant dentists information sheet
A6.2 Immigrant dentists consent form
A6.3 Structured interview for immigrant dentists
Appendix 7: The Occupational Health Study

A7.1 Occupational Health survey form
A7.2 Occupational Health reminder letter
1. Introduction

This thesis comprises of the following seven studies relating to the dental workforce in New Zealand:

1) The working practices and job satisfaction of male and female dentists in New Zealand (the “Gender Study”)
2) The working practices and job satisfaction of dental therapists in New Zealand (the “Therapist Study”)
3) The working practices and job satisfaction of dental hygienists in New Zealand (the “Hygienist Study”)
4) Changes in the New Zealand dentist workforce over a nine-year period (the “Longitudinal Study”)
5) Job stressors of New Zealand dentists and their coping strategies (the “Stress Study”)
6) A qualitative investigation of the experiences of immigrant dentists working in New Zealand (the “Immigrant Dentist Study”)
7) The occupational health of dentists working in New Zealand (the “Occupational Health Study”)

Each of these studies has been published in a peer-reviewed journal (Appendix A).

In this section, a brief introduction to the studies will be given followed by the rationale for and the aims of each study. The layout of the remainder of the thesis will also be described.
1.1 Introduction

Each of the studies in this thesis investigates an aspect of the New Zealand dental workforce. The initial emphasis of the work was on the working practices and job satisfaction of dental professionals in New Zealand. A longitudinal review of the dentist workforce followed, and this was followed by a series of studies relating to issues involving dentists in particular. The findings should be useful for organizations such as the Dental Council of New Zealand (DCNZ), the New Zealand Dental Association (NZDA), the Doctors Health Advisory Service (DHAS) and other support networks. They will also be of assistance to policy-makers and employers of dentists and auxiliaries.

1.2 Rationale for the studies

Limited information is available regarding the working patterns of oral health professionals in New Zealand. The DCNZ have been undertaking an annual workforce survey of practising dentists for several years (and have recently extended this to include dental therapists, dental hygienists, dental technicians, clinical dental technicians and dental or orthodontic auxiliaries). However, there was a need for more detailed information about the working practices of dental professionals, including longitudinal research.

In addition, very limited information was available about the occupational health of dentists (or other dental professionals) in this country. An initial survey investigated work-related stressors and coping strategies; it identified overseas-qualified dentists as a group requiring further investigation. That further research was subsequently undertaken using qualitative methods. The concluding study evaluated the occupational health of dentists overall.
1.3 Aims

The aim of this thesis was to understand the issues facing key groups of the oral health workforce and to identify priorities for workforce development.

The aim of the Gender Study was to describe and compare the working practices and job satisfaction of a representative sample of male and female dentists. The aim of the Therapist Study was to investigate the working patterns, continuing education commitment, and career satisfaction of dental therapists in New Zealand. Similarly, the objective of the Hygienist Study was to investigate the working patterns, continuing education commitment and career satisfaction of dental hygienists in this country. The Longitudinal Study had the aim of identifying and describing trends in the New Zealand dentist workforce over a nine-year period (from 1997 to 2005). The aim of the Stress Study was to investigate job stressors, coping strategies and their associations among New Zealand dentists. The Immigrant Dentist Study used a qualitative approach to determine the nature of problems experienced by overseas-trained dentists settling in New Zealand, and to ascertain what can be done to improve their experiences. Finally, the Occupational Health Study aimed to determine the occupational health status of dentists in New Zealand and any work-related factors that may be related to dentists' health concerns.

1.4 Thesis layout

This thesis is divided into seven main sections. Chapter Two comprises of a review of the literature related to each of the seven studies. In Chapter Three, the methodology of each study is described. The results of the studies are presented in Chapter Four, with discussions following in Chapter Five. The conclusions are provided in Chapter 6 and the references referred to are provided in Chapter Seven. In Appendix A, the papers submitted for publication are presented, and, in Appendix B, other reference material is provided (for example, sample information sheets, consent forms and questionnaires).
2. Review of the literature

2.1 Introduction to the Chapter

In this chapter, a concise review of the literature relating to the dental workforce is undertaken. Initially, the scene is set with some background involving the New Zealand (NZ) health workforce. This is followed by a more detailed discussion of the NZ dental workforce in particular. The literature review then moves on to consider various aspects of the dental workforce from a global perspective, considering the published international literature.

As each component of this thesis was planned, Medline was used to search for literature relevant to the topic. This was read and critiqued, used in the development of each study, and included in this chapter if relevant. The literature is further discussed in relation to the findings of each of the studies in Chapter 5. Also included within this chapter is some background information and justification of the research methods used, the measurement of ethnicity and job satisfaction, and the use of qualitative methods in dental research.

2.2 The New Zealand Health and Disability Workforce

2.2.1 Background

Approximately 23,000 health practitioners and 30,000 support workers deliver health and disability services in NZ (Health Workforce Advisory Committee, 2002). This is a very specialised workforce with relative inflexibility, as most roles require substantial training. The health and disability workforce needs to be monitored constantly to ensure that sufficient numbers of each type of health professional are maintained. The recruitment and retention of health practitioners depends on many factors, including access to education and training, remuneration, status, working conditions, and work content (Health Workforce Advisory Committee, 2002).
Adequate monitoring of the health and disability workforce requires a long-term approach:

"Workforce development can be a useful tool, for Government and the health sector, but one better suited to shaping and supporting an evolving health system rather than to responding reactively to immediate crises. It is an investment for tomorrow, a preventive measure to reduce future reliance on crisis management. Workforce development is also a mechanism for nurturing what is best in our health system, at a time in the history of health service delivery when it is more common to highlight weaknesses than celebrate strengths”


In NZ, there is an increasing demand for a workforce that possesses a sound knowledge of cultural aspects of health care, enabling the provision of culturally appropriate and acceptable services to diverse communities (Health Workforce Advisory Committee, 2002). In the current workforce, there is a mismatch between the demographic and ethnic make-up of the health and disability workforce and that of the society it cares for. The need for the development of a culturally adept workforce (particularly for Māori and Pacific peoples) has been identified. This would improve the effectiveness of service delivery and help to reduce health inequalities. It has been suggested that people are more likely to use health services if they feel culturally safe and identify with the provider (Medical Reference Group, 2006).
2.2.2 Global influences on the health and disability workforce

There are several global influences on the NZ health and disability workforce, including: greater mobility of health professionals; international shortages of many health practitioner groups; the potential to gain higher earnings and better working conditions in some countries; and an international trend towards shorter working hours. The NZ health sector faces strong international competition for its trained staff (Medical Reference Group, 2006). Workforce concerns are evident globally, and some countries have established novel recruitment and retention strategies (such as the *Keeping in Touch Scheme* and the *Retaining and Returning Advisory Service* in the United Kingdom; Firmstone *et al.*, 2007). The Australian Research Centre for Population Oral Health has predicted a shortfall of dental supply for Australia by the year 2010, with particular concerns for the public sector (Luzzi *et al.*, 2005). This may lead to a further increase in the number of NZ dental graduates moving to Australia.

2.2.3 Other influences on the health and disability workforce

Additional factors affecting the health and disability workforce in NZ include demographic change (ageing population, increasing proportion of Māori and Pacific peoples), disease patterns, and technological advances (Health Workforce Advisory Committee, 2002). Changing expectations of consumers also play a role (Medical Reference Group, 2006). For example, there has been an increasing demand for cosmetic dental procedures in recent years following a greater emphasis on this topic in the popular media (Theobald *et al.*, 2006).

2.2.4 Priorities for workforce development in New Zealand

The factors discussed above all impact on the health system and service delivery, and particularly on the recruitment and retention of the health workforce. The Ministry of Health has identified a need to review the way we educate, train, deploy and reward our health practitioners to ensure that they are able to deliver high-quality, culturally
appropriate, effective services in a rewarding work environment (Health Workforce Advisory Committee, 2002).

The Health Workforce Advisory Committee (2002) identified six priorities for workforce development in NZ:

1. Implementation of the primary health strategy;
2. Promoting a healthy hospital environment;
3. Educating a responsive health workforce;
4. Building Māori health workforce capacity;
5. Building Pacific health workforce capacity; and

The priorities of ensuring a responsive workforce and building both Māori and Pacific health workforce capacity are particularly relevant to this discussion, while the other priorities are beyond the scope of this work.

2.2.5 Māori and Pacific workforce capacity

Māori and Pacific peoples have poorer health than people of other ethnic groups. While the causes of this are multi-factorial, one problem is the failure of existing delivery systems to provide accessible and appropriate health services to these groups (Health Workforce Advisory Committee, 2002). Building the Māori and Pacific workforce capacity is one way to reduce these health inequalities.

Capacity refers to the:

"development of people, structures and resources so that communities have the necessary sustainable competencies and expertise to develop and maintain their desired level of health and wellbeing"

(Health Workforce Advisory Committee, 2002, p 63)

Some health practitioners are unable to adequately meet the needs of Māori and Pacific peoples, partly due to insufficient understanding of how cultural values and practices influence health and access to health services. Health professionals (including dentists,
dental therapists and dental hygienists) receive some teaching on how to enable appropriate care for Māori and Pacific people in their undergraduate training, and some employers (such as District Health Boards; DHBs) also provide similar courses. However, a greater involvement of Māori and Pacific in the provision of healthcare is required.

Māori health practitioners comprised 5.4% of the regulated health workforce in 2000 (Health Workforce Advisory Committee, 2002), but Māori represented 14.6% of the population in 2001 (www.stats.govt.nz). In the health sector, Māori are over-represented in dietary services, and support and ancillary roles, and under-represented in front-line clinical roles. Within nursing and medicine, Māori hold fewer advanced qualifications, and hold less senior roles, than their non-Māori counterparts (Health Workforce Advisory Committee, 2002).

Māori health workforce development is a component of Māori development and involves ensuring the continued recruitment, retention, utilisation and development of a quality Māori health workforce (Douglas, 1996). This has been identified as a key strategy for supporting Māori participation in the health sector and improving Māori health. The aim is to ensure that the numbers, skill mix and qualifications of the Māori workforce are available to meet the health needs of Māori communities and New Zealand society generally. Māori-led services delivered by Māori health practitioners should improve Māori health status, and reduce inequalities. Building Māori health workforce capacity is consistent with the Government’s recognition of the Treaty of Waitangi as the founding document of Aotearoa/NZ (Health Workforce Advisory Committee, 2002).

Similar concerns exist for Pacific groups; in 2000, only 1.8% of the regulated health workforce identified themselves as Pacific people, while in the 2001 census, 6.2% of the population self-identified as having Pacific ethnicity (Health Workforce Advisory Committee, 2002).
2.2.6 Maldistribution of the health and disability workforce

Historically, the primary health workforce has not been distributed equitably in relation to need. It is difficult to attract and retain staff in geographically isolated and socioeconomically disadvantaged areas (Health Workforce Advisory Committee, 2002). Currently, there are significant maldistribution problems in the health and disability workforce, with rural and non-metropolitan areas finding it increasingly difficult to recruit and retain doctors (Medical Reference Group, 2006) and other health professionals.

Recent data from overseas (and anecdotal reports from NZ) suggest that a similar problem exists for dentists. For example, it has been reported that there is a worldwide shortage of dentists working in publicly funded positions such as hospital departments, rural dental services and academia (Asare, 2008; Cane and Walker, 2006). In Australia, it has been predicted that there will be a shortfall of dental practitioners by the year 2010 (Luzzi et al., 2005), and that by 2015 there will be 1000 practitioners short of demand for services (Kruger and Tennant, 2005).

Kruger and Tennant (2005) found in their study of dental professionals in Western Australia that there are various factors that attract people to rural and remote areas, such as lifestyle, partner’s employment, the availability of a job, the ability to buy or join a practice, or having family nearby. The most common reason for leaving rural practice was to enable older children to attend appropriate educational facilities. Possible incentives to encourage practitioners to stay in rural areas may include improving access to professional development, assisting in the recruitment of locums and assistant dentists, or financial incentives and/or tax relief.

While the evidence for an actual shortage of dentists in NZ is questionable (as opposed to the maldistribution problem), there does appear to be a shortage of some health professionals, such as nurses. Models produced by the New Zealand Institute of Economic Research (NZIER 2004) forecast an increasing shortage of health workers (Medical Reference Group, 2006).
2.3 Structure, finance and regulation of dental services in New Zealand

2.3.1 The provision of oral health care in New Zealand

In New Zealand, oral health care is provided by a range of providers, including dentists and dental specialists, dental therapists, dental hygienists, dental technicians and clinical dental technicians. Discussion of dental technicians and clinical dental technicians is beyond the scope of this thesis.

The majority of health care is funded by the 21 District Health Boards (DHBs), each covering a geographical area of the country. The DHBs themselves are funded by the Government, and are required to use this funding to provide services for their communities, including those provided by public hospitals, non-government organisations and private providers. The New Zealand dental health care system is one of the most complex in the world. Several different provision models exist for different ‘types’ of dental care.

For children up to Year 8 (approximately 12 years), dental care is provided directly by the State in the form of the School Dental Service (SDS). Traditionally, this care has been provided from dental clinics located within primary schools. This made access to care easy for the majority of families, resulting in enrolment levels of around 95% for primary-school-aged children. Delivery of the SDS has evolved in recent years to include mobile services to replace many of the fixed facilities, with SDS personnel covering several schools in one year. Generally, each DHB has its own SDS, although the Auckland Regional Dental Service and the Canterbury SDS each provide care for 3 DHBs.

In contrast, the adolescent oral health care scheme (for young people from the end of Year 8 until their 18th birthday) involves third-party funding by the State. This care was traditionally provided by private dental practitioners in their surgeries, although some new models of care have developed in recent years (for example, provision of care by primary health organizations and Maori providers). The General Dental Benefit scheme was fee-for-service from 1946 to 2001, after which the Adolescent Oral Health Services Agreement...
came into being. The current scheme is provided by dentists who hold a Combined Dental Agreement (CDA) with their DHB. It is a mixed scheme, whereby a capitation fee is claimed annually for examinations, radiographs, preventive care and any occlusal restorations required, while fee-for-service claims are made for additional treatment (including compound restorations, extraction of teeth, root canal treatment and indirect restorations). Some treatment is not publicly funded (for example, orthodontic treatment and cosmetic bleaching). Problems with this scheme include poor uptake by dental practitioners in some regions, and less-than-ideal enrolment rates. These vary substantially around the country, with 58.7% of New Zealand adolescents participating in the scheme in 2007 (www.moh.govt.nz/moh.nsf/indexmh/oralhealth-resources#statistics). Some families choose to purchase private dental care services for children and adolescents as an alternative to SDS or CDA care.

In general, insurance coverage for dental care is low in New Zealand. The notable exception is care provided under the Accident Compensation scheme which has been in place since 1974. The scheme is a social insurance scheme, and the Accident Compensation Corporation is a Crown organisation which provides ‘no-fault’ insurance, covering for accidents regardless of fault or cause of injury. ACC’s role is to prevent accidents, and to rehabilitate and compensate individuals who are injured. It is funded by levies paid by employers, self-employed individuals and owners of motor vehicles. Since 1974, ACC’s governing legislation has been developed and amended five times. The 1989 amendment introduced (among other things) co-payment for dental treatment. ACC is currently governed by the Injury Prevention, Rehabilitation, and Compensation Act 2001 (latest Amendment Act 2008) (www.acc.co.nz/about-acc/overview-of-acc/introduction-to-acc).

The majority of adult dentistry is funded privately. Some dental care is provided in public hospitals, with the level of care varying by DHB. In many areas, this is limited to the provision of care for medically compromised individuals and acute maxillofacial trauma. Some hospital departments offer a relief-of-pain service, generally with a small co-payment. Some DHBs fund private practitioners to provide essential dental care (primarily relief of pain) for low-income adults. The Ministry of Social Development also supports
urgent dental care via special needs grants for beneficiaries. Only 45% of New Zealanders are routine users of dental care by age 26 (Thomson, 2001).

Strengths of the New Zealand dental care system include universal access to care for children and adolescents, the ‘no-fault’ system for orofacial trauma and a generally high standard of dental care. Problems include oral health inequalities, poor access to care for low-income adults and the dependent elderly and inequity in care (for example, better availability of subsidised care for dental trauma than dental caries, and regional variation in the dental care funded by DHBs.

2.3.2 Regulation of dentistry in New Zealand

The first Dental Act came into being in 1880 and brought about registration of dentists for the first time. The New Zealand Dental Association was established in 1905, and the first Dental School opened in 1907. The Dental Council of New Zealand was established in 1937 and, by 1950, dentists were required to have a full dental degree before they could practise their craft (Brooking, 1980). Dental specialties have been recognised in this country since 1988. There are now 11 specialties registrable with the DCNZ (endodontics, special needs dentistry, oral medicine, oral and maxillofacial surgery, oral pathology, orthodontics, paediatric dentistry, periodontology, prosthodontics, public health dentistry and restorative dentistry).

2.3.3 Key stakeholders influencing oral health provision in New Zealand

The Dental Council of New Zealand (DCNZ) is the statutory body constituted under the Health Practitioners Competence Assurance Act 2003 for maintaining self-regulation of the dental professions (dentists, dental therapists, dental hygienists, dental technicians and clinical dental technicians). Prior to this, the Dental Council was only responsible for registering dentists. The primary role of the council is to promote and protect the public interest by ensuring that oral health practitioners are safe and competent to practise.

The Ministry of Health (MoH) is the principal advisor to the government on health and disability policy, leading and supporting the health sector to achieve better health for New Zealanders. The MoH works as a policy adviser, regulator, funder and service provider. It sets and reviews progress towards key health targets, oral health being one of these. DHBs are required to provide oral health data to the Ministry on an annual basis. This includes: utilisation of DHB-funded dental services by adolescents; the mean DMFT score and percent caries-free at Year 8; the mean dmft score and percent caries-free at age 5 years; the number of preschool children enrolled in DHB-funded dental services; and the number of preschool and primary school aged-children enrolled in DHB-funded dental services who did not receive an annual examination (www.moh.govt.nz).

2.3.4 Organised dentistry in New Zealand

Several dental associations and societies have been established in New Zealand. These are described briefly below.

The New Zealand Dental Association (NZDA) is the professional association for NZ dentists. Approximately 96% of dentists registered in NZ belong to it. It provides many services for its members to support them to deliver quality health care in NZ. NZDA provides three main roles:

1) assisting its members by providing appropriate services and products and represents dentists in discussions with government and private agencies;
2) promoting and funding dental research through the NZDA Dental Research
Foundation, and supports members' families through the NZDA Benevolent Fund; and

3) promoting oral health and the dental profession through education of the public and advocacy and discussion with the broad range of organizations, companies and public and private agencies that affect standards of oral health.

(www.nzda.org.nz)

The New Zealand Dental Therapists' Association (NZDTA) is an incorporated society that provides voluntary membership to NZ-registered practising dental therapists and dental therapy/hygiene students. It has the purposes of preserving and promoting the interests of the dental therapy profession, enhancing the professional profile of dental therapists and dental therapy services, and promoting oral health (www.nzdta.co.nz).

New Zealand Dental Hygienists' Association (NZDHA) operates on behalf of the New Zealand Dental Hygiene Profession. The NZDHA has branches throughout New Zealand where members can meet with colleagues and gain knowledge and experience community (www.nzdha.co.nz).

The New Zealand Institute of Dental Technologists (NZIDT) exists to facilitate the professional development of Dental Technicians and Clinical Dental Technicians in the interests of its members and the communities they serve (www.nzidt.org.nz).

Te Ao Marama is the NZ Maori Dental Association, and its overall goal is achieve Oranga Niho (oral health) for all. It works to raise the awareness of oral health among government agencies, Maori health providers and Maori communities. Te Ao Marama serves as an important Maori organisation (a) to foster and promote oranga niho among Maori, (b) for the dissemination of information and new developments and services in oranga niho, and (c) to foster professional support and whanaungatanga among its membership. This national organisation, which has been recognised as representing the Maori view of oral health, is an assertion of Article II of the Treaty of Waitangi, and is a classic example of tino rangatiratanga (Maori self-determination). It is a recognised leader for Maori oral health (www.teaomarama.org.nz).
Other organisations of importance to dentistry in NZ include the Public Health Association, specialist groups such as the NZ Association of Orthodontists and special interest societies such as the NZ Society of Hospital and Community Dentistry. The Universities involved in training dental professionals (Auckland University of Technology and the University of Otago) are also key stakeholders. Some Australasian groups (such as the Royal Australasian College of Dental Surgeons) also play a role.

2.3.5 Other influences on the New Zealand dental workforce

In addition to legislation pertaining to dental practice, regulation of dentistry, professional associations and other key stakeholders, there are other influences on the dental workforce. These include more far-reaching Government policies and initiatives such as Working for Families and paid parental leave (introduced in 2008), immigration policies, and predicted changes in ACC legislation.

2.4 The New Zealand Oral Health Workforce

2.4.1 Introduction

Over the last decade, a number of concerns have been raised with respect to the oral health workforce. In 1998, Hannah was commissioned by DCNZ to undertake a review of the dentist, dental therapist, and dental hygienist workforces. In addition to this, the Dental Council undertakes an annual review of the dental workforce by means of a workforce questionnaire completed by registered dental professionals (previously only dentists, but now including dental therapists, dental hygienists and clinical dental technicians) at the time of reapplying for an Annual Practising Certificate. The reports prepared from these data provide useful 'snapshots' of the NZ dental workforce.

The main concerns relating to the dentist workforce include the cost of dental training (and subsequent debt level of graduates), an increasing number of dental graduates leaving NZ at the completion of training, and an increasing number of overseas-qualified dentists
entering the country. Other issues include a perceived maldistribution of dentists around the country and poor access to dental care by Māori and other groups. The increasing number of women dentists is also having an impact of the workforce because they work (on average), fewer hours per week than male dentists. This finding has been reported both in NZ (Thomson, 2006) and internationally (Brennan et al., 1992; Spencer and Lewis, 1988).

2.4.2 Recent changes impacting on the oral health workforce in New Zealand

There have been some considerable changes in the NZ dental system in recent years, and these have impacted on the oral health workforce. Arguably, the most significant of these was the implementation of the Health Practitioners Competence Assurance (HPCA) Act in 2004. This Act covers 15 different health professions, and specifies scopes of practice, certification of fitness to practice, and restricted activities. Since then, dental therapists and dental hygienists have been required to register with DCNZ as independent practitioners and to undertake continuing professional development. The Act also brought about significant changes in the scopes of practice of health practitioners and allowed dental therapists to move to the private sector. The boundaries about which oral health practitioners undertake particular types of treatment are continuing to evolve. Dental therapists are now able to treat adults (although the scope of practice for all but one therapist limits them to patients aged less than 18 years) and, with appropriate training, can undertake more complex treatments such as deciduous tooth pulpotomies and stainless steel crowns, and place composite restorations. Some issues remain unresolved, such as who is legally permitted to undertake vital tooth bleaching (Goodhew, 2008).

The HPCA Act also requires dental hygienists to be appropriately qualified, removing from the workforce the so-called “Section 11” workers who were permitted to ‘remove deposits from the teeth; apply materials to the teeth for the purpose of preventing disease; give advice on oral health; and carry out other similar work’ under the 1988 Dental Act. Practising under that section were not only trained dental hygienists but also former dental therapists with limited (if any) dental hygiene training, and untrained persons (Pack, 1995).
The advent of the new combined Bachelor of Oral Health degree (BOH; which integrated the previously offered dental therapy and dental hygiene programmes into a single, three-year degree) was another significant event. The first graduates of the combined BOH programme graduated from Auckland University of Technology (AUT) in December 2008, and the first Otago graduates are due to complete the Otago BOH degree at the end of 2009. The graduates will be useful members of the workforce as they can practise a combination of therapy and hygiene, on individuals of any age. More employment options are available to these graduates than for the previously trained dental therapists and hygienists. However, to continue to be registered in both areas, they need to maintain fitness to practice (involving maintaining sufficient continuing education and clinical practice) in both areas. This could cause difficulties within the School Dental Service (SDS), as the BOH graduates may offer their services to the SDS in only a part-time capacity, enabling them to practise dental hygiene in their other hours of work. As the remuneration for dental hygiene work is perceived to be better than that for dental therapy (which is mostly provided within the SDS), some graduates may choose to concentrate mainly on the former scope of practice. It is not yet clear what influence this change will have on the New Zealand dental workforce, but research is currently underway to determine this.\footnote{Alison Meldum, Convenor of Bachelor of Oral Health, University of Otago, Personal Communication, 2008.}

2.4.3 Current changes being implemented - Reorientation of the school dental service

For several years, it has been acknowledged that the current SDS has not been able to adequately meet the needs of New Zealand’s population. Suggestions about the reconfiguration of the SDS to community-based clinics (Whyman, 2000) have been acted upon, and the Ministry of Health is currently undertaking a substantial upgrade of community-based oral health facilities to support the delivery of child and adolescent oral health services and (it is hoped) improve oral health outcomes (Ministry of Health, 2006a).
The new community-based and population-focused oral health service will (in theory) provide oral health facilities appropriate to the needs of each community, based on a ‘hub and spoke’ model: strategically sited ‘hub’ clinics with appropriate outreach services and facilities. Clinics will be able to cater for the population from infancy through to adolescence and potentially beyond. Proposed improvements will include: greater infant and preschool contact; greater health promotion and preventive activities; reduced barriers to access for Māori, Pacific peoples and low-income families; improved adolescent services; provision of care beyond the scope of dental therapists (by initiatives such as employment of community dentists in the new clinics); and a greater potential for partnership with primary health organisations, Māori and Pacific providers and other providers (Ministry of Health, 2006a).

The proposed refocusing of the community oral health service is a very ambitious plan, and those implementing the policy have already experienced significant challenges. The estimated cost of implementing the proposed changes in some DHBs was greater than the funds allocated, necessitating a review of what can be provided within the available resources, and the need to reduce the planned number of clinics and staff in some regions. In addition, some members of the public will need to be convinced that the new service is a better option than the current model, particularly for those schools (mostly higher-decile; that is, located in higher socio-economic areas) who will lose on-site dental treatment, meaning that parents will have to take children to the community clinics.

It is expected that this major change will take place over several years, and, along with the implementation of the HPCA Act and the new BOH degree has the potential to radically change the working practices of dental therapists and dental hygienists. There is potential for auxiliaries to have a much wider scope of practice, and to work in an environment with greater peer contact and support from other health professionals, such as dentists and Well-Child Providers (who could share the clinics). This may positively impact on the job satisfaction of dental therapists and on the recruitment and retention of oral health professionals.
2.5 Gender issues

2.5.1 Gender and the workplace

Gender is a complex system of socially prescribed traits that sometimes, but not always, correspond to biological sex. Feminine stereotypes consider women to be nurturing, soft, caring, emotional and communal. Conformity to these norms is usually enforced by the culture in which women live (Martin, 2008). Feminist scholars consider that there are no ‘natural’ differences between men and women, and that sex discrimination is the primary reason for differences between men and women in the workforce (Hakim, 2006). It has been suggested that it is more difficult for women, especially those who are traditionally oriented, to be successful in male-dominated careers because they have to alter their personalities to be accepted as competent (Martin, 2008).

The participation of women in the workforce has increased substantially in recent years. For example, in the United States, the participation of women in the workforce increased from 42% in 1950 to 57% in 2007. Furthermore, labour force participation by women with children aged less than 18 years increased from 47% in 1975 to 71% in 2007. During this time, women's educational levels have increased relative to men's; in 1970-71, only 6% of first professional degrees in the US were earned by women, but, in 2004-5, 50% of those graduating with first professional degrees were women. The gender gap in earnings has also decreased; in 1979, the average full-time employed woman earned 62% of the average man’s salary, but, by 2007, the average full-time employed woman was earning 80% of the average male salary (Galinsky et al., 2008). While this is a significant improvement, feminist discourse would argue that an unacceptable difference still exists.

Women still have not achieved true equity in the workplace, and socially prescribed gender roles continue to have a strong influence on how women behave. Women tend, more than men, to put other things (such as family) ahead of work. For this reason, women may be seen to lack commitment to their job, as they may leave to have babies and raise children (Martin, 2008). Traditional gender-role socialisation continues to affect the careers of many women. For example, even women who have highly demanding careers spend more
time on household responsibilities than their male peers do. Although many women are in the workforce, the role of primary nurturer in the home still predominantly falls upon the woman (Martin, 2008). The 'motherhood penalty' remains; the time that mothers take out of the workforce or work reduced hours to care for their children diminishes their lifetime earnings (Galinsky et al., 2008) and arguably their career prospects.

Guilt can be another internal barrier, as many women feel bad about leaving their homes and families to go to work (Martin, 2008). Role conflict occurs when family and career expectations are compounded by the behavioural expectations placed on women. Feminists use the term ‘double workload’ to refer to the women who work full time in employment and then return to another full-time job in housework and child rearing. Women spend twice as much time as men do on household tasks and childcare, despite working outside the home for the same amount of time (Martin, 2008). Factors predicting work-life conflict among mothers include the hours worked per week, time per week spent on self, work-life centrism, job satisfaction and job pressure (Galinsky et al., 2008). It has been reported that, in order to achieve high status and managerial posts, many women reduce their work-life balance problems by remaining childless, or by having just one child (Hakim, 2006).

However, as women increasingly contribute to the family income, there is also a trend for men to work fewer hours per week, and for fathers to spend more time with their children (on average 1 more hour per day than 30 years ago). Men are also reported to be taking more responsibility for the care of their children and for household tasks, according to not only themselves but also their partners! Such changing gender roles appear to have increased the level of work-life conflict experienced by men as well as women (Galinsky et al., 2008).

Historically, women have been linked to careers involved with the health and education of children (such as nursing and teaching). Because these fields are female-dominated, they have less status, lower salaries and limited opportunities for advancement (Martin, 2008). New Zealand’s dental nurses could also be considered in this category, but it is expected that recent changes (including a change of name, university training and registration) will help to raise the profile of the dental therapy profession. Although women are moving into
traditionally male-dominated professions in increasing numbers, the converse is not true. Few men work in traditionally female professions such as teaching and dental therapy.

Although increasing numbers of women are seeking careers in traditionally male-dominated professions such as law and medicine (Galinsky et al., 2008), a large degree of job segregation remains within these occupations. For example, in the pharmacy profession, women tend to have jobs that are local, with the potential for part-time employment or fixed hours that can be fitted around family life. In contrast, their male colleagues are more likely to own an independent pharmacy or work in management positions in the large retail trains; thus, working longer hours and earning more (Hakim, 2006). Similar findings have been reported in New Zealand recently for optometrists, with women more likely than their male colleagues to have taken a career break or to be working part-time, on a salary, or in a locum job (Frederikson et al., 2008).

It has previously been reported that women tend to put less emphasis on pay and more on career satisfaction (Sterrett, 1999). More recently, it has been suggested that women in general are increasingly dissatisfied with work. A recent survey in the UK reported that women find it hard to juggle their responsibilities, and that they require better work-life balance (Taylor, 2002, cited by Murphy et al., 2006).

Despite this, younger women appear to continue to strive for successful careers. A recent study from the United States (Galinsky et al., 2008) reported that women under 29 years of age have similar career ambitions and expectations to their male colleagues. They reported that these women were just as likely as men to want jobs with greater responsibility, and that there was no difference between young women with and without children in their desire to move to jobs with more responsibility.
2.5.2 Gender differences among dentists

In most industrialised countries, there has been a steady increase in the proportion of women in the dentist workforce over the last 25 years (Murphy et al., 2006; Thomson, 2006; Naidoo, 2005; Matthews and Scully, 1994; Brennan et al., 1992; Spencer and Lewis, 1988). This is likely to have impacted on the profession’s productivity, as female dentists work (on average) fewer hours per week than male dentists (Thomson, 2006; Brennan et al., 1992; Spencer and Lewis, 1988). Furthermore, a larger proportion of females than males take career breaks, with women taking longer breaks (up to several years; Newton et al., 2001). Such breaks tend to be followed by reduced working hours upon returning to practise (Newton et al., 2001; Pack et al., 1987; Pack, 1979). It has also been reported that the productivity of female dentists is lower than that of male dentists. For example, Murphy et al., (2006) reported that women orthodontists completed 24.2 treatments per session, while male orthodontists completed 25.6. They calculated that cumulatively, despite similar working patterns of male and female respondents in their survey, the productivity of males was 17.1% higher than females. They stated that as women continue to enter the orthodontic workforce, more orthodontists will be required to achieve the same output, but argued that this was a small price to pay for ensuring equal opportunities for women and to ensure diversity in the workforce.

It has been reported that some women experience difficulties upon their return to dental practice after a career break (Firmstone et al., 2007; Naidoo, 2005; Murray, 2002; Pack et al., 1987). Factors such as loss of confidence, loss of manual skills, working hours, childcare and emotional difficulties have been identified as obstacles to returning to work after career breaks (Naidoo, 2005; Murray, 2002).

In the United Kingdom (UK) the Retaining and Returning Advisory Service has been established to assist dentists (as well as therapists and hygienists) in the transition back to the dental workforce by helping to plan continuing education, providing advice on job applications and requirements, and general careers guidance. Also operating in the UK is the Keeping in Touch Scheme (KITS). This provides dentists with an annual allowance (350 pounds) to remain on the dental register, and to subscribe to a professional association, a peer-reviewed dental journal and a professional indemnity society.
(Firmstone et al., 2007). Getting Back to Practice courses are available for dentists returning from a career break. Those with a hands-on component have been reported by participants to be particularly valuable. The primary goal of these Governmental-funded schemes is to provide educational support and advice for dentists at risk of leaving the profession and to encourage dentists already taking a career break to return to practice (Firmstone et al., 2007). Such courses have also been recommended in other countries (Naidoo, 2005).

Much of the information available regarding women in the New Zealand dental workforce is at least two decades old, and dates from the pioneering work of Pack and Donaldson (Pack, 1979; Pack et al., 1987; Donaldson, 1977). However, much has changed in recent years with regard to women in the workforce, and not just in dentistry. Childcare is more readily available, and increasing numbers of mothers are returning to work while their children are young. Concomitantly, men are playing an increasingly large role in family life, and many are involved in childcare on a day-to-day basis. The extent to which such social changes are impacting on the dental profession is not known.

As the proportion of women in the profession continues to increase, there is a need to monitor the differences in working patterns between male and female dentists, and to be aware of their dental workforce implications. Although child rearing is an important factor, there are other areas to consider, such as breadwinner status and job satisfaction. While there has been an interest in gender issues in the dental workforce, there have been limitations to previous studies, in that some considered women only, without comparison to their male colleagues (Price, 1990; McEwan and Seward, 1988; Pack et al., 1987; Pack, 1979), and others had low response rates, which somewhat compromise their usefulness (Newton et al., 2001; De Wet et al., 1997).
2.6 Job satisfaction

Job satisfaction refers to an individual’s general attitude towards his or her job. It is “not a single entity, but a complex set of interrelationships of tasks, roles, responsibilities, interactions, incentives and rewards” (Harris et al., 2008). This makes job satisfaction difficult to measure, as a person may be satisfied with some aspects of a job but dissatisfied with others (Harris et al., 2008).

As with any job, the practice of dentistry has characteristics that can produce either satisfaction or dissatisfaction (Sur et al., 2004). Several factors which have been found to influence dentists’ job satisfaction include: age, gender, attendance at continuing education, having an area of special interest, work environment, location, type of remuneration, income level, daily patient load, and respect (Harris et al., 2008; Puriene et al., 2008; Gilmour et al., 2005; Luzzi et al., 2005; Sur et al., 2004; Shugars et al., 1990). In general it is been found that dentists who are more active in continuing education and have greater peer contact (for example, working in group practices rather than in sole-practice) have greater job satisfaction, as do specialists or those with a particular areas of interest within dentistry (Denton et al., 2008; Jeong et al., 2006; Puriene et al., 2007; Gilmour et al., 2005). The available information on the relationship between the gender and age of the dentist and job satisfaction is inconclusive. However, it might be assumed that if a dentist is well remunerated, does not have an excessive work-load and is respected within the profession, that he or she would have reasonable job satisfaction.

Job satisfaction has been reported to vary significantly by country, with the number of dentists claiming to be satisfied with their jobs ranging from 36% in South Korea (Jeong et al., 2006) and 40.8% in Turkey (Sur et al., 2004), to between 50 and 60% in the United States of America (USA; Shugars et al., 1990; Logan et al., 1997) and 80.7% in Lithuania (Puriene et al., 2008). No doubt at least some of this variation will be due to differences in the ways job satisfaction was measured between the studies, but other factors will also be involved.
Some influences on job satisfaction may vary according to local factors such as systems of remuneration. For example, recent data from the UK demonstrated that dentists working solely within the National Health Service (NHS) general dental service (fee-per-item of service funding) were least likely to be satisfied with their job, followed by those working as personal dental service contractors (holding a block contract with the primary care trust), than general dental service practitioners working in mixed NHS/private practices. Private dentists had the highest levels of job satisfaction (Harris et al., 2008). Similar findings were reported by Puriene and colleagues (2008) in Lithuania: dentists working in private settings had higher job satisfaction.

Closer to home, a recent survey of 50 private and 36 public sector dentists from Victoria (Australia) reported that 81% were satisfied with their job as a dentist. Respondents aged 55 years or older had the highest scores on all satisfaction dimensions, followed by the 25-34 year age-group. Female dentists reported greater satisfaction on the personal time dimension, and private dentists reported higher satisfaction with their autonomy, relationships with patients, compensation and resources (Luzzi et al., 2005).

Job satisfaction is associated with standards of clinical care as well as general life satisfaction of the dentist (Luzzi et al., 2005). It has been reported that dentists who are dissatisfied with their jobs are more likely to have patients who are dissatisfied with the care given, and who are less cooperative with dental treatment and advice (DiMatteo et al., 1993). Job satisfaction has been reported to influence the productivity, turnover and absenteeism of employees – as summarised by statements such as ‘a happy worker is a good worker’ (Harris et al., 2008). Job satisfaction also influences the recruitment and retention of dentists (and other dental practitioners).
2.7 Continuing professional development

It is widely accepted that health professionals need to regularly update their clinical skills and knowledge to ensure that research developments are incorporated into clinical practice (Bullock et al., 2003). Health workforce education is realised through life-long learning, because health practitioners are educated throughout the course of their careers (Health Workforce Advisory Committee, 2002). Since the implementation of the Health Practitioners Competence Assurance Act in 2004, dentists have been required to undertake 160 hours continuing professional development (CPD) over a four-year cycle (80 hours of verifiable CPD including peer contact activities and 80 hours of non-verified CPD). Failure to do so will result in a practitioner failing to renew their registration with DCNZ. Dental therapists and dental hygienists require 30 hours verifiable and 30 hours non-verifiable CPD (including interactive peer group activity) over each two-year period. Similar requirements exist in other countries. For example, the Lifelong Learning Scheme launched in the United Kingdom in 2002 requires dentists to complete 250 hours of CPD every five years. Fifteen hours per year are required to be verifiable, while the remainder can be general CPD (such as journal reading). Dentists working in the NHS are also required to undertake 5 hours of clinical audit or peer review each year. This can be included within the verifiable component of their CPD activities (Bullock et al., 2003).

Most NZ dentists have been involved in CPD activities since graduation, but the proportion undertaking at least 20 hours of annual CPD has increased in recent years (Dental Council of New Zealand, 2007). Overseas studies have found that dentists undertake substantial amounts of continuing education. For example, Mouatt and colleagues (1991) reported that 79% of a sample of dentists had attended some type of post-graduate education in a calendar year. A review of CPD activity of dentists in the UK found that 98% read at least one journal regularly, 98% had attended a course and 46% a conference in the previous year, and 83% belonged to a professional organisation or society. Only 28% had used a computer-assisted learning (CAL) package and 11% had undertaken clinical audit in the preceding year. Characteristics of dentists with more participation in CPD included: less experience as a dentist; holding a postgraduate qualification; undertaking part-time educational related work (such as tutoring); being an owner or partner of a practice; or working in a group practice. Twenty percent of dentists
in the sample desired greater access to media-based CPD (such as CAL, the Internet, IT, CD-roms, or videos). The authors suggested that a greater availability or awareness of CAL packages and internet-based education might result in higher rates of participation in CPD (Bullock et al., 2003), particularly for rural and remote practitioners. It is likely that such an increase in awareness has occurred in the 5 years since the study was published. Web-based training has been shown to be a useful mode of learning for health professionals, although long-term studies of the outcomes of such learning are lacking (Atreja et al., 2008).

A postal survey of 268 Scottish dentists participating in peer review reported that most were positive about the effects and acceptability of peer review as a mode of CPD. Courses, reading journals, study groups and peer review were felt to be the best continuing education modes for changing knowledge, while courses, study groups and peer review were felt to be the best modes for changing clinical practice. Conferences and symposia were not rated highly for inducing change in practice (Maidment, 2006). Older dentists found CAL less effective in changing practice than younger dentists (Maidment, 2006). Dentists practising on their own were much more likely to report that videos were effective in changing practice (Maidment, 2006).

Some dentists may have more trouble accessing CPD than others. For example, health practitioners in smaller or more rural communities may find it harder to participate in CPD, as they usually have to travel to a larger centre for lectures and courses, meaning increased costs and time away from the practice (Dental Council of New Zealand, 2007; Maidment, 2006, Booth and Lawrance, 2001). Rural health practitioners have indicated preferences for distance learning packages and videotapes to aid them in maintaining adequate CPD (Booth and Lawrance, 2001). Similarly, dentists in solo practice may find it more difficult to get time off practice due to problems arranging cover (Bullock et al., 2003). These dentists are generally more isolated and at greater risk of being out of date. Peer review is particularly important for this group (Maidment, 2006). It has been reported that peer contact and study groups may help to prevent burnout and increase work engagement (Gorter et al., 2006). There is also evidence that it may be more difficult for women to maintain adequate attendance at CPD courses due to their domestic commitments (or during periods of maternity leave; Mouatt et al., 1991).
Both formal and informal discussion with colleagues can contribute highly to the updating of a clinician’s knowledge and significantly influence his/her practice (Tipping et al., 2001). Tipping and colleagues (2001) reported following their qualitative review of unstructured time (breaks) at formal continuing medical education (CME) events, that the professional interaction that occurs during breaks is perceived as crucial in aiding the process of applying knowledge to practice. They suggested that unstructured time (breaks) should be included in formal CME events to help participants to integrate new material, solve individual problems, and make new meaning out of their experience. In NZ, such peer contact can be logged as non-verifiable continuing professional development.

Impact on practice is improved when CPD is selected in relation to learning needs. A personal development plan is a good way to encourage reflection on learning needs and can enhance the impact of CPD on practice (Bullock et al., 2003).
2.8 Retirement from the dental profession

Dentists usually leave the profession because of retirement or disability. Although some leave to pursue an alternative career, it is generally difficult for dentists to make career shifts. Various factors have been implicated, such as: the large investment in training (in both time and financially); high debt levels (student loans, home mortgages, practice purchase); the inability to earn equivalent income in other professions; limited ability to transfer skills to other professions; and the stigma of leaving the profession (Meskin, 1997).

A survey of dentists in the USA found that 10% hoped to retire before 55 years of age, 44% wanted to retire between 55 and 64, 22% anticipated retiring between 65 and 75, and 25% wanted to continue practising “for ever”. Reasons for continuing to practise dentistry included enjoying work and the need to earn an income. Dentists who wanted to retire early had planned second careers, wanted to volunteer or travel, or were simply planning to relax and enjoy life. Some were concerned that the quality of care they provided would deteriorate as they became older (Anonymous, 1998). In recent years, it has become more difficult to sell dental practices, causing concern for dentists who had hoped that the sale of their practice would fund their retirement (Beazoglou, 2000).

An early New Zealand study (Donaldson, 1977) reported that female dentists retire earlier than male dentists, but more recent data are lacking.
2.9 Monitoring the New Zealand dentist workforce over time

In recent years, there has been a concern among the NZ dental profession regarding several workforce issues. These stem largely from anecdotal reports about (a) dentists being unable to attract associates or sell their practices, (b) patients being unable to access timely dental care (particularly in rural areas), and (c) overworked dentists (New Zealand Dental Association, 2006a). In addition, there have been concerns about the impact of the increasing number of women and overseas-trained dentists in the profession and their impact on the dentist workforce, in addition to the high number of recent NZ graduates leaving to work overseas. Quantitative research is required to assist in evaluating the significance of these issues.

The New Zealand Dental Association (NZDA) periodically undertakes a survey of its membership. This gives limited information about workforce issues, and has a limited external validity due to the variable response rate and relatively small sample size. In 2003, the Association commissioned a major report to evaluate the evidence of suspected workforce problems (New Zealand Dental Association, 2006a and b). This report drew on available information (mainly the New Zealand Dental Council annual reports), and identified several areas in need of further investigation.

The Dental Council of New Zealand (DCNZ) has been monitoring dental workforce issues for a number of years. All dentists practising in New Zealand (NZ) must be registered with the DCNZ and possess an Annual Practising Certificate (APC) issued by the same body. Each year, upon application for an APC, dentists complete a workforce questionnaire. Annual reports derived from the questionnaire data provide valuable information regarding the sociodemographic characteristics of the dentist workforce, employment rates, postgraduate education and continuing professional development (CPD), practice characteristics, cohort remainder rates and distribution of dentists. Although comparison has been made from one year to the next, a longitudinal review of the workforce data has not taken place.
2.10 Stress and dentistry

Although there are many positive aspects of a career in dentistry, it is perceived as a stressful profession (Denton et al., 2008; Newton et al., 2006; Rada and Johnson-Leong, 2004; Gibbons and Newton, 1998). High levels of stress can lead to personal health problems, both physical and mental (Denton et al., 2008; Newton et al., 2006; Rada and Johnson-Leong, 2004). High levels of work-related stress have also been linked to poor relationships, a lack of job satisfaction (Cooper et al., 1987) and compromised quality of care (Myers and Myers, 2004).

Research findings on the health and wellbeing of dentists are conflicting (Joffe, 1996). It has been suggested that dentistry generates more stress than any other profession, and that job-related factors explain almost half of the overall stress in a dentist’s life (Myers and Myers, 2004). On the other hand, the personality traits common to those who choose to practise dentistry may also play a role (Rada and Johnson-Leong, 2004). Dentists have been reported to be very hard working and driven to achieve perfection (The Type A personality). It has been suggested that dentistry tends to attract “compulsive personalities who display unrealistic expectations and strive for unattainable standards of excellence”.2

A recent cross-sectional study in the UK reported that 60% of general dental practitioners were experiencing symptoms of stress (Myers and Myers, 2004). Further studies have indicated that over 10% of dentists experience high levels of ‘burn-out’, a possible consequence of prolonged occupational stress (Gorter et al., 1999; Croucher and Osbourne, 1998; Osbourne and Croucher, 1994). Burnout is a persistent, negative, work-related state of mind in “normal” individuals, primarily characterised by exhaustion, along with distress, a sense of reduced effectiveness, decreased motivation and the development of dysfunctional attitudes and behaviours at work (Denton et al., 2008). A recent survey of dentists (using the Utrecht Work Engagement Scale and the Maslach Burnout Inventory) reported that dentists with postgraduate qualifications, and those working in group practice

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2 Self Care for Dentists, New Zealand Dental Association and Dental Council of New Zealand, Year and place of publication unknown.
have been reported to have lower burnout and more positive work engagement than their peers. Conversely, those undertaking predominantly NHS work had lower work engagement and higher levels of burnout (Denton et al., 2008). Dentists at risk of burnout have poorer health and more unhealthy behaviours than their less-stressed peers (Gorter et al., 2000), and are believed to have inadequate coping strategies (Denton et al., 2008). It is assumed that burnout adversely impacts on the quality of a dentist’s work (Dento et al., 2008). Furthermore, stress-related disorders are a common cause of early retirement among dentists (Freeman et al., 1995).

Interventions that might help to reduce stress and burnout include contact with colleagues, counselling, learning coping skills or changing work behaviour (Denton et al., 2008). However, dentists appear to lack awareness and knowledge of managing stress (Moore and Brodsgaard, 2001; Te Brake et al., 2001). Before developing interventions to manage and prevent stress among dentists, the job-related stressors and existing coping strategies need to be determined (Moller and Spangenberg, 1996). The most commonly reported stressors reported include time-related pressures, heavy work loads, financial concerns, anxious/difficult patients, the causing of pain, staff problems, equipment breakdowns, defective materials, poor working conditions, medical emergencies in the surgery, and the routine nature of the job (Myers and Myers, 2004; Moore and Brodsgaard, 2001; Wilson et al., 1998; Cooper et al., 1987). Some stressors appear to be linked to the health system in which dentists work and the way in which they are remunerated.

Despite the reports suggesting that dentistry is a very stressful occupation, little comparison has been made of the stress experienced by dentists and that encountered by other professionals (Moller and Spangenberg, 1996). Some authors believe that claims that dentistry is a dangerously stressful occupation are not justified, and that dentists are as well and happy as other professional groups (Kay and Lowe, 2008).

There is a lack of information on stress levels among dentists in New Zealand. A study is currently underway investigating the stress levels of orthodontists in New Zealand, but the results are not yet available.
2.11 Immigrant Dentists

There has been much attention to dental workforce issues in NZ recently, including annual workforce reports produced by the DCNZ (Dental Council of New Zealand, 2007) and the New Zealand Dental Association Workforce Project (Bain et al., 2006). A key feature of workforce trends in recent years has been the increase in the number of overseas-trained dentists, who now comprise over 20% of the NZ dentist workforce. These dentists originate from 38 different countries (mainly United Kingdom, South Africa, Iraq, India and Australia) and approximately half are required to sit the New Zealand Dental Registration examination (NZDREX) prior to commencing work as a dentist in this country. The international mobility of health professionals is a reality of the global economy, and it strongly influences service planning and policy (Buchan and O’May, 1999). Immigration of dentists to NZ helps to offset the significant loss of NZ graduates, enabling maintenance of a satisfactory dentist-to-population ratio (Bain et al., 2006).

In line with the international mobility of the medical workforce, NZ has long had some dependence on overseas-trained doctors, and this has increased over recent years (Medical Reference Group, 2006). New Zealand has the highest proportion of overseas-trained doctors (34.5% of its medical workforce) of any Western country (Medical Reference Group, 2006).

Anecdotal evidence suggests that a number of immigrant dentists experience difficulties settling into the dental community in NZ and that they may experience more stress than their NZ-trained colleagues. The reasons for this are unclear, but the issue has been identified as a cause of concern by some individuals and representatives of the New Zealand Dental Association (NZDA)3.

3 David Crum, Executive Director, New Zealand Dental Association, Personal Communication, 2007
2.12 Occupational health of dentists

Dentistry is a stimulating and rewarding occupation, but is demanding both physically and mentally. Physical attributes required for clinical practice include good visual acuity, hearing, depth perception, psychomotor skills, manual dexterity, and the ability to maintain occupational postures over long periods. Dentists also need to maintain constant mental alertness, sound judgement, and good communication, interpersonal and managerial skills. The diminution of any of these abilities may significantly inhibit the performance of a practitioner (Mohl, 1998).

Failure to adapt to or contend with the working environment can predispose to illness or injury (Gonzalez, 1998). Dentists may be at risk of occupational diseases such as systemic infection (for example, HIV, Hepatitis B or C, and tuberculosis), allergies (including dermatitis and respiratory disorders), toxicity, hearing loss, musculoskeletal disorders (particularly of the neck, back and shoulders), injuries (for example, percutaneous or ocular), and psychological problems (Leggat et al., 2007; Mohl, 1998). Musculoskeletal disorders, cardiovascular disease and neurotic symptoms are frequent causes of premature retirement among dentists (Burke et al., 1997). Although dentistry has seen significant technical advancements in recent years, occupational health problems remain (Leggat, 2007).

There has been little discussion in the literature regarding the practising characteristics of dentists that may be associated with occupational disease.
2.13 The dental therapy workforce

Dental therapists (previously known as school dental nurses) have been part of New Zealand society for more than 80 years. New Zealand was the first country to introduce dental nurses, in 1921, as workers complementary to dentistry, to address the widespread dental disease in the NZ population. School dental nurses were trained by the Ministry of Health, and were awarded a Certificate in Dental Nursing on completion of the strict two-year teaching. Dental nurses were all female, and were employed in the public sector to treat children, under the supervision of a public health dentist. This visionary service attracted global interest, and several countries have introduced dental nurses over the following decades (Tane, 2004).

However, there were problems with this early dental workforce. As all dental nurses were female, there was a high turnover rate due to childbirth, and the non-acceptance of women working following marriage and childbirth. In addition, school dental nurses were encouraged to be subservient to the dental profession (Tane, 2004), meaning that there was minimal collaboration or team-work between dental nurses and dentists. Despite these problems, few changes occurred over the next few decades, other than improvements in dental materials and equipment. Dental nurses had a name change, becoming dental therapists in 1991.

During the 1990s, a large number of dental therapists exited the workforce, leading to a reduction of the workforce by one third. Dental therapists leaving the workforce were predominantly in the younger age-groups, causing a right-skewed age distribution (Health Workforce Information Program, 2008). At the same time, many school dental clinics were closed, and dental therapists have been increasingly required to cover several schools in one year, often by providing treatment from the new mobile clinics. Dental therapists had a significant pay increase giving them pay-parity with a number of other DHB-employees (such as occupational therapists and physiotherapists) early in the 2000s.

A recent review of the dental therapy workforce indicated that there are several difficulties facing this profession, including an ageing workforce and difficulty recruiting new trainees. Contributing factors to the poor recruitment and retention of dental therapists
include the lack of a career structure, a narrow scope of practice, outdated facilities, and inadequate remuneration. There are also concerns about the disparity in ethnic composition between the dental therapist workforce and the population as a whole (Dental Therapy Technical Advisory Group, 2004).

Significant improvements in the attractiveness of the occupation have occurred in recent years. Dental therapists are now university-educated and are reported to have significantly more biomedical and behavioural science knowledge and practical skill (Dental Therapy Technical Advisory Group, 2004; Health Workforce Information Program, 2008). The HPCA Act allows for greater autonomy and an expansion of the scope of practice. Furthermore, dental therapists now have expanded employment opportunities, including positions in private dental practices and non-government organization health providers (NGOs). These changes parallel changes to dentistry in the UK (General Dental Council, 1998).

There have also been changes in the demographic profile of trainee dental therapists. A small number of males have undertaken training. The average age of dental therapy graduates has increased from 20 to 27 years, with some individuals entering the profession in their 40s. The acute shortfall in the supply of dental therapists predicted in the 1990s has not resulted, as recruitment into the occupation has increased in recent years. A recent cumulative age profile for presumed exits from the workforce suggest that only 20% of departures were by therapists under 48 years of age, in stark contrast to the 1990s (Health Workforce Information Program, 2008).

Today, dental therapists are the second largest direct suppliers of dental services in NZ (Whyman, 2000). They provide oral health assessment, oral health care and preventive dental services for children and adolescents. Most (95%) still work within the SDS, usually treating children up to the age of 13 years (Dental Council of New Zealand, 2007).

Such radical change to the nature of the dental therapy as an occupation, and in the demographic characteristics of the new members of the workforce, means that it is very difficult to predict how the workforce will behave over the coming decades. For example, it is not known what sort of career breaks the new graduates will take, and how long after
graduation they are likely to do so. Given that the average age on entering the occupation is now 27 years, many of these graduates may already have children. Although the Ministry of Health and the District Health Boards wish to increase the productivity of the workforce to achieve more patient visits per day, (Health Workforce Information Program, 2008), the therapists themselves may not wish to work full-time.

In addition, little is known about the career satisfaction of dental therapists in NZ, despite recent interest in this area internationally. Most career satisfaction research has focused on dentists and dental hygienists (Gibbons et al., 2001; Jevack et al., 2000; Logan et al., 1997; Bader and Sams, 1992; Lancaster and Grogono, 1990; Boyer, 1990; Moltzer et al., 1990), with only 3 papers considering dental therapists (Naidu et al., 2002; Newton and Gibbons, 2001; Gibbons et al., 2000). Although dental therapists in the UK have been found to have relatively high levels of career satisfaction (mean = 7.3 on a 10 point scale where 1 is lowest and 10 is highest; Gibbons et al., 2000), dental nurses in Trinidad and Tobago had a mean value of only 5.2, reportedly due to poor salary and working conditions and the lack of a career path (Naidu et al., 2002). The role of dental nurses in Trinidad and Tobago is similar to that of dental therapists in NZ, while those in the UK work in a more expanded role in the community dental services. Career satisfaction is an important factor to consider as it is likely to influence dental therapist recruitment and retention.
2.14 The dental hygienist workforce

Although oral health workers have been undertaking dental hygiene tasks in NZ for some years, they have not been (until recently) officially recognised as dental hygienists but as 'Section 11 workers'. These individuals practised under Section 11 of the 1988 Dental Act and were permitted to: remove deposits from the teeth; apply materials to the teeth for the purpose of preventing disease; give advice on oral health; and carry out other similar work. Practising under this Act were not only trained dental hygienists, but also former dental therapists with limited (if any) dental hygiene training, and untrained persons (Pack, 1995).

In 2004, the 1988 Dental Act was replaced by the HPCA Act. Under the new framework, dental hygienists are required to register with DCNZ; in order to do so, applicants must submit evidence of an appropriate qualification. While the Dental Council does not define the term 'dental hygienist', it has prepared a "Scope of Practice" which states that dental hygienists are involved in providing oral health education and preventing oral disease. Their tasks usually relate to the prevention and non-surgical treatment of periodontal diseases, with clinical guidance provided by a dentist. Dental auxiliaries without hygiene qualifications are accommodated under a "Scope of Dental Auxiliary Practice", which allows 5 years for them to gain appropriate qualifications. A "Scope of Orthodontic Auxiliary Practice" is also available.

Training for dental hygienists in NZ has been controversial and varied (Pack, 1995). The first course commenced in 1974, and was a one-year training program within the Army. In 1990, a two-week course was established to teach dental hygiene procedures to school dental nurses, enabling them to practise as 'Section 11' workers. However, this program was short-lived (Pack, 1995). The first students of the Certificate in Dental Hygiene graduated from Otago Polytechnic in 1995 following a fifteen-month course. The Certificate was soon superseded by a two-year Diploma of Dental Hygiene. In recent years, the University of Otago offered both a diploma and a degree in dental hygiene. These have now been replaced by a three-year Bachelor of Oral Health (BOH) degree which incorporates training in both dental therapy and dental hygiene. Auckland University of Technology offers an equivalent degree.
There are concerns about whether the dental workforce will be adequate to serve NZ communities in the future, and discussion is taking place about how best to ensure that New Zealanders receive appropriate, accessible and affordable dental services. Options which are being developed include expanding the roles of dental hygienists and therapists, and training new auxiliaries to undertake both therapy and hygiene tasks.

In order to plan effectively, information is required regarding the role, career patterns and job satisfaction of the professional group involved (Hillam, 2000). Dental hygienists have, up to now, been a difficult group to assess because almost all (95.6%) work in the private sector (some in several different practices) (Dental Council of New Zealand, 2007), and have lacked a registering body. There is minimal information available on the retention of dental hygiene graduates in the workforce, or on their daily working circumstances or level of career satisfaction. The database constructed by the Dental Council for the purposes of registration offered an excellent opportunity to contact dental hygienists and to gain information about these dental workers.4

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4 In 2006 the Dental Council of New Zealand workforce analysis (Dental Council of New Zealand, 2007) included data on dental hygienists (and dental therapists) for the first time. This information was not available at the time of planning or undertaking the study.
Chapter 3 Methods

3.1 Introduction to the Chapter

Several different approaches were used for the studies described in this thesis. The main method was the postal survey, which was used for the Gender Study, the Therapist Study and the Hygienist Study. A similar method was also used for the Stress Study and the Occupational Health Study. The questionnaires used in these surveys were modified from those which had previously been used by other investigators in the dental field. The resultant data provided cross-sectional ‘snap-shots’ of the groups of dental professionals at a given point in time. Following from this research, other methods were used, including a longitudinal approach (the Longitudinal Study) and the qualitative method (the Immigrant Dentist Study).

Following an initial literature review using Medline (the most frequently used database for health sciences research), more detailed consideration of the literature was undertaken as each study was commenced. In the development of each questionnaire, variables were chosen after careful consideration of previously published work. The use of similar variables allowed comparison between studies (for example, in career satisfaction). Questions included in the semi-structured interview for the qualitative study were based on information gathered in other studies undertaken as part of this thesis (particularly the Stress study), and in wider consultation with key stakeholders (such as NZDA, employers of immigrant dentists and immigrant dentists themselves).

Ethical approval was sought from the University of Otago prior to commencing each stage of the research. Participants were ensured confidentiality by the use of unique three-digit identification codes. Prize draws were offered as an incentive for participation in the postal questionnaires to ensure a satisfactory response rate.
3.2 Research methodology

3.2.1 Introduction

Several different types of study were used in the preparation of this thesis. Initially cross-sectional surveys were undertaken to examine the working practices and career satisfaction of dentists, dental therapists and dental hygienists (the Gender Study, the Therapist Study and the Hygienist Study). A longitudinal analysis of routinely collected data followed (the Longitudinal Study). A further cross-sectional survey was undertaken to investigate the job stressors of dentists and their coping strategies (the Stress Study). This was followed by a qualitative study to gain further information about the stressors of overseas-qualified dentists. Finally, a self-report questionnaire survey was used to investigate the occupational health of dentists in NZ (the Occupational Health Study).

The use of several complementary research methods enabled a more thorough investigation of aspects of the NZ dental workforce. For example, in the Stress Study it was found that overseas-qualified dentists reported higher levels of stress than NZ-trained dentists, but the reasons for this were not clear. The subsequent use of qualitative methodology enabled the researcher to investigate issues from the perspective of the overseas-qualified dentists. The findings of the qualitative study (along with the recommendations developed) were then presented to the Board of the NZDA, leading to the development of improved support systems for immigrant dentists. In the future, a further cross-sectional study could be conducted to determine whether such changes had been of benefit, thus providing a longitudinal perspective.

It is common for research to occur in cycles such as this. Starting with an epidemiological survey may answer some questions, but raise others. This might be followed by an in-depth interview study that provides more detailed information. In turn, this may lead on to a randomised control trial or another in-depth study, and so on (Daly et al., 1997).
3.2.2 Maximising response rates to postal questionnaires

The response rate of a questionnaire survey is defined as the number of completed and partially completed questionnaires divided by the number of eligible sample units. A high response rate (70-80%) is essential to ensure generalisability of the study’s findings; that is, to ensure that the data are representative of the population of interest (Parashos et al., 2005). There are many reasons for non-response, including lack of time, lack of interest, or being on holiday. Some people just do not want to complete surveys (Parashos et al., 2005).

When a response rate is less than ideal, non-response bias should be investigated to determine whether responders differ from non-responders (usually with respect to socio-demographic variables such as gender, age and ethnicity). If a systematic difference between responders and non-responders exists, then introduced biases can invalidate the results of the survey. If no differences are identified, non-responders are ignored and the respondents assumed to be representative of the population (Parashos et al., 2005; Locker, 2000).

However, a recent study of dentists (Parashos et al., 2005) found that differences in data between early and non-responders can occur even in the absence of demographic differences. Edwards and colleagues (2002) undertook a systematic review of 292 randomised controlled trials including 258,315 participants and 75 strategies for influencing response to postal questionnaires. The odds of response were more than doubled when a monetary incentive was used (OR = 2.2, 95% CI 1.8-2.3). Other means of increasing response rates included: personalising questionnaires and keeping them concise; including stamped return envelopes; using coloured ink; and sending a duplicate questionnaire to non-responders. Questionnaires designed to be of more interest to participants were more likely to be returned, but questionnaires containing questions of a sensitive nature were less so. Questionnaires originating from universities were more likely to be returned than others.

Striving for very high response rates will reduce the effects of non-response bias caused by socio-demographic and behavioural differences between responders and non-responders.
Therefore, to achieve as high a response rate as possible when undertaking questionnaire survey research, researchers need to ensure good questionnaire design, sound sampling techniques and incentives to encourage participation.

3.2.3 Measuring ethnicity

Race and ethnicity are constantly evolving concepts, deceptively easy to measure and used ubiquitously in the biomedical literature, but are difficult to pinpoint as definitive individual characteristics (Winker, 2004). Race can be defined as “a family, tribe, people, or nation belonging to the same common stock, or a class or kind of people unified by shared interests, habits, or characteristics” (Winker, 2004). In contrast, ethnicity is defined by Statistics New Zealand as “the ethnic group or groups that people identify with or feel they belong to”. It is a measure of cultural affiliation, as opposed to race, ancestry, nationality or citizenship. Ethnicity may be influenced by ancestry, culture, country of birth, or nationality (Callister et al., 2007). Ethnicity is self-perceived and people can belong to more than one ethnic group.\(^1\)

It has been well documented internationally that minority groups: do not always receive the same quality of healthcare; do not have the same access to healthcare; are less represented in the health professions; and have poorer overall health than non-minorities (American College of Physicians, 2004). In New Zealand, it has been found that Maori are more likely to have poor health, and die earlier than other New Zealanders, even at the same level of deprivation (Salmond and Crampton, 2000). Race can be an important indicator of health disparities and health care delivery (Winker, 2004), but it should not be used as a proxy for other variables (such as socioeconomic status or education).

Generally speaking, individuals should self-designate ethnicity to ensure that the designation most closely matches what they believe reflects their personal and cultural background (Mays et al., 2003). Individuals have been able to self-designate race in the US census since 1960, and to self-designate more than one category since 2000 (Winker, \(^{1}\)(www.stats.govt.nz/census/2006-census-information-about-data/information-by-variable/ethnicity.htm).
Many New Zealanders now identify with multiple ethnic groups, due to high rates of both immigration and ethnic intermarriage, as well as now being allowed to record more than one group in surveys (Callister et al., 2007). In the 2006 Census in New Zealand, 10.4% gave more than one ethnicity response.\(^4\)

Statistics New Zealand recently completed a review of the measurement of ethnicity. It was found that ethnicity needs to be measured in a consistent way across all official statistics, and that the 2001 census ethnicity question should continue to be used. Those collecting official statistics require the capacity to record multiple ethnicity responses, and self-identification should be used (http://www.stats.govt.nz/analytical-reports/review-measurement-ethnicity/default.htm).

The “total count approach” is the preferred method of presenting ethnicity data. The integrity of each ethnic group is preserved and it provides the appropriate base for measuring characteristics of the group, but also allows comparison with the population as a whole. The sum of the groups add to more than the total population who specified their ethnicities. Reporting of combination groups can provide a more powerful approach for detailed analysis of populations, and with increasing internal migration and intermarriage, the use of culturally-based, complex ethnicity-based measures will become more important (Callister et al., 2007). Where possible, ethnicity should be measured using the same method to allow comparison between studies. The current NZ Census ethnicity question appears to be the most appropriate choice for investigating the ethnic characteristics of the dental workforce.
3.2.4 Measuring career satisfaction

Research involving the measurement of job satisfaction has been undertaken for almost 50 years, and several types of instruments have been developed (Harris et al., 2008; Luzzi et al., 2005; van Saane et al., 2003; Shugars et al., 1990; Cooper et al., 1987; Chapko et al., 1986). These have varied from global measures to single-item instruments, and from those developed to measure job satisfaction for people working in a range of jobs to instruments for a specific workforce (van Saane et al., 2003).

As discussed above (in Section 2.5), job satisfaction is not a single entity; the term refers to complex set of inter-relationships of tasks, roles, responsibilities, interactions, incentives and rewards (Harris et al., 2008). This makes job satisfaction difficult to measure, as a person may be satisfied with some aspects of a job but dissatisfied with others. For this reason, many measures of job satisfaction involve multi-dimensional scales, developed to measure ‘job facets’, thus enabling the researchers to identify the areas in which the job satisfaction is high or low (Harris et al., 2008).

There is no “gold standard” that indicates which job aspects should be taken into account when measuring job satisfaction, and the reliability and construct validity of most measures is limited (van Saane et al., 2003). The Dentist Satisfaction Survey (Shugars et al., 1991) has often been used to measure the job satisfaction of dentists, but this is a 54-item instrument and may be too complex for some investigations, particularly if career satisfaction is not the primary focus of the study.
3.2.5 Qualitative research in dental public health

Dental research has traditionally been quantitative in nature (Bower and Scambler, 2007; Stewart et al., 2008), with randomised control trials, cross-sectional studies and questionnaire-based surveys being the methods most commonly used. In recent years there has been a strong drive for evidence-based dentistry, further stressing the importance of quantitative research methodologies. However, the complementary role of qualitative methods has also become increasingly accepted among dental academics, particularly in dental public health (Stewart et al., 2008), and qualitative research is even starting to be incorporated into systematic reviews (Bower and Scambler, 2007). Both quantitative and qualitative approaches have a place in health research as each can address different research questions (Stewart et al., 2008).

The term ‘qualitative research’ refers to a range of methodological approaches which aim to generate ‘an in-depth and interpreted understanding of the social world, by learning about people’s social and material circumstances, their experiences, perspectives and histories’ (Ritchie and Lewis, 2003; cited by Bower and Scambler, 2007). Qualitative research can investigate sociological issues in greater detail and with more subtlety address than quantitative methods alone (Blinkhorn et al., 1989). Stewart and co-workers (2008) recently stated:

“Qualitative methods, such as interviews, can offer dentistry a unique insight into peoples’ personal perspectives, providing a more comprehensive understanding of their beliefs, knowledge and attitudes as well as offering greater depth and methodological flexibility than quantitative research methods such as structured questionnaires”.

A variety of methods can be used in qualitative research, including in-depth interviews, focus groups, observation and documentary analysis. Sampling is purposive and reflects the diversity of the population, rather than aiming to select participants on a statistically representative basis (Blinkhorn et al., 1989; Bower and Scambler, 2007). Phenomena are usually explored from the participants’ perspective, ideally within their natural environment as opposed to experimental settings. The data collected is narrative rather
than numeric, and the data collection and analysis are usually sufficiently flexible to allow for the exploration of emergent issues (Bower and Scambler, 2007).

There are several advantages to using qualitative methods in dental public health research:

1. Hypotheses can be postulated and investigated. If the results are promising, further investigations can be undertaken on a larger scale using quantitative techniques;
2. Discussions with individuals and groups may generate a new way of looking at an old problem;
3. General background information can be collected that is helpful when estimating interest in different social or health problems;
4. Questioning people in a relatively free way may gain more wide-ranging information than is possible using questionnaires;
5. The meaning of conflicting or unexpected data from large-scale quantitative research can be investigated in greater detail;
6. It is possible to use complicated interviewing techniques concentrating on imagery, feelings, and motivation – areas in which the traditional questionnaires may lack subtlety and depth;
7. Discussion may offer more direct and immediate feedback from respondents as verbatim quotes can be used to bring tone and feeling to the results; and
8. The discussion can be recorded and transcribed, enabling the researchers to review the responses, ideally independently of each other to reduce bias.

(Blinkhorn, 2000; Blinkhorn et al., 1989)

However, there are also potential problems associated with qualitative research. The investigators have to be careful to remain scientific and objective. Participants may give socially desirable answers or alternatively become defensive if they feel emotionally threatened. Such problems may be compounded in group discussions if one participant dominates the conversation (Blinkhorn 1990; Blinkhorn et al., 1989). A further problem associated with qualitative research is attributive error. This is a bias which can develop when a researcher condenses the large volumes of collected information into a readable and meaningful format, and may unknowingly add his or her prejudices (Blinkhorn et al.,
1989). It is good technique for a proportion of the discussions to be reviewed by another researcher (Blinkhorn, 2000). Moreover, as the results or qualitative research are based on relatively few respondents, other studies need to be undertaken to confirm ‘new’ findings (Blinkhorn, 2000).

'To argue over the merits of qualitative or quantitative research is futile. They are different and each has a place in the research armamentarium…

Qualitative methodology certainly has a place in public health research for problem definition, hypothesis generation, and evaluation. Nevertheless, all of us in academia must not fall into the trap of continually collecting data to highlight problems, without ever testing solutions’ (Blinkhorn, 2000).

In this study qualitative methods will be used to explore certain themes raised in the questionnaire studies in greater detail.

3.2.6 In-depth interviews

In this method, the researcher undertakes individual interviews in which the participant is encouraged to talk in depth about their perspectives on a research topic. The data obtained comprise a transcript of the interview. This method is useful in the investigation of beliefs, understandings and interpretations of phenomena. It is particularly useful when researching confidential issues or where participants are geographically disparate.

There are three fundamental types of research interviews – structured, semi-structured and unstructured. Semi-structured interviews consist of several key questions that help to define the areas to be explored, but also allows the interviewer or interviewee to diverge in order to pursue an idea or response in more detail. This interview format is used most frequently in healthcare (Gill et al., 2008). Good questions are open-ended, neutral, sensitive and understandable. It is usually best to start with questions that participants can answer easily and then proceed to more difficult or sensitive topics (Gill et al., 2008).

A comparison between quantitative and qualitative methods is presented in Table 3.1.
**Table 3.1.** Comparison between qualitative and quantitative research

<table>
<thead>
<tr>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td><strong>Subjective</strong></td>
</tr>
<tr>
<td>Study fully planned before commencement</td>
<td>The design may alter as the study progresses</td>
</tr>
<tr>
<td>Random sampling</td>
<td>Purposive sampling – represent diversity of population</td>
</tr>
<tr>
<td><strong>Hypothesis testing</strong></td>
<td><strong>Hypothesis development</strong></td>
</tr>
<tr>
<td>Researcher uses tools or equipment to collect data</td>
<td>Researcher is the data-gathering instrument</td>
</tr>
<tr>
<td>Analysis of numerical data</td>
<td>Analysis of words, pictures or objects</td>
</tr>
<tr>
<td>Data collected then analysed</td>
<td>Data collected and analysed concurrently</td>
</tr>
<tr>
<td>Data may miss contextual detail</td>
<td>Data more ‘rich’</td>
</tr>
<tr>
<td>Aim is to have data that can be generalised to a population</td>
<td>Data less able to be generalised</td>
</tr>
<tr>
<td>Researcher tends to remain objectively separated from subject matter</td>
<td>Researcher tends to become subjectively immersed in the subject matter</td>
</tr>
</tbody>
</table>
3.3 The working practices and job satisfaction of male and female dentists in New Zealand - the Gender Study

This cross-sectional study involved a nationwide postal survey of all women dentists and one-third of all male dentists who held an annual practising certificate in 2003 (women) or 2004 (men). The aim of the study was to describe and compare the working practices and job satisfaction of a representative sample of male and female dentists.

3.3.1 Ethical approval

Ethical approval was granted by the University of Otago Ethics Committee prior to commencing the study.

3.3.2 Study method

Contact details for all dentists with an Annual Practising Certificate (APC) were obtained from the New Zealand Dental Register (with kind permission from DCNZ). All women and a randomly-selected one-third of male dentists were invited to participate. The different sampling ratios were used to maximise the statistical power of the gender comparisons. Participation incentives were offered in the form of prize draws. A self-completion questionnaire, covering letter and reply-paid return envelope were sent to 659 male and 482 female dentists (Appendix B). Questions sought information on respondents’ socio-demographic characteristics, current working practice, career breaks, continuing education and career satisfaction. A follow-up letter and duplicate questionnaire were sent to those who had not responded after 3 weeks.

3.3.3 Career satisfaction scale

Using a previously developed and tested career satisfaction scale (Gibbons et al., 2000; Gibbons et al., 2001; Naidu et al., 2002), respondents were asked to rate their satisfaction with their work life on a ten-point scale. The scale consisted of the numbers 1 to 10 with written anchors at each end, where 1 = minimum satisfaction and 10 = maximum satisfaction. This provided a career satisfaction score for each dentist.
3.3.4 Statistical analysis

The responses received were entered into an Excel spreadsheet and analysed using the Statistical Package for the Social Sciences (SPSS; Version 11.0 for Mac OS X, SPSS Inc., Chicago, Il). Chi-square tests were used for comparing proportions, while differences between means were tested for statistical significance using the independent samples t-test. The level of statistical significance was set at P<0.05.

3.4 The working practices and job satisfaction of dental therapists in New Zealand - the Therapist Study

This cross-sectional study involved a nationwide postal survey of all dental therapists on the DCNZ database in 2004. The aim of the Therapist Study was to investigate the working patterns, continuing education commitment, and career satisfaction of dental therapists in New Zealand.

3.4.1 Ethical approval

Ethical approval for the study was granted by the University of Otago Ethics Committee.

3.4.2 Study method

A self-completion questionnaire (and reply-paid return envelope) was sent to all dental therapists on the DCNZ database. Questions sought information on respondents’ demographic characteristics, current occupation and working practice, previous career breaks, continuing education and career satisfaction (Appendix B). A follow-up letter and duplicate questionnaire were sent to those who had not replied after 3 weeks.
3.4.3 Career satisfaction scale

Using a previously developed and utilised career satisfaction scale (Gibbons et al., 2000; Naidu et al., 2002), respondents were asked to rate their satisfaction with their work life on a ten-point scale, in order to provide a career satisfaction score. The scale consisted of the numbers 1 to 10, with written anchors at each end, where 1 = minimum satisfaction and 10 = maximum satisfaction. The scale was modified to measure income satisfaction in a similar fashion.

3.4.4 Statistical analysis

The responses received were entered into an Excel database and analysed using the Statistical Package for the Social Sciences (SPSS; Version 11.0 for Mac OS X, SPSS Inc., Chicago, Il). To examine differences by age, dental therapists were divided into two age groups (younger than 45 years, and 45 or above). Chi-square tests were used for comparing proportions, while differences between means were examined using the independent samples t-test. The level of significance was set at P<0.05. Logistic regression modelling was used to examine the correlates of job satisfaction.

3.5 The working practices and job satisfaction of dental hygienists in New Zealand - the Hygienist Study

This cross-sectional study involved a nationwide postal survey of all dental hygienists on the DCNZ database in 2004. The aim of the Hygienist Study was to investigate the working patterns, continuing education commitment and career satisfaction of dental hygienists in this country.

3.5.1 Ethical approval

The University of Otago Ethics Committee granted ethical approval for the study.
3.5.2 Study method

A self-completion questionnaire (and reply-paid return envelope) was sent to all 316 dental hygienists on the Dental Council database (Appendix B). Questions sought information on respondents’ demographic characteristics, current occupation and working practice, previous career breaks, continuing education and career satisfaction. A follow-up letter and duplicate questionnaire was sent to those who had not replied after 3 weeks.

3.5.3 Career satisfaction scale

Using a previously developed and utilised career satisfaction scale (Gibbons et al., 2000; Naidu et al., 2002), respondents were asked to rate their satisfaction with their work life on a ten-point scale, providing a career satisfaction score. The scale consisted of the numbers 1 to 10 with written anchors at each end, where 1 = minimum satisfaction and 10 = maximum satisfaction. The scale was modified to measure income satisfaction in a similar fashion.

3.5.4 Statistical analysis

The responses received were entered onto an Excel database and analyzed using the Statistical Package for the Social Sciences (SPSS; Version 11.0 for Mac OS X, SPSS Inc., Chicago, II). To examine differences by age, a median split was used to divide respondents into those aged less than 36 years and those aged 36 or above. Chi-square tests were used for comparing proportions, while differences between means were examined using the independent samples t-test. The level of significance was set at P<0.05.
3.6 Changes in the New Zealand dentist workforce over a nine-year period - the Longitudinal Study

The aim of this study was to identify and describe trends in the New Zealand dentist workforce over a nine-year period (from 1997 to 2005). This study involved collation of data from the 1997, 2001 and 2005 annual DCNZ workforce questionnaires. Cross-sectional analysis was used to identify characteristics of the complete workforce in each year. Subsequent longitudinal analysis examined changes in the practising characteristics of those practitioners who were working in each of the three years.

3.6.1 Ethical approval

Ethical approval for the study was granted by the University of Otago Ethics Committee.

3.6.2 Study method

Permission was sought from DCNZ to access data from the questionnaires in the years 1997, 2001 and 2005. Spreadsheets were obtained from the two consultants who had analysed data and prepared reports in these years (Dr RA Whyman and Professor WM Thomson).

3.6.3 Definitions

In order to be consistent with other DCNZ publications, the respondents' “first ethnicity” was used when determining each dentist’s ethnic group. Dentists were also categorised according to the location of their practice. “Major cities” included Auckland, North Shore, Waitakere, Manukau, Papakura, Hamilton, Porirua, Upper Hutt, Lower Hutt, Wellington, Christchurch and Dunedin. Locations classified as “provincial cities” included Whangarei, Tauranga, Rotorua, Gisborne, Hastings, Napier; New Plymouth, Wanganui, Palmerston North, Masterton, Nelson, Blenheim, Kaikoura, Timaru and Invercargill. All other locations were classified as “other”.

54
3.6.4 Statistical analysis

The data were amalgamated into a single database and analysed using the Statistical Package for the Social Sciences (SPSS; Version 11 for Mac OS X; www.spss.com). Associations between categorical variables were tested for significance using the Chi-square test, with the alpha level set at 0.05. For examining the statistical significance of differences between means, 95% confidence intervals were used. The McNemar test was used for the matched analyses, again with the alpha level set at 0.05.

3.7 Job stressors of New Zealand dentists and their coping strategies - the Stress Study

This cross-sectional study involved a nationwide postal survey of a random sample of dentists from DCNZ database in 2006. The aim of the study was to investigate job stressors, coping strategies and their associations among New Zealand dentists.

3.7.1 Ethical approval

Ethical approval for the study was granted by the University of Otago Ethics Committee.

3.7.2 Study method

A nationwide postal survey of 700 general dental practitioners was undertaken between April and July 2006. The sample was randomly selected from the New Zealand Dental Register (with permission from DCNZ). Participation incentives of two prize draws (sponsored by dental supply companies) were used. The questionnaire was posted with a covering letter explaining the study’s purpose, and a reply-paid envelope was included for returning completed forms (Appendix B).

One month later, a second wave of forms was sent to the 354 dentists who had not responded. The survey questionnaire sought data on respondents’ socio-demographic and
practice characteristics, together with information on factors causing stress in dentistry and coping strategies.

3.7.3 Inventory of Job Stressors

A modified form of the inventory devised by Cooper et al. (1987) was used to obtain information about job stressors. It consisted of 33 items within the following scales: time pressures, financial stressors, patient-related stressors, staff and technical problems, the nature of work, and concerns about the future. Respondents were asked to rate those stressors in terms of the frequency with which they experienced them. The response options were: ‘never’, ‘seldom’, ‘sometimes’, ‘often’, ‘frequently’ and ‘all the time’.

3.7.4 Statistical analysis

The survey responses were entered into an electronic database, and then analysed using the Statistical Package for the Social Sciences (SPSS; Version 11 for Mac OS X; www.spss.com). For reporting purposes, respondents were grouped by gender, year of graduation (Pre-1970, 1970-79, 1980-89, 1990-99 and 2000+), and site of practice (major city, provincial city and other). “Major cities” included Auckland, North Shore, Waitakere, Manukau, Papakura, Hamilton, Porirua, Upper Hutt, Lower Hutt, Wellington, Christchurch and Dunedin. Locations classified as “provincial cities” included Whangarei, Tauranga, Rotorua, Gisbourne, Hastings, Napier, New Plymouth, Wanganui, Palmerston North, Masterton, Nelson, Blenheim, Kaikoura, Timaru and Invercargill. All other locations were classified as “other”. Associations between categorical variables were tested for statistical significance using the Chi-square test, with the alpha level set at 0.05.
3.8 A qualitative investigation of the experiences of immigrant dentists working in New Zealand - the Immigrant Dentist Study

This qualitative study using semi-structured interviews to seek information regarding the problems experienced by overseas-trained dentists settling in New Zealand. The aims of the study were to determine the nature of problems experienced by overseas-trained dentists settling in New Zealand, and to ascertain what can be done to improve their experiences.

3.8.1 Ethical approval

Ethical approval for the study was obtained from the University of Otago.

3.8.2 Study method

A series of questions were developed to seek information on participants' experiences of working as dentists in NZ (Appendix B). The questions were designed in consultation with several individuals, including New Zealand-trained dentists, immigrant dentists, a practice manager from a large practice employing predominantly overseas-qualified dentists, and a NZDA representative. An initial interview took place with one participant. After transcription, this interview was analysed by three of the investigators and necessary modifications were made to the interview schedule.

The principal investigator contacted 13 further dentists and invited them to participate in the study. All agreed to participate in an interview and completed a consent form. Interviews were undertaken at the workplace of each participant, in a quiet room. One dentist chose to have the practice manager present, and another chose to undertake the interview at home, with her spouse (also an immigrant dentist) present as a passive observer. Aside from the collection of basic demographic information, each semi-structured interview included questions relating to: reasons for coming to NZ; gaining dental registration; experiences of working in this country; membership of NZDA and other support systems; life in NZ; and advice for other dentists moving to NZ. Where
necessary, further questions were asked of participants to expand on important areas of discussion.

3.8.3 Data analysis

Interviews were recorded on digital audiotape and transcribed by an independent typist. Analysis involved reading through the transcripts several times and identifying patterns and themes expressed by the participants (content analysis). The interview transcripts were scrutinised by two further researchers (Professor WM Thomson and Dr H Al-Hassiny) to maximise the accuracy of interpretation. After 14 interviews, a point of ‘saturation’ was reached, with no new themes arising.

3.9 The occupational health of dentists working in New Zealand - the Occupational Health Study

This further cross-sectional study involved a postal survey of a random sample of general practitioners holding an APC and a NZ postal address early in 2008. The aim of the study was to determine the occupational health status of dentists in New Zealand and any work-related factors that may be related to dentists’ health concerns.

3.9.1 Ethical approval

Approval was gained from the University of Otago Ethics Committee.

3.9.2 Study method

A nationwide postal survey of general dental practitioners was undertaken between February and March 2008. With assistance from the DCNZ, a sample of 750 general dental practitioners was randomly selected from the 2007 Dental Register. The questionnaire was posted with a covering letter explaining the study’s purpose, and a reply-paid envelope was enclosed for returning completed forms (Appendix B). Three weeks later, a second wave of forms was sent to the dentists who had not responded. This was accompanied by an
amended covering letter. Participation incentives were offered in the form of a prize draw for each round of letters.

3.9.3 The questionnaire

The survey questionnaire sought data on respondents' socio-demographic and practising characteristics, together with information about their health behaviours and general health. For reporting purposes, respondents were grouped by gender, number of years working as a dentist (<10, 10-19, 20-29, 30-39 and 40+), country of dental training (NZ or other), number of patients treated per week (up to 12, 13 or more), and hand used to operate the dental drill (left or right). The Body Mass Index (BMI) was calculated for each dentist by using the following formula: BMI = (weight in kg)/(height in m)$^2$.

3.9.4 Statistical analysis

The survey responses were entered into an electronic database, and then analysed using the Statistical Package for the Social Sciences (SPSS; Version 16 for Mac OS X; www.spss.com). Associations between categorical variables were tested for statistical significance using the Chi-square test, with the alpha level set at 0.05. Means were compared using the independent samples t-test.
### 3.10 Summary of the Chapter

A summary of the methodology of the investigations is provided in Table 3.2

<table>
<thead>
<tr>
<th>Study Name</th>
<th>Type of Study</th>
<th>Ethical approval</th>
<th>Sample</th>
<th>Sampling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender Study</td>
<td>Cross-sectional survey</td>
<td>University of Otago</td>
<td>All women dentists and one-third of male dentists with an APC in 2004</td>
<td>Whole population of female dentists and random sample of male dentists</td>
</tr>
<tr>
<td>Therapist Study</td>
<td>Cross-sectional survey</td>
<td>University of Otago</td>
<td>Dental therapists on the DCNZ database in 2004</td>
<td>Whole population</td>
</tr>
<tr>
<td>Hygienist Study</td>
<td>Cross-sectional survey</td>
<td>University of Otago</td>
<td>Dental hygienists on the DCNA database in 2004</td>
<td>Whole population</td>
</tr>
<tr>
<td>Longitudinal Study</td>
<td>Longitudinal analysis of routinely-collected data</td>
<td>University of Otago</td>
<td>Dentists working in NZ in 1997, 2001 and 2005 who completed a workforce questionnaire</td>
<td>Whole population</td>
</tr>
<tr>
<td>Stress Study</td>
<td>Cross-sectional survey</td>
<td>University of Otago</td>
<td>General dental practitioners with an APC in 2006</td>
<td>Random sample</td>
</tr>
<tr>
<td>Immigrant Dentist Study</td>
<td>Qualitative research using semi-structured interview</td>
<td>University of Otago</td>
<td>Dentists who had immigrated to NZ within last 10 years</td>
<td>Convenience sample</td>
</tr>
<tr>
<td>Occupational Health Study</td>
<td>Cross-sectional survey</td>
<td>University of Otago</td>
<td>All general dental practitioners with an APC in 2007</td>
<td>Random sample</td>
</tr>
</tbody>
</table>
Chapter 4 Results

4.1 Introduction to the Chapter

In this chapter, the findings of each of the studies will be presented. For consistency, the following footnotes apply for statistically significant differences: \textsuperscript{a}P<0.05, \textsuperscript{b}P<0.01, \textsuperscript{c}P<0.001. Additional footnotes are used where required.

4.2 The working practices and job satisfaction of male and female dentists in New Zealand - the Gender Study

4.2.1 Response rate

Of the 659 questionnaires sent to male dentists, 16 were returned without reaching the addressee because of data-base address errors, and 15 were returned because the practitioner had died or retired. Completed questionnaires were received from 468 men, giving an effective response rate of 74.5%. Of the 482 questionnaires sent to female dentists, 22 were returned because of address errors. Completed questionnaires were received from 382 women (response rate 83.0%). An overall response rate of 78.1% was achieved.

4.2.2 Socio-demographic characteristics

The socio-demographic characteristics of the respondents are summarised by gender in Table 4.1.
### Table 4.1 Demographic characteristics of dentists by gender (brackets contain percentages; some respondents did not answer all questions)

<table>
<thead>
<tr>
<th>Gender</th>
<th>Male (N=468)</th>
<th>Female (N=382)</th>
<th>All Combined (N=850)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ European</td>
<td>333 (71.2)</td>
<td>247 (64.7)</td>
<td>580 (68.2)</td>
</tr>
<tr>
<td>NZ Maori</td>
<td>11 (2.4)</td>
<td>14 (3.7)</td>
<td>25 (2.9)</td>
</tr>
<tr>
<td>Pacific Island</td>
<td>1 (&lt;0.1)</td>
<td>3 (&lt;0.1)</td>
<td>4 (&lt;0.1)</td>
</tr>
<tr>
<td>Chinese</td>
<td>62 (13.2)</td>
<td>40 (10.5)</td>
<td>102 (12.0)</td>
</tr>
<tr>
<td>Indian</td>
<td>22 (4.7)</td>
<td>26 (6.8)</td>
<td>48 (5.6)</td>
</tr>
<tr>
<td>Other</td>
<td>54 (11.5)</td>
<td>65 (17.0)</td>
<td>119 (14.0)</td>
</tr>
<tr>
<td><strong>Age group (years)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 to 39</td>
<td>105 (22.6)</td>
<td>235 (61.7)</td>
<td>340 (40.1)</td>
</tr>
<tr>
<td>40 to 59</td>
<td>269 (57.8)</td>
<td>145 (38.0)</td>
<td>414 (48.9)</td>
</tr>
<tr>
<td>60 or more</td>
<td>91 (19.6)</td>
<td>1 (0.3)</td>
<td>92 (10.9)</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married/cohabiting</td>
<td>396 (85.0)</td>
<td>287 (75.1)</td>
<td>683 (80.5)</td>
</tr>
<tr>
<td>Single, divorced, widowed</td>
<td>70 (15.0)</td>
<td>95 (24.9)</td>
<td>165 (19.5)</td>
</tr>
<tr>
<td><strong>Number of children</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>72 (15.8)</td>
<td>140 (37.1)</td>
<td>212 (25.5)</td>
</tr>
<tr>
<td>1 to 2</td>
<td>190 (41.7)</td>
<td>168 (44.6)</td>
<td>358 (43.0)</td>
</tr>
<tr>
<td>3 or more</td>
<td>194 (42.5)</td>
<td>69 (18.3)</td>
<td>263 (31.6)</td>
</tr>
<tr>
<td><strong>Year of Qualification</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior to 1970</td>
<td>108 (23.1)</td>
<td>3 (0.8)</td>
<td>111 (13.1)</td>
</tr>
<tr>
<td>1970 to 1989</td>
<td>262 (56.1)</td>
<td>179 (46.9)</td>
<td>441 (51.9)</td>
</tr>
<tr>
<td>1990 or later</td>
<td>97 (20.7)</td>
<td>200 (52.3)</td>
<td>297 (35.0)</td>
</tr>
<tr>
<td><strong>Country of graduation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Zealand</td>
<td>399 (85.3)</td>
<td>292 (76.4)</td>
<td>691 (81.3)</td>
</tr>
<tr>
<td>Australia</td>
<td>6 (1.3)</td>
<td>5 (1.3)</td>
<td>11 (1.3)</td>
</tr>
<tr>
<td>UK</td>
<td>20 (4.3)</td>
<td>28 (7.3)</td>
<td>48 (5.6)</td>
</tr>
<tr>
<td>Other</td>
<td>43 (9.2)</td>
<td>57 (15.0)</td>
<td>100 (11.7)</td>
</tr>
<tr>
<td><strong>Postgraduate qualifications</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>312 (67.8)</td>
<td>300 (78.5)</td>
<td>612 (72.7)</td>
</tr>
<tr>
<td>PGDipClinDent</td>
<td>31 (6.7)</td>
<td>25 (6.5)</td>
<td>56 (6.6)</td>
</tr>
<tr>
<td>MDS/MComDent</td>
<td>47 (10.2)</td>
<td>29 (7.6)</td>
<td>76 (9.1)</td>
</tr>
<tr>
<td>FRACDS</td>
<td>30 (6.5)</td>
<td>11 (2.9)</td>
<td>41 (4.9)</td>
</tr>
<tr>
<td>Other</td>
<td>80 (17.4)</td>
<td>31 (8.1)</td>
<td>111 (13.2)</td>
</tr>
<tr>
<td><strong>Registered as a specialist</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>67 (14.6)</td>
<td>30 (7.9)</td>
<td>97 (11.6)</td>
</tr>
<tr>
<td>No</td>
<td>391 (85.4)</td>
<td>350 (92.1)</td>
<td>741 (88.4)</td>
</tr>
</tbody>
</table>

*P<0.05  bP<0.01  cP<0.001

*d Participants were permitted to identify with more than one ethnic group

*e Some respondents held more than one post-graduate qualification
Most responding dentists were of NZ European ethnic origin, although this included a smaller proportion of female than male dentists. A greater proportion of female than male dentists reported that they self-identified with ‘other’ ethnic groups (such as South African). Most women dentists were younger than 40, while most males were aged between 40 and 59 years. Almost one in five male respondents were aged 60 or more, but only 1 female was in this age band. Most dentists were married or cohabiting and had at least one child. Around half had qualified between 1970 and 1989, with only 3 women having qualified before 1970. Most respondents had trained in NZ, with a larger proportion of women than men qualifying overseas. Approximately one-third of respondents held a post-graduate qualification of some kind. While similar proportions of males and females held postgraduate dental Diplomas or Masters degrees, larger proportions of male than female dentists held College Fellowships and other qualifications. A higher proportion of men than women were registered as dental specialists. The mean number of years registered as a specialist was 11.1 (SD 8.0) overall, with 12.5 (SD 8.2) and 8.0 (SD 6.8) for males and females respectively (P < 0.05). Thirty-five male (7.5%) and 292 female (78.1%) respondents had a student loan (P < 0.001).

### 4.2.3 Current career breaks

Of the 849 respondents, 36 were not working as dental practitioners at the time of the study; 30 were female (7.8% of female respondents) and 6 were male (1.3% of male respondents; P < 0.001). The most common reasons for currently being on a career break were parental leave or caring for children (17, 47.2%), personal choice (11, 30.5%), personal illness (7, 19.4%) and working outside dentistry (7, 19.4%). Some respondents gave more than one reason for their career break. Fourteen (38.9%) had been away from work for less than 6 months, 10 (27.8%) between 6 and 12 months, and 10 (27.8%) for more than one year. Two-thirds (20, 66.7%) of those who were taking a career break planned to return to dental practice (most within 6 months), while five (13.9%) were unsure and five (13.9%) stated that they did not intend to return to dentistry. Two-thirds stated that they would be interested in taking a refresher course prior to returning to dental practice, while the remainder were either not interested or were unsure.
4.2.4 Previous career breaks

Information about previous career breaks is presented in Table 4.2.

<table>
<thead>
<tr>
<th>Table 4.2</th>
<th>Information about dentists’ previous career breaks by gender (percentages in brackets; some respondents did not answer all questions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>Ever had a career break</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>133 (28.6)</td>
</tr>
<tr>
<td>No</td>
<td>332 (71.4)</td>
</tr>
<tr>
<td>Duration of break</td>
<td></td>
</tr>
<tr>
<td>&lt;12 months</td>
<td>62 (47.7)</td>
</tr>
<tr>
<td>12-24 months</td>
<td>20 (15.4)</td>
</tr>
<tr>
<td>&gt;24 months</td>
<td>48 (36.9)</td>
</tr>
<tr>
<td>Reason for career break&lt;sup&gt;d&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Caring for children</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>Personal illness</td>
<td>15 (11.3)</td>
</tr>
<tr>
<td>Personal choice</td>
<td>45 (33.8)</td>
</tr>
<tr>
<td>Seeking job in dentistry</td>
<td>45 (33.8)</td>
</tr>
<tr>
<td>Working outside dentistry</td>
<td>15 (11.3)</td>
</tr>
<tr>
<td>Study</td>
<td>31 (23.3)</td>
</tr>
<tr>
<td>Other (mainly travel)</td>
<td>32 (24.1)</td>
</tr>
<tr>
<td>Experienced difficulty after returning from career break</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>18 (13.6)</td>
</tr>
<tr>
<td>No</td>
<td>114 (86.4)</td>
</tr>
</tbody>
</table>

<sup>a</sup>P<0.05  <sup>b</sup>P<0.01  <sup>c</sup>P<0.001

<sup>d</sup>Respondents were able to identify more than one reason
A career break was defined as any period of six weeks or longer away from practice, and almost half indicated that they had taken a break at some stage of their career. Although a greater proportion of females than males had taken a career break, there were no significant gender differences in the duration of career breaks. While most women had taken breaks to care for children, men mainly took breaks because of personal choice or because they were seeking a job in dentistry. More men than women had taken breaks for the purpose of further study. Over one-fifth of women but only one-seventh of men reported that they had experienced difficulty returning to work following their career break.

4.2.5 Current working practices

Data regarding the current working practices of those currently working as dental practitioners are summarised in Table 4.3.
### Table 4.3 Current working practices of dentists (percentages in brackets; some respondents did not answer all questions)

<table>
<thead>
<tr>
<th></th>
<th>Male N=462</th>
<th>Female N=352</th>
<th>All Combined N=814</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current position</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own practice</td>
<td>324 (70.1)</td>
<td>137 (38.9)</td>
<td>461 (56.6)</td>
</tr>
<tr>
<td>Associate</td>
<td>103 (22.3)</td>
<td>168 (47.7)</td>
<td>271 (33.3)</td>
</tr>
<tr>
<td>Hospital</td>
<td>35 (7.6)</td>
<td>46 (13.1)</td>
<td>81 (10.0)</td>
</tr>
<tr>
<td>Teaching</td>
<td>16 (3.5)</td>
<td>21 (6.0)</td>
<td>37 (4.5)</td>
</tr>
<tr>
<td>Other dental setting</td>
<td>20 (4.3)</td>
<td>15 (4.3)</td>
<td>35 (4.3)</td>
</tr>
<tr>
<td><strong>Hours worked per week</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>36.0 (10.0)</td>
<td>29.1 (12.6)</td>
<td>32.9 (11.8)</td>
</tr>
<tr>
<td>Median</td>
<td>37</td>
<td>32</td>
<td>35</td>
</tr>
<tr>
<td><strong>Reasons for working part-time</strong></td>
<td>N=77</td>
<td>N=180</td>
<td>N=257</td>
</tr>
<tr>
<td>Caring for children</td>
<td>6 (7.8)</td>
<td>121 (67.2)</td>
<td>124 (48.2)</td>
</tr>
<tr>
<td>Caring for other relatives</td>
<td>1 (1.3)</td>
<td>6 (3.3)</td>
<td>7 (2.7)</td>
</tr>
<tr>
<td>Personal illness</td>
<td>6 (7.8)</td>
<td>5 (2.8)</td>
<td>11 (4.3)</td>
</tr>
<tr>
<td>Personal choice</td>
<td>55 (63.6)</td>
<td>96 (53.3)</td>
<td>151 (58.8)</td>
</tr>
<tr>
<td>Job outside dentistry</td>
<td>12 (15.6)</td>
<td>7 (3.9)</td>
<td>19 (7.4)</td>
</tr>
<tr>
<td>Study</td>
<td>5 (5.2)</td>
<td>14 (7.8)</td>
<td>19 (7.4)</td>
</tr>
<tr>
<td>Other</td>
<td>6 (7.8)</td>
<td>7 (3.9)</td>
<td>13 (5.1)</td>
</tr>
<tr>
<td><strong>Principal earner in family</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>394 (85.3)</td>
<td>123 (34.9)</td>
<td>517 (63.5)</td>
</tr>
<tr>
<td>No</td>
<td>19 (4.1)</td>
<td>135 (38.4)</td>
<td>154 (18.9)</td>
</tr>
<tr>
<td>Equal contribution</td>
<td>50 (10.8)</td>
<td>120 (34.1)</td>
<td>170 (20.9)</td>
</tr>
<tr>
<td><strong>Planned age of retirement</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;50 years</td>
<td>11 (2.7)</td>
<td>48 (15.4)</td>
<td>59 (8.1)</td>
</tr>
<tr>
<td>50-59 years</td>
<td>94 (20.3)</td>
<td>151 (48.4)</td>
<td>245 (33.7)</td>
</tr>
<tr>
<td>60 or more</td>
<td>310 (67.1)</td>
<td>113 (36.2)</td>
<td>423 (58.2)</td>
</tr>
</tbody>
</table>

\(^a^P<0.01 \ ^b^P<0.001\)

\(^d^\) Some dentists held more than one position

\(^e^\) More than one reason was permitted
Whereas the majority of male dentists owned their own practice, a greater proportion of women worked as an associate in dental practice. More women than men worked in hospital departments. The mean number of hours worked per week ranged from 0 to 80 (with a mean of 32.9), with men working 6.9 hours per week more (on average) than women. Men’s most frequent reason for working part-time was personal choice, and that for women was caring for children, followed by personal choice. Most men (but only one-third of women) were the main family income earners. Two-thirds of men planned to work until at least 60 years of age, while a similar proportion of women planned to retire before 60 years.

### 4.2.6 Continuing education practices

The continuing education practices of respondents are presented in Table 4.4.
Table 4.4  Continuing professional education practices of dentists by gender (percentages in brackets; some respondents did not answer all questions)

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>All combined</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Member of NZDA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>408 (87.4)</td>
<td>342 (89.5)</td>
<td>750 (88.3)</td>
</tr>
<tr>
<td>No</td>
<td>59 (12.6)</td>
<td>40 (10.5)</td>
<td>99 (11.7)</td>
</tr>
<tr>
<td><strong>Number of dental society memberships</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 or 1</td>
<td>223 (47.8)</td>
<td>239 (62.6)c</td>
<td>462 (54.4)</td>
</tr>
<tr>
<td>2 or more</td>
<td>244 (52.2)</td>
<td>143 (37.4)c</td>
<td>387 (45.6)</td>
</tr>
<tr>
<td><strong>Number of dental journals read regularly</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 or 1</td>
<td>172 (37.1)</td>
<td>173 (45.3)a</td>
<td>345 (40.8)</td>
</tr>
<tr>
<td>2 or more</td>
<td>292 (62.9)</td>
<td>209 (54.7)a</td>
<td>501 (59.2)</td>
</tr>
<tr>
<td><strong>20+ hours of CPD in last year</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>356 (77.4)</td>
<td>267 (69.9)c</td>
<td>623 (74.0)</td>
</tr>
<tr>
<td>No</td>
<td>104 (22.6)</td>
<td>115 (30.1)c</td>
<td>219 (26.0)</td>
</tr>
<tr>
<td><strong>Number branch meetings attended in last year</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>144 (31.4)</td>
<td>177 (43.4)c</td>
<td>321 (37.0)</td>
</tr>
<tr>
<td>1 or 2</td>
<td>105 (22.9)</td>
<td>87 (21.3)</td>
<td>192 (22.1)</td>
</tr>
<tr>
<td>3 or more</td>
<td>210 (45.8)</td>
<td>144 (35.3)b</td>
<td>354 (40.8)</td>
</tr>
<tr>
<td><strong>Find meetings useful</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>194 (48.7)</td>
<td>119 (39.4)a</td>
<td>313 (44.7)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>145 (36.4)</td>
<td>139 (46.0)a</td>
<td>284 (40.6)</td>
</tr>
<tr>
<td>No</td>
<td>59 (14.8)</td>
<td>44 (14.6)</td>
<td>103 (14.7)</td>
</tr>
<tr>
<td><strong>Feel welcome at branch meetings</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>307 (79.5)</td>
<td>196 (65.6)c</td>
<td>503 (73.4)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>59 (15.3)</td>
<td>67 (22.4)a</td>
<td>126 (18.4)</td>
</tr>
<tr>
<td>No</td>
<td>20 (5.2)</td>
<td>36 (12.0)b</td>
<td>56 (8.2)</td>
</tr>
</tbody>
</table>

* P<0.05  b P<0.01  c P<0.001
Most dentists belonged to the NZDA. A greater proportion of men than women had a dental college fellowship, or belonged to two or more societies. Greater proportions of male respondents than female dentists had: read two or more dental journals regularly; undertaken at least 20 hours of continuing professional development in the previous year; and attended three or more NZDA branch meetings in the previous year. A greater proportion of male than female dentists reported that they found branch meetings useful, and that they felt welcome at those. Most women who were specialists had undertaken their postgraduate training before having children (17, 60.7%) or didn’t have any children (5, 17.9%). In contrast, 59 of the 60 male specialists (98.3%) had children, with 26 (43.3%) having undertaken specialist training around the time of the birth of their children, and 13 (21.7%) after having children (P<0.001).

4.2.7 Career satisfaction

Information regarding the career satisfaction of respondents is presented in Table 4.5.
Table 4.5  Indicators of career satisfaction with dentistry among male and female dentists
(Percentages in brackets; some respondents did not answer all questions)

<table>
<thead>
<tr>
<th>Question</th>
<th>Male</th>
<th>Female</th>
<th>All combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has dentistry fulfilled your career expectations?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>380 (83.9)</td>
<td>293 (77.1)</td>
<td>673 (80.8)</td>
</tr>
<tr>
<td>No/Unsure</td>
<td>73 (16.1)</td>
<td>87 (22.9)</td>
<td>160 (19.2)</td>
</tr>
<tr>
<td>Would you study dentistry again?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>380 (82.4)</td>
<td>261 (69.0)</td>
<td>641 (76.4)</td>
</tr>
<tr>
<td>No/Unsure</td>
<td>81 (17.6)</td>
<td>117 (31.0)</td>
<td>198 (23.6)</td>
</tr>
<tr>
<td>Adequate career opportunities?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>424 (93.2)</td>
<td>346 (91.5)</td>
<td>770 (92.4)</td>
</tr>
<tr>
<td>No/Unsure</td>
<td>31 (6.8)</td>
<td>32 (8.5)</td>
<td>63 (75.6)</td>
</tr>
<tr>
<td>Has your partner made career adjustments to suit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>your dental career?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>199 (48.1)</td>
<td>86 (25.7)</td>
<td>285 (38.1)</td>
</tr>
<tr>
<td>No/Unsure</td>
<td>215 (51.9)</td>
<td>248 (74.3)</td>
<td>463 (61.9)</td>
</tr>
</tbody>
</table>

\(^a P<0.05 \quad ^b P<0.001\)
Most respondents stated that dentistry had fulfilled their career expectations and that they would study dentistry again, although more positive responses were received from males than females. Almost all respondents stated that there were adequate career opportunities for dentists, with no significant differences by gender. Approximately half of male dentists and one-quarter of female dentists felt that their partner had made career adjustments to suit their dental career.

Career satisfaction scores are presented by socio-economic characteristics in Table 4.6.

Table 4.6 Career satisfaction scores by dentists’ sociodemographic characteristics

<table>
<thead>
<tr>
<th></th>
<th>Career satisfaction mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>7.6 (1.7)</td>
</tr>
<tr>
<td>Female</td>
<td>7.1 (1.8)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>Less than 40</td>
<td>7.1 (1.7)</td>
</tr>
<tr>
<td>40 or more</td>
<td>7.5 (1.8)</td>
</tr>
<tr>
<td><strong>Specialist</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>8.2 (1.6)</td>
</tr>
<tr>
<td>No</td>
<td>7.3 (1.8)</td>
</tr>
<tr>
<td><strong>Principal earner</strong></td>
<td></td>
</tr>
<tr>
<td>Yes or equal</td>
<td>7.4 (1.8)</td>
</tr>
<tr>
<td>No</td>
<td>7.3 (1.7)</td>
</tr>
<tr>
<td><strong>Children</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7.4 (1.8)</td>
</tr>
<tr>
<td>No</td>
<td>7.1 (1.7)</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
</tr>
<tr>
<td>Married/cohabiting</td>
<td>7.3 (1.6)</td>
</tr>
<tr>
<td>Single/divorced/widowed</td>
<td>7.4 (1.8)</td>
</tr>
<tr>
<td><strong>All combined</strong></td>
<td>7.4 (1.8)</td>
</tr>
</tbody>
</table>

Career satisfaction scores were higher for male dentists, those aged 40 or more, dental specialists, and those with children. Linear regression confirmed that only female gender was associated with career satisfaction; being overseas-trained was not associated with the dependent variable once age group and gender were controlled for.
4.3 The working practices and job satisfaction of dental therapists in New Zealand - the Therapist Study

4.3.1 Response rate

Questionnaires were sent to 711 dental therapists, but 28 were subsequently deemed to be out of frame (18 returned unopened, and 10 were dental assistants working within the SDS rather than therapists). Replies were received from 566, giving an effective response rate of 82.9%. Some respondents did not answer all questions.

4.3.2 Characteristics of the respondents

There were 555 females (98.0%) and 7 males (1.2%). The average age was 47.7 years (SD=8.8, range 21-70). Male dental therapists were, on average, younger than female dental therapists (P<0.001). The majority of dental therapists (553; 97.7%) had trained in NZ. Respondents were permitted to self-identify with more than one ethnic group: 526 (91.2%) were NZ European; 56 (9.9%) Maori; 7 (1.2%) Pacific Island, and 25 (4.4%) identified with another ethnic group. Many respondents (228, 40.3%) had childcare responsibilities, although older therapists were less likely to report childcare responsibilities than their younger colleagues (P<0.001). The mean time since qualification was 27.3 years (SD=9.9). Most respondents (514, 90.8%) held a Certificate in Dental Therapy. Approximately equal numbers held a Diploma in Dental Therapy (31, 5.4%) and an Advanced Dental Therapy Certificate or Diploma (35, 6.1%). Fourteen individuals (2.5%) held a University Degree.

4.3.3 Current working practices

Most respondents (512; 90.5%) were currently employed as dental therapists. Data on the working circumstances of these individuals are presented in Table 4.7.
Table 4.7 Working circumstances of practising dental therapists by age-group (brackets contain percentages)

<table>
<thead>
<tr>
<th>Age group</th>
<th>&lt; 45 years (N=153)</th>
<th>45 years + (N=350)</th>
<th>All combined (N=503)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current employer</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School Dental Service/DHB</td>
<td>153 (100.0)</td>
<td>341 (97.4)</td>
<td>494 (98.2)</td>
</tr>
<tr>
<td>Hospital dental department</td>
<td>1 (0.6)</td>
<td>6 (1.7)</td>
<td>7 (1.4)</td>
</tr>
<tr>
<td>Teaching institution</td>
<td>1 (0.6)</td>
<td>5 (1.4)</td>
<td>6 (1.2)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (0.6)</td>
<td>9 (2.6)</td>
<td>10 (2.0)</td>
</tr>
<tr>
<td><strong>Current role</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dental therapist</td>
<td>151 (98.7)</td>
<td>347 (99.1)</td>
<td>498 (99.0)</td>
</tr>
<tr>
<td>Dental assistant</td>
<td>0 (0.0)</td>
<td>2 (0.6)</td>
<td>2 (0.4)</td>
</tr>
<tr>
<td>Tutor/lecturer</td>
<td>2 (1.3)</td>
<td>7 (2.0)</td>
<td>9 (1.8)</td>
</tr>
<tr>
<td>Team leader/Manager</td>
<td>9 (5.9)</td>
<td>16 (1.1)</td>
<td>25 (5.0)</td>
</tr>
<tr>
<td>Other</td>
<td>3 (2.0)</td>
<td>4 (0.3)</td>
<td>7 (1.4)</td>
</tr>
<tr>
<td><strong>Hours worked per week</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>32.8</td>
<td>34.4</td>
<td>34.0</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>7.6</td>
<td>7.0</td>
<td>7.2</td>
</tr>
<tr>
<td><strong>Prefer to work</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fewer hours</td>
<td>37 (24.2)</td>
<td>99 (28.3)</td>
<td>136 (27.0)</td>
</tr>
<tr>
<td>The same number of hours</td>
<td>97 (63.4)</td>
<td>237 (67.7)</td>
<td>334 (66.4)</td>
</tr>
<tr>
<td>More hours</td>
<td>13 (8.5)</td>
<td>11 (3.1)</td>
<td>24 (4.8)</td>
</tr>
<tr>
<td>Did not state</td>
<td>6 (3.9)</td>
<td>3 (0.9)</td>
<td>9 (1.8)</td>
</tr>
<tr>
<td><strong>Number of schools/clinics per year</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One -two</td>
<td>51 (33.3)</td>
<td>128 (36.6)</td>
<td>179 (35.6)</td>
</tr>
<tr>
<td>Three - four</td>
<td>60 (39.2)</td>
<td>131 (37.4)</td>
<td>191 (38.0)</td>
</tr>
<tr>
<td>Five or more</td>
<td>39 (25.5)</td>
<td>88 (25.1)</td>
<td>127 (25.2)</td>
</tr>
<tr>
<td>Did not state</td>
<td>3 (2.0)</td>
<td>3 (0.9)</td>
<td>6 (1.2)</td>
</tr>
<tr>
<td><strong>Have a dental assistant</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usually/Sometimes</td>
<td>84 (55.0)</td>
<td>192 (54.9)</td>
<td>276 (54.9)</td>
</tr>
<tr>
<td>Rarely/Never</td>
<td>68 (44.4)</td>
<td>157 (44.9)</td>
<td>225 (44.7)</td>
</tr>
<tr>
<td>Did not state</td>
<td>1 (0.6)</td>
<td>1 (0.2)</td>
<td>2 (0.4)</td>
</tr>
<tr>
<td><strong>Holding a job of another type</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>21 (13.7)</td>
<td>43 (12.3)</td>
<td>64 (12.7)</td>
</tr>
<tr>
<td>No</td>
<td>131 (85.6)</td>
<td>307 (87.7)</td>
<td>438 (87.1)</td>
</tr>
<tr>
<td>Did not state</td>
<td>1 (0.7)</td>
<td>0 (0.0)</td>
<td>1 (0.2)</td>
</tr>
<tr>
<td><strong>No. of hours in second job</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>9.1 (5.7)</td>
<td>8.8 (6.5)</td>
<td>8.9 (6.2)</td>
</tr>
</tbody>
</table>

\*P<0.05
\*Therapists who did not state their age are not included, and some respondents did not answer all questions
\*Some therapists had more than one employer and/or worked in more than one role
Almost all (494, 98.2%) were employed in the SDS. On average, younger therapists worked fewer hours per week (mean 32.8 hrs, SD=7.6) than their older colleagues (mean 34.4 hrs, SD=7.0; P<0.05). A larger proportion of younger (13; 8.5%) than older therapists (11; 3.1%) stated that they would like to increase the number of hours worked (P<0.05).

4.3.4 Clinical duties

The clinical duties regularly performed by respondents are summarised in Table 4.8.
Table 4.8 Duties regularly performed by dental therapists in their working practice (brackets contain percentages). Some respondents did not answer all questions.

<table>
<thead>
<tr>
<th>Age group</th>
<th>&lt; 45 years</th>
<th>45 years +</th>
<th>All combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental health education</td>
<td>95 (62.5)</td>
<td>198 (58.6)</td>
<td>293 (59.8)</td>
</tr>
<tr>
<td>Dietary counselling</td>
<td>115 (76.7)</td>
<td>268 (79.3)</td>
<td>383 (78.5)</td>
</tr>
<tr>
<td>Fluoride application</td>
<td>97 (63.4)</td>
<td>243 (70.2)</td>
<td>340 (68.1)</td>
</tr>
<tr>
<td>Examination</td>
<td>152 (99.3)</td>
<td>347 (99.1)</td>
<td>499 (99.2)</td>
</tr>
<tr>
<td>Taking radiographs</td>
<td>78 (52.3)</td>
<td>170 (53.1)</td>
<td>248 (52.9)</td>
</tr>
<tr>
<td>Reading radiographs</td>
<td>85 (56.3)</td>
<td>197 (59.2)</td>
<td>282 (58.3)</td>
</tr>
<tr>
<td>Fissure sealant</td>
<td>138 (90.2)</td>
<td>335 (95.7)</td>
<td>473 (94.0)</td>
</tr>
<tr>
<td>Local anaesthetic</td>
<td>150 (98.0)</td>
<td>347 (99.1)</td>
<td>497 (98.8)</td>
</tr>
<tr>
<td>Placement of restorations</td>
<td>150 (98.0)</td>
<td>345 (98.3)</td>
<td>495 (98.2)</td>
</tr>
<tr>
<td>Polishing of restorations</td>
<td>51 (34.2)</td>
<td>99 (29.1)</td>
<td>150 (30.7)</td>
</tr>
<tr>
<td>Pulpotomy</td>
<td>22 (15.2)</td>
<td>45 (14.4)</td>
<td>67 (14.6)</td>
</tr>
<tr>
<td>Direct pulp capping</td>
<td>63 (42.6)</td>
<td>158 (48.2)</td>
<td>221 (46.4)</td>
</tr>
<tr>
<td>Indirect pulp capping</td>
<td>88 (59.1)</td>
<td>193 (58.8)</td>
<td>281 (58.9)</td>
</tr>
<tr>
<td>Stainless Steel crown</td>
<td>0 (0.0)</td>
<td>5 (1.6)</td>
<td>5 (1.1)</td>
</tr>
<tr>
<td>Extraction of primary tooth</td>
<td>135 (88.2)</td>
<td>297 (85.6)</td>
<td>432 (86.4)</td>
</tr>
<tr>
<td>Extraction of permanent tooth</td>
<td>1 (0.7)</td>
<td>4 (1.3)</td>
<td>5 (1.1)</td>
</tr>
<tr>
<td>Temporary dressing</td>
<td>81 (53.6)</td>
<td>177 (50.9)</td>
<td>258 (51.7)</td>
</tr>
<tr>
<td>Other emergency treatment</td>
<td>47 (34.3)</td>
<td>127 (40.6)</td>
<td>174 (38.7)</td>
</tr>
<tr>
<td>Peer appraisal/peer review</td>
<td>40 (26.8)</td>
<td>118 (36.0)</td>
<td>158 (33.1)</td>
</tr>
<tr>
<td>Clinical supervision</td>
<td>19 (13.0)</td>
<td>57 (17.9)</td>
<td>76 (16.4)</td>
</tr>
<tr>
<td>Clinical teaching</td>
<td>12 (8.1)</td>
<td>33 (10.5)</td>
<td>45 (9.7)</td>
</tr>
<tr>
<td>Team management/co-ordination</td>
<td>14 (9.5)</td>
<td>58 (18.4)</td>
<td>72 (15.6)</td>
</tr>
</tbody>
</table>

*A* <0.05

A larger proportion of older than younger dental therapists reported regularly placing fissure sealants *(P*<0.05), and to be involved in peer appraisal/review *(P*<0.05) or team management *(P*<0.05).
4.3.5 Current career breaks

Fifty-four respondents (9.5%) were not currently practising. Data relating to these respondents are presented in Table 4.9.

Table 4.9 Information relating to dental therapists currently taking a career break, together with information on intentions to return to dental therapy (brackets contain percentages; N = 54)

<table>
<thead>
<tr>
<th>Duration of current break</th>
<th>Dental therapists on a career break</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 year</td>
<td>16 (29.6)</td>
</tr>
<tr>
<td>1 to 5 years</td>
<td>10 (18.5)</td>
</tr>
<tr>
<td>&gt; 5 years</td>
<td>15 (27.8)</td>
</tr>
<tr>
<td>No answer</td>
<td>13 (24.1)</td>
</tr>
</tbody>
</table>

Areas in which respondent previously worked

| School Dental Service/DHB | 48 (88.9) |
| Teaching Institution      | 1 (1.9)   |
| Other                     | 4 (7.4)   |
| Never worked as a dental therapist | 2 (3.7) |

Currently in paid employment

| Yes                        | 35 (64.8) |
| Dental assistant           | 12 (22.2) |
| Other dental job           | 13 (24.1) |
| Other job                  | 10 (18.5) |
| No                         | 19 (35.2) |

Reason for current career break

| Personal illness            | 3 (5.6)  |
| Family illness              | 1 (1.9)  |
| Child rearing               | 9 (16.7) |
| To aid partner’s career     | 1 (1.9)  |
| Study                       | 3 (5.6)  |
| Travelling                  | 1 (1.9)  |
| Other                       | 1 (1.9)  |
| Not stated                  | 35 (64.8) |

Intend to return to dental therapy

| No                         | 28 (44.4) |
| Yes                        | 20 (37.0) |
| Within 12 months           | 6 (11.1)  |
| Longer than 12 months      | 4 (7.4)   |
| Don’t know when            | 10 (18.5) |
| No answer                  | 6 (11.1)  |

*I therapist worked in more than 1 area*
4.3.6 Previous career breaks

A career break was defined as any period taken away from work lasting longer than six weeks. The 54 respondents who were currently taking a career break were excluded and further 11 respondents did not answer this section. The majority of participants (412; 82.2%) had taken a career break. The mean time taken in career breaks per therapist was 6.5 years (SD 5.9). Respondents aged 45 years or over were more likely to have had a career break (P<0.05) and to have taken multiple career breaks (P<0.05). The most common reason for career breaks was child rearing (361 respondents, 87.6%). The mean length of time taken off for child rearing by older therapists (7.1 years, SD 1.7) was significantly greater than the time taken by younger therapists (4.8 years; SD 5; P<0.01). One-third of respondents (135; 32.8%) who had taken a career break had done so for a holiday or travel, but there were no differences in the length of these breaks by age. Forty-five respondents (8.8%) had taken a break due to personal illness (mean 4.5 months; SD 3.7).

4.3.7 Continuing education

The Journal of the New Zealand Dental Therapists Association and the New Zealand Dental Journal were the most popular professional journals, with 280 (54.7%) and 207 (40.4%) therapists respectively having read them within the previous three months. Older therapists were more likely to have read additional journals within the preceding quarter (P<0.05). Most respondents (311; 60.7%) had met the Dental Council continuing education target of 20 hours in the previous year. There were no differences in continuing education attendance by age.

4.3.8 Career satisfaction

Data relating to the career satisfaction of dental therapists are presented in Table 4.10.
Table 4.10 Dental therapists’ career satisfaction, interests and intentions (brackets contain percentages). Some respondents did not answer all questions.

<table>
<thead>
<tr>
<th>Age group of therapists</th>
<th>Career Satisfaction&lt;sup&gt;d&lt;/sup&gt;</th>
<th>Satisfaction with income&lt;sup&gt;d&lt;/sup&gt;</th>
<th>Feel a valued part of dental community</th>
<th>Interested in moving to private practice?</th>
<th>Interested in treating adults?</th>
<th>Would choose to pursue dental therapy again</th>
<th>Intentions to retire from dental therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 45 years</td>
<td>72 (48.0)</td>
<td>67 (43.8)</td>
<td>60 (39.5)</td>
<td>100 (65.8)</td>
<td>92 (60.1)</td>
<td>66 (44.3)</td>
<td>51 (36.2)</td>
</tr>
<tr>
<td>45 + years</td>
<td>168 (49.0)</td>
<td>188 (54.2)</td>
<td>142 (41.0)</td>
<td>170 (49.4)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>183 (52.9)</td>
<td>155 (45.1)</td>
<td>217 (63.6)&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>All combined</td>
<td>240 (48.7)</td>
<td>255 (51.0)</td>
<td>202 (40.6)</td>
<td>220 (44.4)</td>
<td>275 (55.1)</td>
<td>221 (44.9)</td>
<td>268 (55.6)</td>
</tr>
<tr>
<td>Lower</td>
<td>72 (48.0)</td>
<td>67 (43.8)</td>
<td>60 (39.5)</td>
<td>100 (65.8)</td>
<td>92 (60.1)</td>
<td>66 (44.3)</td>
<td>51 (36.2)</td>
</tr>
<tr>
<td>Higher</td>
<td>78 (52.0)</td>
<td>86 (56.2)</td>
<td>92 (60.5)</td>
<td>51 (33.6)</td>
<td>59 (38.6)</td>
<td>83 (55.3)</td>
<td>90 (63.8)</td>
</tr>
</tbody>
</table>

<sup>a</sup>P < 0.05  <sup>b</sup>P < 0.001
<sup>d</sup>Divisions based on median split
The mean career satisfaction score was 7.1 (SD 2.0) and the median value was 8.0. Almost three-quarters of respondents had a career satisfaction score of 7 or above. There were no differences in the degree of career satisfaction by age. The mean value of income satisfaction was 2.9 (SD 2.1) and the median value was 2. Older respondents had a lower mean income satisfaction score (2.8; SD 2.1) than younger therapists (3.3; SD 2.2; P<0.05). More older (280; 80.7%) than younger (111; 72.5%) respondents had an income satisfaction scale score of less than 5 (P<0.05).

More respondents with a high career satisfaction score were satisfied with their remuneration (P<0.05) and felt a valued part of the dental community (P<0.01) than those with a low career satisfaction score (P<0.05). The logistic regression model showed that, after controlling for age and income satisfaction, therapists who felt that they were valued members of the dental community always or most of the time had over four times the odds of having higher overall job satisfaction (Table 4.11).

**Table 4.11** Logistic regression model for career satisfaction

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aged over 45 years</td>
<td>1.08 (0.73, 1.61)</td>
</tr>
<tr>
<td>Feel a valued part of the dental community</td>
<td>4.14 (2.78, 6.17)</td>
</tr>
<tr>
<td>Higher income satisfaction</td>
<td>0.52 (0.84, 1.83)</td>
</tr>
</tbody>
</table>

*Note: Nagelkerke R2 = 0.15; Hosmer and Lemeshow test P = 0.65*
4.4 The working practices and job satisfaction of dental hygienists in New Zealand - the Hygienist Study

4.4.1 Response rate

Of the 316 questionnaires posted, 25 were returned unopened (incorrect address). Completed questionnaires were received from 213 hygienists, giving a response rate of 73.2%. Some respondents did not answer all questions.

4.4.2 Characteristics of the respondents

There were 203 female respondents (95.3%) and 10 males (4.7%). The average age of the hygienists was 37.7 years (SD 8.6, median 36, range 21-61 years). Males were younger than females (mean age 33.4 and 37.9 respectively). Respondents were permitted to self-identify with more than one ethnic group: 155 (72.8%) were NZ European; 12 (5.6%) Maori; 1 (0.5%) Pacific Island; and 54 (25.4%) identified with another ethnic group. Childcare responsibilities were indicated by 95 respondents (44.6%). Respondents aged 36 or over were more likely to report childcare responsibilities (P<0.05).

4.4.3 Hygienist training and qualifications

Most respondents held a formal vocational qualification, with 11 having two and one respondent having three qualifications. However, there was considerable variation in the qualifications held (Table 4.12).
Table 4.12  Dental qualifications held by respondents

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diploma in Dental Hygiene</td>
<td>84 (39.4)</td>
</tr>
<tr>
<td>Certificate in Dental Hygiene</td>
<td>28 (13.1)</td>
</tr>
<tr>
<td>Army Training</td>
<td>14 (6.6)</td>
</tr>
<tr>
<td>Bachelor of Dental Surgery</td>
<td>14 (6.6)</td>
</tr>
<tr>
<td>Dental therapy qualification plus periodontal training</td>
<td>10 (4.7)</td>
</tr>
<tr>
<td>Degree in Dental Hygiene</td>
<td>4 (1.9)</td>
</tr>
<tr>
<td>Other/Not stated</td>
<td>34 (16.0)</td>
</tr>
<tr>
<td>No formal training/qualification</td>
<td>25 (11.7)</td>
</tr>
</tbody>
</table>

Of the NZ-trained dental hygienists, 55 (60.4%) had a Diploma in Dental Hygiene, while 20 (22.0%) had a Certificate in Dental Hygiene. All of the army-trained hygienists had trained in New Zealand, while those who had graduated as a dentist had done so overseas.

Fewer than half of the respondents (91; 42.7%) had trained in NZ. Twenty-two (10.3%) had trained in the United Kingdom, 5 (2.7%) in South Africa, 3 (1.4%) in the USA, and 17 (9%) in another country. Seventy-five dental hygienists (35.2%) did not state a country of qualification. There were no differences in mean age by country of qualification. The mean time since qualification was 8.8 years (SD 7.6).

4.4.4  Current career breaks

Twenty respondents (9.4%) were not working as dental hygienists; fourteen (70.0%) had been on a career break for at least 12 months. Four participants (20.0%) had never worked as dental hygienists. Seven (35.0%) of those not working as dental hygienists were in paid employment, with 5 (25.0%) working in dentistry. The most common reasons for the career break were child rearing (5 individuals, 25.0%) and study (2, 10.0%). Seven (35.0) of those on a career break stated that they plan to return to dental hygiene practice.
4.4.5 Current working practices

The remaining 193 respondents were employed as dental hygienists. Data on their main employers and roles, hours worked and the number of practices in which they were employed are shown in Table 4.13.

A greater proportion of dental hygienists with childcare responsibilities reported working part-time (fewer than 30 hours; 43, 48.9%) than those without such responsibilities (28, 27.2%; P<0.05).
Table 4.13 Working circumstances of dental hygienists currently employed as hygienists by age-group (Percentages in brackets unless otherwise specified; N=193)

<table>
<thead>
<tr>
<th>Current employer&lt;sup&gt;d&lt;/sup&gt;</th>
<th>Up to 35 years</th>
<th>36+ years</th>
<th>All combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N=89)</td>
<td>(N=100)</td>
<td>(N=189)</td>
</tr>
<tr>
<td>Private dental practitioner</td>
<td>74 (83.1)</td>
<td>73 (76.0)</td>
<td>147 (79.4)</td>
</tr>
<tr>
<td>Orthodontist</td>
<td>20 (22.4)</td>
<td>22 (22.9)</td>
<td>42 (22.7)</td>
</tr>
<tr>
<td>Other dental specialist</td>
<td>8 (9.0)</td>
<td>7 (7.3)</td>
<td>15 (8.1)</td>
</tr>
<tr>
<td>Hospital dental department</td>
<td>0 (0.0)</td>
<td>2 (2.1)</td>
<td>2 (1.1)</td>
</tr>
<tr>
<td>Teaching institution</td>
<td>2 (2.2)</td>
<td>2 (2.1)</td>
<td>4 (2.2)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (1.1)</td>
<td>7 (7.3)</td>
<td>8 (4.3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current role(s)&lt;sup&gt;d&lt;/sup&gt;</th>
<th>Up to 35 years</th>
<th>36+ years</th>
<th>All combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N=89)</td>
<td>(N=100)</td>
<td>(N=189)</td>
</tr>
<tr>
<td>Dental hygienist</td>
<td>74 (83.1)</td>
<td>79 (79.0)</td>
<td>153 (81.0)</td>
</tr>
<tr>
<td>Dental assistant</td>
<td>12 (13.5)</td>
<td>14 (14.0)</td>
<td>26 (13.8)</td>
</tr>
<tr>
<td>Practice manager</td>
<td>3 (3.4)</td>
<td>9 (9.0)</td>
<td>12 (6.3)</td>
</tr>
<tr>
<td>Tutor/lecturer</td>
<td>2 (2.2)</td>
<td>3 (3.0)</td>
<td>5 (2.6)</td>
</tr>
<tr>
<td>Dental sales representative</td>
<td>1 (1.1)</td>
<td>0 (0)</td>
<td>1 (0.5)</td>
</tr>
<tr>
<td>Orthodontic auxiliary</td>
<td>10 (11.2)</td>
<td>15 (15.0)</td>
<td>25 (13.2)</td>
</tr>
<tr>
<td>Other</td>
<td>3 (3.4)</td>
<td>8 (8.0)</td>
<td>11 (5.8)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hours worked per week</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (sd)</td>
<td>30.4 (9.8)</td>
<td>30.4 (9.4)</td>
<td>30.2 (9.5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of practices</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>52 (58.4)</td>
<td>66 (65.3)</td>
<td>118 (62.1)</td>
</tr>
<tr>
<td>Two or more</td>
<td>37 (41.6)</td>
<td>35 (34.7)</td>
<td>72 (37.9)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prefer to work</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fewer hours</td>
<td>12 (13.6)</td>
<td>30 (29.4)</td>
<td>42 (22.1)</td>
</tr>
<tr>
<td>The same number of hours</td>
<td>62 (70.5)</td>
<td>62 (60.8)</td>
<td>124 (65.3)</td>
</tr>
<tr>
<td>More hours</td>
<td>14 (15.9)</td>
<td>10 (9.8)</td>
<td>24 (12.6)&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Have a dental assistant</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Usually/Sometimes</td>
<td>21 (24.1)</td>
<td>32 (31.7)</td>
<td>53 (28.2)</td>
</tr>
<tr>
<td>Rarely/Never</td>
<td>66 (75.9)</td>
<td>69 (68.3)</td>
<td>135 (71.8)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Holding a job of another type</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>14 (15.7)</td>
<td>23 (22.5)</td>
<td>37 (19.4)</td>
</tr>
<tr>
<td>No</td>
<td>75 (84.3)</td>
<td>79 (77.5)</td>
<td>156 (80.6)</td>
</tr>
</tbody>
</table>

<sup>a</sup>P<0.05  <sup>d</sup>Some hygienists had more than one employer and/or worked in more than one role
Data relating to the regular clinical duties of dental hygienists are presented in Table 4.14.

### Table 4.14  
Duties regularly performed by dental hygienists in their working practice, by age group (brackets contain percentages; some respondents did not answer all questions)

<table>
<thead>
<tr>
<th></th>
<th>Age group</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Up to 35 years</td>
<td>36+ years</td>
<td>All combined</td>
<td></td>
</tr>
<tr>
<td><strong>Preventive procedures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dental health education</td>
<td>78 (91.8)</td>
<td>94 (93.1)</td>
<td>172 (92.5)</td>
<td></td>
</tr>
<tr>
<td>Dietary counseling</td>
<td>42 (50.0)</td>
<td>57 (59.4)</td>
<td>99 (55.0)</td>
<td></td>
</tr>
<tr>
<td>Fluoride application</td>
<td>33 (39.3)</td>
<td>32 (36.0)</td>
<td>65 (37.6)</td>
<td></td>
</tr>
<tr>
<td>Fissure sealants</td>
<td>8 (9.9)</td>
<td>13 (16.0)</td>
<td>21 (13.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Operative procedures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examination</td>
<td>42 (48.8)</td>
<td>42 (48.3)</td>
<td>84 (48.6)</td>
<td></td>
</tr>
<tr>
<td>Taking radiographs</td>
<td>32 (37.2)</td>
<td>56 (59.6)</td>
<td>88 (48.9)</td>
<td></td>
</tr>
<tr>
<td>Reading radiographs</td>
<td>51 (61.4)</td>
<td>60 (70.6)</td>
<td>111 (66.1)</td>
<td></td>
</tr>
<tr>
<td>Local anesthetic</td>
<td>0 (0.0)</td>
<td>2 (2.4)</td>
<td>2 (1.2)</td>
<td></td>
</tr>
<tr>
<td>Temporary dressings</td>
<td>8 (9.6)</td>
<td>6 (7.1)</td>
<td>14 (8.3)</td>
<td></td>
</tr>
<tr>
<td>Permanent restorations</td>
<td>1 (1.2)</td>
<td>1 (1.2)</td>
<td>2 (1.2)</td>
<td></td>
</tr>
<tr>
<td>Polishing of restorations</td>
<td>23 (27.1)</td>
<td>29 (33.7)</td>
<td>52 (30.4)</td>
<td></td>
</tr>
<tr>
<td>Taking impressions</td>
<td>46 (54.1)</td>
<td>58 (60.4)</td>
<td>104 (57.5)</td>
<td></td>
</tr>
<tr>
<td>Placing/removing</td>
<td>21 (24.4)</td>
<td>21 (23.1)</td>
<td>42 (23.7)</td>
<td></td>
</tr>
<tr>
<td>orthodontic bands/wires</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suture/pack removal</td>
<td>8 (9.6)</td>
<td>9 (10.6)</td>
<td>17 (10.1)</td>
<td></td>
</tr>
<tr>
<td>Curettage</td>
<td>31 (37.8)</td>
<td>41 (47.1)</td>
<td>72 (42.6)</td>
<td></td>
</tr>
<tr>
<td>Other emergency treatment</td>
<td>12 (14.6)</td>
<td>12 (14.3)</td>
<td>24 (14.5)</td>
<td></td>
</tr>
<tr>
<td><strong>Other activities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer support/review</td>
<td>26 (31.7)</td>
<td>14 (18.4)</td>
<td>40 (25.3)</td>
<td></td>
</tr>
<tr>
<td>Clinical supervision</td>
<td>5 (6.7)</td>
<td>6 (7.8)</td>
<td>11 (7.2)</td>
<td></td>
</tr>
<tr>
<td>Clinical teaching</td>
<td>2 (2.7)</td>
<td>3 (4.1)</td>
<td>5 (3.4)</td>
<td></td>
</tr>
<tr>
<td>Team co-ordination</td>
<td>19 (23.5)</td>
<td>19 (22.6)</td>
<td>38 (23.0)</td>
<td></td>
</tr>
</tbody>
</table>

---

*P<0.05
A higher proportion of overseas-trained than NZ-trained dental hygienists reported undertaking dietary counseling regularly (30, 69.8% and 40, 46.5% respectively, P<0.05). Conversely, a higher proportion of NZ- than overseas-trained hygienists reported that they regularly undertook team management/coordination (22, 27.2% and 4, 10.0% respectively, P<0.05).

4.4.6 Previous career breaks

Respondents were asked to indicate whether they had taken any career breaks since qualification. A career break was defined as any period taken off work lasting longer than six weeks. This question was answered by 185 respondents, of whom, 86 (46.5%) had taken one or more career breaks and 51 (27.6%) had taken two or more. The reason most commonly given was child rearing or maternity leave (50 respondents, 58.1%), with a mean time of 36.9 months. A further 29 respondents (33.7%) had taken an extended break for holiday or travel (mean time 17.3 months). Seven (8.1%) had taken a break due to personal illness (mean time 6.5 months). The mean total time taken in career breaks was 42.7 months (SD 70.8).

4.4.7 Continuing education

The New Zealand Dental Journal was the most popular journal, with 99 respondents (46.5%) having read it in the last three months. The New Zealand Dental Hygienists Association Newsletter had been read by 28 (13.1%), other dental hygiene/auxiliary journals by 54 (25.3%), and periodontal journals by 48 (22.5%) respondents in the same time frame. Ninety individuals (42.3%) met the DCNZ continuing education target of 20 hours per year. There were no differences in the numbers of journals read or the numbers of hours of continuing education attended by age of hygienist, childcare responsibilities or country of qualification.
4.4.8 Job satisfaction

Data relating to career satisfaction, intentions and interests of dental hygienists are presented in Table 4.15.

Table 4.15  Dental hygienists' career satisfaction, interests and intentions (brackets contain percentages). Some respondents did not answer all questions.

<table>
<thead>
<tr>
<th></th>
<th>Up to 35 years</th>
<th>Age group 36+ years</th>
<th>All combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean job satisfaction score (SD)*</td>
<td>7.7 (1.6)</td>
<td>8.3 (1.2)</td>
<td>8.0 (1.4)</td>
</tr>
<tr>
<td>Mean income satisfaction score (SD)</td>
<td>6.7 (2.3)</td>
<td>7.1 (1.9)</td>
<td>6.9 (2.1)</td>
</tr>
<tr>
<td>Feel a valued part of dental community</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always/Mostly</td>
<td>68 (78.2)</td>
<td>75 (72.8)</td>
<td>143 (75.3)</td>
</tr>
<tr>
<td>Sometimes/Seldom/Never</td>
<td>19 (21.8)</td>
<td>28 (27.2)</td>
<td>47 (24.7)</td>
</tr>
<tr>
<td>Interested in expanding range of procedures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes/Maybe</td>
<td>74 (85.1)</td>
<td>77 (77.8)</td>
<td>151 (81.2)</td>
</tr>
<tr>
<td>No</td>
<td>13 (14.9)</td>
<td>22 (22.2)</td>
<td>35 (18.8)</td>
</tr>
<tr>
<td>Would choose to pursue dental hygiene again</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>64 (81.0)</td>
<td>76 (76.0)</td>
<td>140 (78.2)</td>
</tr>
<tr>
<td>No</td>
<td>15 (19.0)</td>
<td>24 (24.0)</td>
<td>39 (21.8)</td>
</tr>
<tr>
<td>Intend to retire from dental hygiene b</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 10 years</td>
<td>24 (35.3)</td>
<td>41 (43.6)</td>
<td>65 (39.2)</td>
</tr>
<tr>
<td>10 to 19 years</td>
<td>26 (36.1)</td>
<td>42 (44.7)</td>
<td>68 (41.0)</td>
</tr>
<tr>
<td>20 years and over</td>
<td>22 (30.6)</td>
<td>11 (11.7)</td>
<td>33 (19.9)</td>
</tr>
</tbody>
</table>

*P<0.05  **P<0.01

Older hygienists planned to retire sooner than their younger colleagues (P=0.01). Overseas-trained hygienists planned to retire earlier than those trained in NZ (P<0.05).
4.5 Changes in the New Zealand dentist workforce over a nine-year period - the Longitudinal Study

4.5.1 Introduction

The complete database included all 3065 dentists who were on the DCNZ register in 1997, 2001 or 2005. The majority (2088 dentists, 68.1%) possessed an APC and completed the APC questionnaire in at least one of these years; 1026 (49.1%) of those individuals (comprising 33.5% of the total number) possessed an APC and completed the workforce questionnaire in each of the three years.

4.5.2 Socio-demographic characteristics

The socio-demographic characteristics of those dentists who were practising in NZ in any of the three years are presented in Table 4.16.

Over the nine-year observation period, there was a significant increase in the number of women in the workforce. The mean age of practising dentists increased by twenty-five months, and the proportion aged at least 65 years also increased significantly. The proportion of the workforce who were NZ European decreased, while the number of dentists of Chinese, Indian and ‘other’ ethnic groups increased. The percentage of dentists who were NZ-trained decreased during the study period, and the proportion of specialists in the dentist workforce was relatively stable.
| Table 4.16  Sociodemographic characteristics of the active New Zealand dentist workforce from 1997 to 2005 (percentages in brackets; some respondents did not answer all questions). |
|-----------------|-----------------|-----------------|-----------------|
| **1997**        | **2001**        | **2005**        |
| **N = 1418**    | **N = 1518**    | **N = 1682**    |
| Female          | 290 (20.5)      | 358 (23.6)      | 458 (27.2)c     |
| Mean age (SD)   | 43.8 (12.2)     | 44.6 (12.1)     | 45.9 (12.3)a    |
| Age 65 or more  | 73 (5.2)        | 91 (6.0)        | 124 (7.4)a      |
| Ethnic Group    |                 |                 |                 |
| NZ European     | 1097 (77.4)     | 982 (64.7)      | 1058 (62.9)c    |
| NZ Maori        | 7 (0.5)         | 12 (0.8)        | 9 (0.5)         |
| Chinese         | 97 (6.8)        | 143 (9.4)       | 170 (10.1)b     |
| Indian          | 43 (3.0)        | 69 (4.5)        | 86 (5.1)a       |
| Other/Not stated| 174 (12.3)      | 312 (20.5)      | 359 (21.3)c     |
| Registrable qualification |        |                 |                 |
| NZ BDS          | 1263 (89.0)     | 1274 (83.9)     | 1329 (79.0)c    |
| NZDREX          | 38 (2.7)        | 127 (8.4)       | 151 (9.0)c      |
| Other/Not stated| 117 (8.3)       | 117 (7.7)       | 202 (12.0)c     |
| Practitioner status |            |                 |                 |
| Specialist trainee | 49 (3.5)        | 39 (2.6)        | 58 (3.4)        |
| Dental Specialist | 166 (11.7)      | 174 (11.5)      | 212 (12.6)      |
| General practitioner | 1203 (84.8)     | 1305 (86.0)     | 1412 (83.9)     |

*P<0.05  b P<0.01  c P<0.001
### 4.5.3 Practising characteristics

The practising characteristics of the dentist workforce over the study period are presented in Table 4.17.

**Table 4.17** Practising characteristics of the active New Zealand dentist workforce from 1997 to 2005 (percentage in brackets; some respondents did not answer all questions)

<table>
<thead>
<tr>
<th></th>
<th>1997 N = 1418</th>
<th>2001 N = 1518</th>
<th>2005 N = 1682</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of practice</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private practice</td>
<td>1209 (90.3)</td>
<td>1291 (87.5)</td>
<td>1414 (87.9)a</td>
</tr>
<tr>
<td>Other</td>
<td>130 (9.7)</td>
<td>184 (12.5)</td>
<td>194 (12.1)a</td>
</tr>
<tr>
<td><strong>Town type</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major city</td>
<td>855 (60.3)</td>
<td>980 (64.6)</td>
<td>1102 (65.5)</td>
</tr>
<tr>
<td>Provincial city</td>
<td>268 (18.9)</td>
<td>290 (19.1)</td>
<td>336 (20.0)</td>
</tr>
<tr>
<td>Other</td>
<td>295 (20.8)</td>
<td>248 (16.3)</td>
<td>244 (14.5)c</td>
</tr>
<tr>
<td><strong>Full time equivalent</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>179 (12.7)</td>
<td>91 (6.0)</td>
<td>121 (7.2)c</td>
</tr>
<tr>
<td>0.1-0.8</td>
<td>278 (19.8)</td>
<td>375 (24.7)</td>
<td>493 (29.3)c</td>
</tr>
<tr>
<td>0.9 or more</td>
<td>948 (67.5)</td>
<td>1052 (69.3)</td>
<td>1068 (63.5)c</td>
</tr>
<tr>
<td><strong>Mean hours/week (SD)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>31.8 (15.7)</td>
<td>33.6 (13.1)</td>
<td>32.2 (13.5)a</td>
</tr>
<tr>
<td>GDPs</td>
<td>31.4 (15.3)</td>
<td>33.0 (13.1)</td>
<td>32.1 (12.7)a</td>
</tr>
<tr>
<td>Specialists</td>
<td>38.5 (12.9)</td>
<td>37.8 (12.3)</td>
<td>32.5 (17.7)a</td>
</tr>
<tr>
<td><strong>20+ hours of CPD</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1047 (73.8)</td>
<td>1071 (70.6)</td>
<td>1327 (78.9)c</td>
<td></td>
</tr>
<tr>
<td><strong>Reason for part-time practice</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doing non-dental work</td>
<td>31 (11.2)</td>
<td>30 (8.0)</td>
<td>32 (6.5)</td>
</tr>
<tr>
<td>Insufficient dental work</td>
<td>28 (10.1)</td>
<td>24 (6.4)</td>
<td>23 (4.7)c</td>
</tr>
<tr>
<td>Seeking dental work</td>
<td>12 (4.3)</td>
<td>11 (2.9)</td>
<td>4 (0.8)b</td>
</tr>
<tr>
<td>Semi-retired from dentistry</td>
<td>48 (17.3)</td>
<td>61 (16.3)</td>
<td>82 (16.6)</td>
</tr>
<tr>
<td>Parental responsibilities</td>
<td>69 (24.8)</td>
<td>93 (24.8)</td>
<td>141 (28.6)</td>
</tr>
<tr>
<td>Other</td>
<td>61 (21.9)</td>
<td>226 (60.3)</td>
<td>270 (54.8)c</td>
</tr>
</tbody>
</table>

*a P<0.05  b P<0.01  c P<0.001  
d More than one response was permitted to this question
The vast majority of dentists worked in private practice, although there was an increase in the proportion of dentists working in other settings during the observation period. Approximately two-thirds of dentists worked in major cities and one-fifth in provincial cities. The proportion of dentists working in small towns decreased with time. Most dentists worked full-time (defined as being at least 4.5 days per week), but the proportion working part-time increased. There was a decrease in the number of individuals who held an APC but were not working in dentistry. For all dentists, the mean number of hours worked in 2001 was higher than in the other two years. The same was true for general practitioners. For specialists, the mean number of hours worked in 2005 was substantially lower than in 1997 and 2001. The proportion of dentists achieving the DCNZ target of 20 hours CPD per year increased between 1997 and 2005. Of those dentists who worked part-time, the proportion having insufficient dental work or seeking dental work decreased significantly. The proportion who cited parental responsibilities or semi-retirement as the reason for part-time practice did not change significantly. The proportion of dentists who cited ‘other’ reasons (mostly ‘personal choice’) for part-time practice more than doubled over the study period.

Comparison of the characteristics of those for whom data were available for all of the three time points and the remainder showed that there was a higher proportion of female dentists in the smaller sample; 202 women (19.7%) compared with 339 women (16.2%) in the larger sample (P<0.05). Within the group of dentists who were working in all three years, there was a higher proportion of specialists (158,15.4%) than in the full sample (265, 12.7%; P<0.05). Within the longitudinal cohort, there was a higher proportion of NZ graduates (934, 91%) than in the larger group (1664, 79.7%; P<0.001).

All subsequent data pertain to the 1026 active dentists for whom complete longitudinal data were available. Approximately four-fifths of the dentists were male (824; 80.3%). The mean age of the sample increased from 42.4 in 1997 to 50.4 in 2005. There was some minor variation in the reported ethnicity of respondents over the time period. In 2005 approximately three-quarters (791; 77.1%) were NZ European and fewer than one percent (3; 0.3%) self-identified as Maori. The majority (934, 91.0%) of dentists had qualified in NZ. The proportion who were registered as specialists increased from 115 (11.2%) to 152 (14.8%) over the nine-year period.
Data relating to the practising characteristics of the longitudinal cohort are presented in Table 4.18.

### Table 4.18  Practice characteristics of dentists who were working in NZ in all three years (N=1026; percentages in brackets)

<table>
<thead>
<tr>
<th></th>
<th>1997</th>
<th>2001</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of practice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private practice (self-employed)</td>
<td>817 (83.2)</td>
<td>849 (84.1)</td>
<td>837 (83.8)</td>
</tr>
<tr>
<td>Private practice (employee)</td>
<td>89 (9.1)</td>
<td>80 (7.9)</td>
<td>81 (8.1)</td>
</tr>
<tr>
<td>MOH/DHB</td>
<td>30 (3.1)</td>
<td>34 (3.4)</td>
<td>38 (3.8)</td>
</tr>
<tr>
<td>Dental School</td>
<td>28 (2.9)</td>
<td>29 (2.9)</td>
<td>25 (2.5)</td>
</tr>
<tr>
<td>Other</td>
<td>18 (1.8)</td>
<td>18 (1.8)</td>
<td>18 (1.8)</td>
</tr>
<tr>
<td>Town type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major city</td>
<td>635 (61.9)</td>
<td>646 (63.0)</td>
<td>647 (63.1)</td>
</tr>
<tr>
<td>Provincial city</td>
<td>200 (19.5)</td>
<td>208 (20.3)</td>
<td>213 (20.8)</td>
</tr>
<tr>
<td>Other</td>
<td>191 (18.6)</td>
<td>172 (16.8)</td>
<td>166 (16.2)</td>
</tr>
<tr>
<td>FTE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>126 (12.4)</td>
<td>41 (4.0)</td>
<td>51 (5.0)</td>
</tr>
<tr>
<td>0.1-0.8</td>
<td>171 (16.8)</td>
<td>226 (22.0)</td>
<td>235 (32.7)</td>
</tr>
<tr>
<td>0.9-1.0</td>
<td>720 (70.8)</td>
<td>759 (74.0)</td>
<td>640 (62.4)</td>
</tr>
<tr>
<td>Mean hours/week (SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>32.6 (15.6)</td>
<td>35.0 (11.6)</td>
<td>32.5 (12.6)</td>
</tr>
<tr>
<td>General dentists</td>
<td>32.1 (15.2)</td>
<td>34.6 (11.2)</td>
<td>31.9 (12.3)</td>
</tr>
<tr>
<td>Specialists</td>
<td>40.2 (11.0)</td>
<td>39.0 (11.6)</td>
<td>34.0 (16.4)</td>
</tr>
<tr>
<td>Reason for part time practice d</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doing non-dental work</td>
<td>20 (11.7)</td>
<td>16 (7.1)</td>
<td>19 (8.1)</td>
</tr>
<tr>
<td>Insufficient dental work</td>
<td>13 (7.6)</td>
<td>13 (5.8)</td>
<td>10 (4.3)</td>
</tr>
<tr>
<td>Seeking dental work</td>
<td>8 (4.7)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Semi-retired from dentistry</td>
<td>16 (9.4)</td>
<td>23 (10.2)</td>
<td>69 (29.4)</td>
</tr>
<tr>
<td>Parental responsibilities</td>
<td>55 (32.2)</td>
<td>71 (31.4)</td>
<td>88 (37.4)</td>
</tr>
<tr>
<td>Other</td>
<td>40 (23.4)</td>
<td>140 (61.9)</td>
<td>181 (77.0)</td>
</tr>
</tbody>
</table>

*P<0.05  **P<0.01  ***P<0.001

*More than one response was permitted to this question*
In each year, the vast majority of dentists were working in private practice, and were self-employed. Approximately two-thirds worked in major cities and one-fifth in provincial cities. The remaining dentists worked in small towns; the proportion doing so decreased over the nine-year period, although this decrease did not reach statistical significance. Most dentists worked full-time, but the proportion doing so dropped between 1997 and 2005. There was also a decrease in the number of dentists who were not practising at all. There was a corresponding increase in the number of dentists working part-time. There were no significant differences in the mean hours worked per week by all dentists combined over the nine-year period. For dental specialists, however, there was a substantial decrease in the mean number of hours worked per week. There were differences in the hours worked by general dentists in each of the three years, but the pattern was not clear.

The reasons given for working part-time varied over the nine-year period. In 1997, the main reason given was “parental responsibilities”. Although the number of respondents giving this reason increased in 2001 and 2005, the proportion of part-time dentists citing this reason did not change significantly. There was a three-fold increase in the proportion of part-time workers citing “other” reasons (mostly “personal choice”). Other patterns included a three-fold increase in the proportion who were semi-retired from dentistry and a decrease in the proportion who were seeking dental work.

4.5.4 Continuing professional development

The workforce questionnaires also sought information on the number of hours of CPD undertaken in each year. Overall, there was a significant increase in the number of dentists who reported having undertaken at least 20 hours annual CPD over the time period from 784 (76.4%) in 1997 to 827 (82.1%) in 2005. Over half of the sample (583; 56.8%) did at least 20 hours CPD in all 3 years.

Throughout the observation period, the CPD activities of dentists differed according to their practice setting. In 1997, a minimum of 20 hours CPD was undertaken by 513 (80.8%) dentists from major cities, 156 (78.0%) from provincial cities, and 115 (60.2%) from other areas (P<0.001). In 2001, 506 (78.3%) of city dentists, 155 (74.5%) of
provincial dentists, and 114 (66.3%) of other dentists met this target (P<0.01). In 2005, 537 (83.0%) of dentists in major cities, 170 (79.8%) in provincial cities and 120 (72.3%) in other regions achieved the DCNZ requirement of 20 hours of verifiable CPD (P<0.01).

4.5.5 Specialist status

Comparison of the sociodemographic and practising characteristics general dentists and specialists was undertaken (Table 4.19).

Table 4.19. Sociodemographic and practising characteristics of dentists who were working in NZ in all three years by practitioner status (percentages in brackets; some respondents did not answer all questions; for simplicity, only 2005 data are reported here)

<table>
<thead>
<tr>
<th></th>
<th>Specialist any year</th>
<th>Others</th>
<th>All combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=158</td>
<td>N=868</td>
<td>N=1026</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male^a</td>
<td>138 (87.3)</td>
<td>686 (79.0)</td>
<td>824 (80.3)</td>
</tr>
<tr>
<td>Female^a</td>
<td>20 (12.7)</td>
<td>182 (21.0)</td>
<td>202 (19.7)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)^b</td>
<td>52.4 (9.3)</td>
<td>50.0 (10.3)</td>
<td>50.4 (10.2)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ European^b</td>
<td>137 (87.8)</td>
<td>654 (77.9)</td>
<td>791 (79.5)</td>
</tr>
<tr>
<td>Chinese^b</td>
<td>2 (1.3)</td>
<td>82 (9.8)</td>
<td>84 (8.4)</td>
</tr>
<tr>
<td>Town type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major city^c</td>
<td>122 (77.2)</td>
<td>525 (60.5)</td>
<td>647 (63.1)</td>
</tr>
<tr>
<td>Provincial City</td>
<td>31 (19.6)</td>
<td>182 (21.0)</td>
<td>213 (20.8)</td>
</tr>
<tr>
<td>Other^c</td>
<td>5 (3.2)</td>
<td>161 (18.5)</td>
<td>166 (16.2)</td>
</tr>
<tr>
<td>Practice type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solo (SE)</td>
<td>61 (38.6)</td>
<td>269 (31.0)</td>
<td>330 (32.2)</td>
</tr>
<tr>
<td>Group (SE)^c</td>
<td>50 (31.6)</td>
<td>457 (52.6)</td>
<td>507 (49.4)</td>
</tr>
<tr>
<td>Employee^c</td>
<td>9 (5.7)</td>
<td>72 (8.3)</td>
<td>81 (7.9)</td>
</tr>
<tr>
<td>Other^c</td>
<td>38 (24.1)</td>
<td>70 (8.1)</td>
<td>108 (10.5)</td>
</tr>
<tr>
<td>Continuing education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20+ hrs in any year^b</td>
<td>157 (99.4)</td>
<td>807 (93.0)</td>
<td>964 (94.0)</td>
</tr>
<tr>
<td>20+ hrs in each year^c</td>
<td>129 (81.6)</td>
<td>454 (52.3)</td>
<td>583 (56.8)</td>
</tr>
</tbody>
</table>

^aP<0.05 ^bP<0.01 ^cP<0.001
A higher proportion of specialists than general practitioners were male. Specialists were, on average, more than two years older than those who had not specialised, and a higher proportion of specialists than general practitioners self-identified as NZ European. Moreover, more general dentists than specialists identified as Chinese. There were no differences between generalists and specialists in the proportion of NZ graduates. A higher proportion of specialists than general dentists were practising in the major cities than in provincial cities and towns. A lower proportion of specialists than generalists were in group practice. More generalists than specialists were self-employed. A larger percentage of specialists than dentists were employed in “other” settings (such as district health boards or community clinics).

There were statistically significant differences between general dentists and specialists with respect to completing at least 20 hours of CPD in each of the three years, with consistently high proportions of specialists meeting the target (94.9%, 89.2% and 91.8% in 1997, 2001 and 2005), although the general dentists did improve over time (73.0%, 73.0% and 78.6% respectively). An overwhelming majority of specialists had undertaken at least 20 hours of CPD in any (and each) of the three years. Although only half the general dentists had undertaken at least 20 hours of CPD in each year, most had done so in at least one of those years.

4.5.6 Gender

The key findings in the analysis of sociodemographic and practising characteristics by gender are presented in Table 4.20.
Table 4.20  Key sociodemographic and practising characteristics of dentists who were working in NZ in all three years by gender (percentages in brackets; some respondents did not answer all questions)

<table>
<thead>
<tr>
<th></th>
<th>All respondents</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=1026</td>
<td>N=824</td>
<td>N=202</td>
</tr>
<tr>
<td>Specialist in any year*</td>
<td>158 (15.4)</td>
<td>138 (16.7)</td>
<td>20 (9.9)</td>
</tr>
<tr>
<td>Age in 2005</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)*</td>
<td>50.4 (10.2)</td>
<td>52.3 (10.1)</td>
<td>42.6 (6.5)</td>
</tr>
<tr>
<td>Registrable qualification</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ BDS*</td>
<td>934 (91.0)</td>
<td>760 (92.2)</td>
<td>174 (86.1)</td>
</tr>
<tr>
<td>NZDREX</td>
<td>26 (2.5)</td>
<td>21 (2.5)</td>
<td>5 (2.5)</td>
</tr>
<tr>
<td>Other/did not state*</td>
<td>66 (6.4)</td>
<td>43 (5.2)</td>
<td>23 (11.4)</td>
</tr>
<tr>
<td>Self-employed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997*</td>
<td>817 (83.2)</td>
<td>679 (86.1)</td>
<td>138 (71.5)</td>
</tr>
<tr>
<td>2001*</td>
<td>849 (84.1)</td>
<td>705 (86.5)</td>
<td>144 (73.8)</td>
</tr>
<tr>
<td>2005*</td>
<td>837 (84.0)</td>
<td>695 (86.3)</td>
<td>142 (73.2)</td>
</tr>
<tr>
<td>Mean hours per week</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997 (SD)*</td>
<td>32.6 (15.6)</td>
<td>33.9 (15.5)</td>
<td>27.3 (14.7)</td>
</tr>
<tr>
<td>2001 (SD)*</td>
<td>35.0 (11.6)</td>
<td>36.8 (10.7)</td>
<td>27.6 (12.4)</td>
</tr>
<tr>
<td>2005 (SD)*</td>
<td>32.5 (12.6)</td>
<td>34.2 (12.1)</td>
<td>25.7 (12.2)</td>
</tr>
<tr>
<td>Town type*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major city*</td>
<td>647 (63.1)</td>
<td>502 (60.9)</td>
<td>145 (71.8)</td>
</tr>
<tr>
<td>Provincial city*</td>
<td>213 (20.8)</td>
<td>183 (22.2)</td>
<td>30 (14.9)</td>
</tr>
<tr>
<td>Other</td>
<td>166 (16.2)</td>
<td>139 (16.9)</td>
<td>27 (13.4)</td>
</tr>
</tbody>
</table>

*P<0.05  bP<0.01  cP<0.001

dAs there was minimal variation in the proportion of male and female dentists working in each town type over the time period, the 2005 data are presented here.
There were no ethnic differences by gender. A higher proportion of male than female dentists were registered as specialists. Male respondents were, on average, ten years older than their female counterparts. Relatively more male than female dentists reported that they held a NZ BDS; similar proportions of male and female dentists reported having the NZDREX. A larger proportion of females than males either held a different registrable qualification or did not state what qualification they had. In each of the three years, a higher proportion of male than female dentists were self-employed; there were minimal changes in this status throughout the study period. On average, male dentists worked significantly more hours per week than female dentists in each of the three years.

A greater proportion of female than male dentists worked in the major cities, and a correspondingly larger percentage of male dentists were practising in provincial cities. Although there was a tendency for a lower proportion of female dentists to work in rural areas, this did not reach statistical significance. The proportion of male and female dentists working in each of the practice settings did not change much over time.

In 1997, a higher proportion of male (78.4%) than female dentists (68.3%) achieved the CPD target of 20 hours. Although the gender differences were not significant in 2001 or 2005, relatively more male (58.7%) than female (49.0%) dentists undertook at least 20 hours of CPD in all three years (P<0.05).

4.5.7 Country of graduation

While approximately four-fifths (760, 81.4%) of NZ-trained dentists were male, fewer than three-quarters (64, 69.6%) of overseas-trained dentists were male (P<0.01). There were no differences between the two groups by age. Among the overseas-trained dentists, there were relatively fewer respondents who self-identified as NZ European (43, 46.7%) or Chinese (2, 2.2%), and more who identified as Indian (9, 9.8%) or of other ethnicity (34, 37.0%) compared to the NZ-trained group (748, 80.1%; 82, 8.8%; 28, 3.0%; 46, 4.9% respectively). In 1997, a lower proportion of overseas-trained dentists than NZ graduates were self-employed in private practice (75.5% and 83.9% respectively, P<0.05). Correspondingly, a larger proportion of overseas than NZ-trained dentists were employees. This difference was not evident in either 2001 or 2005. In 1997 a larger proportion of
overseas-qualified than NZ-qualified dentists were employed in small towns (34.8% and 17% respectively, P<0.001). The proportion of overseas dentists working in small towns decreased to 26.1% in 2001 and by 2005 was more closely approximating the proportion of NZ-graduates working in the small towns (21.7% and 15.6% respectively). There were no significant differences in the mean number of hours worked between the two groups in any of the three years.

In 1997, there was a large difference between the two groups with respect to the proportion of respondents who had undertaken at least 20 hours of CPD. In the NZ-trained group, 730 (78.2%) had met the target, but only 54 (58.7%) of the overseas-trained group had met the target (P<0.001). The difference was less marked in 2001, when 716 (76.7%) NZ and 59 (64.1%) overseas dentists had undertaken 20 hours of CPD (P<0.01). In 2005, there was no significant difference between the two groups, with 754 (80.7%) NZ-trained and 73 (79.3%) overseas-trained dentists meeting the requirement.

4.6 Job stressors of New Zealand dentists and their coping strategies - the Stress Study

4.6.1 Introduction

Of the original random sample of 700 general dental practitioners, 23 were outside the sampling frame, either because they were retired or deceased, or because they had incorrect address details. The 437 questionnaires returned from the remaining 677 dentists gave a response rate of 64.5%. Comparison of the characteristics of the responders with the practising dentists in NZ (using the DCNZ Dentist’s Register) showed that there were no significant differences, with the Register data falling within the 95% confidence intervals for all of the survey estimates (Table 4.21).
Table 4.21  Comparison of respondents’ sociodemographic and degree characteristics with those of the actively-practising NZ dental profession as a whole (data are percentages)

<table>
<thead>
<tr>
<th></th>
<th>Respondents (95% CI)</th>
<th>The NZ dental profession$^d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>75.3 (71.1, 79.3)</td>
<td>72.8</td>
</tr>
<tr>
<td>Female</td>
<td>24.7 (20.7, 28.9)</td>
<td>27.2</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowest to 29</td>
<td>9.6 (6.9, 12.5)</td>
<td>9.9</td>
</tr>
<tr>
<td>30 to 39</td>
<td>20.8 (16.9, 24.5)</td>
<td>22.7</td>
</tr>
<tr>
<td>40 to 49</td>
<td>31.8 (27.4, 36.2)</td>
<td>30.1</td>
</tr>
<tr>
<td>50 to 59</td>
<td>23.1 (19.0, 27.0)</td>
<td>22.3</td>
</tr>
<tr>
<td>60 and over</td>
<td>14.6 (11.4, 18.0)</td>
<td>14.8</td>
</tr>
<tr>
<td>Country of qualification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Zealand</td>
<td>81.9 (78.3, 85.5)</td>
<td>79.0</td>
</tr>
<tr>
<td>Other</td>
<td>18.1 (14.5, 21.7)</td>
<td>21.0</td>
</tr>
</tbody>
</table>

$^d$Data source: Dental Council of New Zealand
4.6.2 Socio-demographic characteristics

There were 329 male (75.3%) and 108 female respondents (24.7%). The mean age of male respondents was 48.2 (SD 12.1), and of females was 38.8 (SD 8.4). Many males (146, 44.3%) had graduated prior to 1980, approximately one-third (105, 31.9%) between 1980 and 1989, and the remaining 78 (23.7%) had graduated in 1990 or later. Only fourteen females (13.0%) had graduated prior to 1980; one-third (36, 33.3%) had graduated in the 1980s, and over half (58, 53.7%) graduated in 1990 or later (P<0.001). More male (281, 85.4%) than female (77, 71.3%) dentists were NZ graduates (P<0.001). There were no significant differences in practice setting by gender, but a larger proportion of male (180, 54.7%) than female (34, 31.5%) dentists had a typical weekly patient load of 58 patients or more (P<0.001), with 58 patients per week being the median. There were no differences in the typical patient load of NZ- and overseas-trained dentists.

4.6.3 Job-related stressors

There was considerable variation in the number of stressors that dentists experienced ‘frequently’ or “all the time”, with the number per dentist ranging from 0 to 31 (mean 7.0, SD 6.2). About half (215, 49.2%) of all participants experienced five or fewer sources of stress “frequently” or “all the time”, while 22 individuals reported experiencing 20 or more stressors “frequently” or “all the time”. The mean number of such stressors was 6.4 (SD 5.6) among NZ graduates, and 9.7 (SD 7.8,) among overseas-qualified dentists (P<0.05). A higher proportion of the latter reported experiencing eight or more stressors “frequently” or “all the time” (39, 49.4%) than NZ graduates (125, 37.8%, p<0.05).

The frequency with which the various stressors were reported as occurring “very often” or “all of the time” are presented in Table 4.22.
Table 4.22  Frequency of stressors reported “very often” or “all of the time” among general dental practitioners

<table>
<thead>
<tr>
<th>Stressor</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treating difficult children</td>
<td>223 (52.2)</td>
</tr>
<tr>
<td>Constant time pressure</td>
<td>207 (47.8)</td>
</tr>
<tr>
<td>Maintaining high levels of concentration</td>
<td>185 (43.1)</td>
</tr>
<tr>
<td>Coping with difficult patients</td>
<td>171 (39.5)</td>
</tr>
<tr>
<td>Treating extremely nervous patients</td>
<td>159 (36.7)</td>
</tr>
<tr>
<td>Working with children</td>
<td>139 (32.4)</td>
</tr>
<tr>
<td>Causing pain</td>
<td>139 (32.3)</td>
</tr>
<tr>
<td>Rising costs</td>
<td>122 (28.6)</td>
</tr>
<tr>
<td>Finding time for family and friends</td>
<td>115 (26.8)</td>
</tr>
<tr>
<td>Long working hours</td>
<td>103 (24.0)</td>
</tr>
<tr>
<td>Quoting fees/collecting payments</td>
<td>99 (23.0)</td>
</tr>
<tr>
<td>Possibility of making mistakes</td>
<td>97 (22.5)</td>
</tr>
<tr>
<td>Ability to sell practice in future</td>
<td>94 (22.4)</td>
</tr>
<tr>
<td>Earning enough money to meet lifestyle needs</td>
<td>94 (21.8)</td>
</tr>
<tr>
<td>Cancellations/no show</td>
<td>89 (20.8)</td>
</tr>
<tr>
<td>Decisions about future career directions</td>
<td>76 (17.9)</td>
</tr>
<tr>
<td>Seeing more patients for income reasons</td>
<td>75 (17.7)</td>
</tr>
<tr>
<td>Equipment breakdown/defective materials</td>
<td>74 (17.2)</td>
</tr>
<tr>
<td>Staff-related problems</td>
<td>73 (16.9)</td>
</tr>
<tr>
<td>Inability to meet own expectations/standards</td>
<td>71 (16.4)</td>
</tr>
<tr>
<td>Medical emergencies in surgery</td>
<td>64 (14.9)</td>
</tr>
<tr>
<td>New requirements for continuing professional</td>
<td>61 (14.6)</td>
</tr>
<tr>
<td>development</td>
<td></td>
</tr>
<tr>
<td>Supply of dentists</td>
<td>59 (14.4)</td>
</tr>
<tr>
<td>Unsatisfactory auxiliary help</td>
<td>59 (13.8)</td>
</tr>
<tr>
<td>Actually making mistakes</td>
<td>56 (13.0)</td>
</tr>
<tr>
<td>Feeling underrated by patients</td>
<td>54 (12.5)</td>
</tr>
<tr>
<td>Repetitive nature of work</td>
<td>54 (12.5)</td>
</tr>
<tr>
<td>Unsatisfactory laboratory service from technicians</td>
<td>52 (12.1)</td>
</tr>
<tr>
<td>Conflict between profit and professional ethics</td>
<td>52 (12.1)</td>
</tr>
<tr>
<td>Lack of patient appreciation</td>
<td>50 (11.6)</td>
</tr>
<tr>
<td>Feeling isolated</td>
<td>40 (9.3)</td>
</tr>
<tr>
<td>Perceived problems with colleagues</td>
<td>31 (7.2)</td>
</tr>
<tr>
<td>Possible viral infection contraction</td>
<td>24 (5.5)</td>
</tr>
</tbody>
</table>
The most commonly reported stressors were treating difficult children, constant time pressure, and maintaining high levels of concentration. The least frequent stressors were feeling isolated, perceived problems with colleagues, and the possibility of contracting a viral infection.

For a number of stressors, there were no significant differences by gender, graduating cohort, practice setting, country of graduation, or weekly workload in the number of respondents reporting them "very often" or "all of the time". These included: seeing more patients for income reasons, rising costs, perceived problems with colleagues, actually making mistakes, working with children, and treating difficult children.

There were no significant differences between male and female respondents in the frequency of reporting any of the job stressors, except for maintaining high levels of concentration (45.8% and 34.9% respectively; P=0.05) and causing pain (34.9% and 24.3% respectively; P<0.05). A higher proportion of male respondents reported working with children as a stressor "very often" or "all the time", but this failed to reach statistical significance (34.2% and 27.1% respectively).

The only stressors which reached statistical significance with respect to the weekly workload of dentists (<58 patients versus 58 or more) were: concerns about the supply of dentists (22, 10.7% and 36, 18.3% respectively); CPD requirements (22, 10.5% and 37, 18.2% respectively); and the ability to sell the practice in the future (37, 17.9% and 55, 26.7% respectively).

There were only five stressors that differed significantly in reported frequency by graduating cohort. These are presented in Table 4.23.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant time pressure</td>
<td>19 (31.1)</td>
<td>48 (50.5)</td>
<td>76 (53.9)</td>
<td>48 (48.5)</td>
<td>16 (43.2)*</td>
</tr>
<tr>
<td>Finding time for family and friends</td>
<td>10 (16.7)</td>
<td>21 (22.3)</td>
<td>43 (30.9)</td>
<td>34 (34.3)</td>
<td>7 (18.9)*</td>
</tr>
<tr>
<td>Cancellations/no show</td>
<td>12 (20.0)</td>
<td>24 (26.4)</td>
<td>20 (14.2)</td>
<td>28 (28.6)</td>
<td>5 (13.5)*</td>
</tr>
<tr>
<td>Coping with difficult patients</td>
<td>19 (31.1)</td>
<td>46 (48.4)</td>
<td>51 (36.2)</td>
<td>46 (46.5)</td>
<td>9 (24.3)*</td>
</tr>
<tr>
<td>Lack of patient appreciation</td>
<td>8 (13.1)</td>
<td>12 (12.8)</td>
<td>11 (7.8)</td>
<td>14 (14.1)</td>
<td>5 (13.5)</td>
</tr>
<tr>
<td>Possibility of making mistakes</td>
<td>13 (21.3)</td>
<td>18 (18.9)</td>
<td>28 (20.0)</td>
<td>26 (26.3)</td>
<td>12 (32.4)</td>
</tr>
<tr>
<td>Unsatisfactory auxiliary help</td>
<td>4 (6.8)</td>
<td>11 (11.6)</td>
<td>26 (18.6)</td>
<td>13 (13.3)</td>
<td>5 (13.5)</td>
</tr>
<tr>
<td>Supply of dentists</td>
<td>7 (12.5)</td>
<td>17 (19.1)</td>
<td>22 (16.8)</td>
<td>12 (12.5)</td>
<td>1 (2.7)</td>
</tr>
<tr>
<td>Ability to sell practice in future</td>
<td>19 (32.2)</td>
<td>31 (33.0)</td>
<td>30 (21.9)</td>
<td>11 (11.3)</td>
<td>3 (9.1)*</td>
</tr>
</tbody>
</table>

*P<0.05  **P<0.001
Fewer dentists who had graduated prior to 1970 reported feeling stressed by constant time pressure than those who had graduated later (P<0.05), while those who had graduated between 1980 and 1999 reported having difficulty finding time for family and friends more often than their colleagues (P<0.05). Those in the oldest and youngest groups reported being stressed by coping with difficult patients more often than those in the other age groups (P<0.05). The elder dentists were also the most concerned about their ability to sell their practice in the future (P<0.001).

In Table 4.24 the number of respondents reporting job stressors “very often” or “all the time” are presented by practice setting.

**Table 4.24**  Number reporting job stressors “very often” or “all the time” by practice setting

<table>
<thead>
<tr>
<th>Stressor</th>
<th>Major City</th>
<th>Provincial City</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant time pressure</td>
<td>127 (46.7)</td>
<td>47 (53.4)</td>
<td>33 (45.2)</td>
</tr>
<tr>
<td>Finding time for family and friends</td>
<td>75 (27.0)</td>
<td>20 (23.0)</td>
<td>20 (27.4)</td>
</tr>
<tr>
<td>Cancellations/no show</td>
<td>53 (19.7)</td>
<td>22 (25.6)</td>
<td>14 (19.4)</td>
</tr>
<tr>
<td>Coping with difficult patients</td>
<td>103 (37.9)</td>
<td>39 (44.3)</td>
<td>29 (39.7)</td>
</tr>
<tr>
<td>Lack of patient appreciation</td>
<td>23 (8.5)</td>
<td>16 (18.2)</td>
<td>11 (15.1)*</td>
</tr>
<tr>
<td>Possibility of making mistakes</td>
<td>53 (19.6)</td>
<td>29 (33.0)</td>
<td>15 (20.5)*</td>
</tr>
<tr>
<td>Unsatisfactory auxiliary help</td>
<td>45 (16.7)</td>
<td>6 (6.8)</td>
<td>8 (11.3)*</td>
</tr>
<tr>
<td>Supply of dentists</td>
<td>25 (9.7)</td>
<td>11 (13.4)</td>
<td>23 (32.9)*</td>
</tr>
<tr>
<td>Ability to sell practice in future</td>
<td>50 (18.9)</td>
<td>17 (19.8)</td>
<td>27 (38.6)*</td>
</tr>
</tbody>
</table>

*P<0.05  **P<0.01  ***P<0.001
More dentists from provincial cities than those in major cities or small towns were concerned about lack of patient appreciation and the possibility of making mistakes ($P<0.05$). Dentists in major cities reported being more frequently stressed by unsatisfactory auxiliary help than other dentists ($P<0.05$), while those in the small towns were more frequently concerned about the supply of dentists ($P<0.001$) and their ability to sell their practice in the future ($P<0.01$) than their colleagues in the towns and cities.

Further comparison between NZ versus overseas-trained dentists demonstrated that, for most potential stressors, more overseas- than NZ-trained dentists reported experiencing them “frequently” or “all of the time”. The only exceptions were treating difficult children, concerns about the supply of dentists, and the ability to sell the practice in future. These data are presented in Table 4.25.
Table 4.25  Number reporting job stressors “very often” or “all the time”, by country of primary dental qualification

<table>
<thead>
<tr>
<th>Stressor</th>
<th>NZ</th>
<th>Other</th>
<th>%</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time pressures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long working hours</td>
<td>75 (21.4)</td>
<td>28 (35.9)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finding time for family and friends</td>
<td>79 (22.5)</td>
<td>36 (46.2)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Financial issues</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conflict between profit and ethics</td>
<td>36 (10.2)</td>
<td>16 (20.8)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earning enough money to meet lifestyle needs</td>
<td>70 (19.8)</td>
<td>24 (30.8)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quoting fees/collecting payments</td>
<td>74 (21.0)</td>
<td>25 (32.5)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cancellations/no show</td>
<td>62 (17.7)</td>
<td>27 (35.5)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Patient factors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeling underrated by patients</td>
<td>36 (10.2)</td>
<td>18 (23.1)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of patient appreciation</td>
<td>34 (9.6)</td>
<td>6 (20.5)b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treating extremely nervous patients</td>
<td>122 (34.5)</td>
<td>37 (46.8)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Staff/technical problems</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff-related problems</td>
<td>53 (15.0)</td>
<td>20 (25.6)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unsatisfactory auxiliary help</td>
<td>42 (12.0)</td>
<td>17 (21.8)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment breakdown/defective materials</td>
<td>51 (14.5)</td>
<td>23 (29.5)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unsatisfactory lab service from technicians</td>
<td>33 (9.4)</td>
<td>19 (24.4)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Nature of work</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repetitive nature of work</td>
<td>29 (8.2)</td>
<td>25 (32.1)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeling isolated</td>
<td>23 (6.5)</td>
<td>17 (21.5)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inability to meet own expectations/standards</td>
<td>45 (12.7)</td>
<td>26 (32.9)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical emergency in the surgery</td>
<td>45 (28.8)</td>
<td>19 (24.1)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Possible viral infection contraction</td>
<td>11 (3.1)</td>
<td>13 (16.5)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Concerns about the future</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decisions about future career directions</td>
<td>56 (16.0)</td>
<td>20 (26.3)*</td>
<td></td>
<td></td>
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<tr>
<td>CPD requirements</td>
<td>44 (12.8)</td>
<td>17 (22.7)*</td>
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<td></td>
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</tbody>
</table>

*P<0.05  bP<0.01  cP<0.001

4.6.4 Strategies for managing stress

The most commonly used strategies for coping with stress are presented in Table 4.26.
Table 4.26  Strategies most commonly used for coping with stress, by demographic and practising characteristics (brackets contain percentages)

<table>
<thead>
<tr>
<th>Gender</th>
<th>Alcohol (n%)</th>
<th>Eating (n%)</th>
<th>Sports (n%)</th>
<th>Resting (n%)</th>
<th>Hobby (n%)</th>
<th>Spending money (n%)</th>
<th>Forgetting about work (n%)</th>
<th>Interactions with people (n%)</th>
<th>Active coping strategies (n%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>101 (31.1)</td>
<td>70 (21.5)</td>
<td>222 (68.3)</td>
<td>191 (58.8)</td>
<td>157 (48.3)</td>
<td>57 (17.5)</td>
<td>195 (60.0)</td>
<td>241 (74.2)</td>
<td>102 (31.3)</td>
</tr>
<tr>
<td>Female</td>
<td>19 (17.6)c</td>
<td>26 (24.1)</td>
<td>55 (50.9)b</td>
<td>64 (59.3)</td>
<td>45 (41.7)</td>
<td>30 (27.8)a</td>
<td>61 (56.5)</td>
<td>97 (89.8)c</td>
<td>27 (25.0)</td>
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<td>Graduating cohort</td>
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<tr>
<td>Pre-1970</td>
<td>24 (39.3)</td>
<td>14 (23.0)</td>
<td>39 (63.9)</td>
<td>29 (47.5)</td>
<td>34 (55.7)</td>
<td>7 (11.5)</td>
<td>43 (70.5)</td>
<td>43 (70.5)</td>
<td>13 (20.6)</td>
</tr>
<tr>
<td>1970-1979</td>
<td>30 (31.3)</td>
<td>13 (13.5)</td>
<td>68 (70.8)</td>
<td>50 (52.1)</td>
<td>47 (49.0)</td>
<td>10 (10.4)</td>
<td>50 (52.1)</td>
<td>73 (76.0)</td>
<td>24 (25.0)</td>
</tr>
<tr>
<td>1980-1989</td>
<td>35 (25.0)</td>
<td>29 (20.7)</td>
<td>93 (66.4)</td>
<td>83 (59.3)</td>
<td>62 (44.3)</td>
<td>33 (23.6)</td>
<td>82 (58.6)</td>
<td>109 (77.9)</td>
<td>50 (37.5)</td>
</tr>
<tr>
<td>1990-1999</td>
<td>27 (27.3)</td>
<td>25 (25.3)</td>
<td>54 (54.5)</td>
<td>66 (66.7)</td>
<td>45 (45.5)</td>
<td>25 (25.3)</td>
<td>56 (56.6)</td>
<td>80 (80.8)</td>
<td>30 (30.6)</td>
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<tr>
<td>2000+</td>
<td>4 (10.8)a</td>
<td>15 (40.5)</td>
<td>23 (62.2)</td>
<td>27 (73.0)a</td>
<td>14 (37.8)</td>
<td>12 (32.4)b</td>
<td>25 (67.6)</td>
<td>33 (89.2)</td>
<td>12 (32.4)</td>
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<td>Practice setting</td>
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<tr>
<td>Major city</td>
<td>71 (26.0)</td>
<td>65 (23.8)</td>
<td>171 (62.6)</td>
<td>165 (60.4)</td>
<td>117 (42.9)</td>
<td>60 (22.0)</td>
<td>164 (60.1)</td>
<td>227 (83.2)</td>
<td>78 (28.5)</td>
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<tr>
<td>Provincial city</td>
<td>32 (36.4)</td>
<td>15 (17.0)</td>
<td>60 (68.2)</td>
<td>50 (56.8)</td>
<td>45 (51.1)</td>
<td>14 (15.9)</td>
<td>52 (59.1)</td>
<td>58 (65.9)</td>
<td>30 (33.7)</td>
</tr>
<tr>
<td>Other</td>
<td>17 (23.6)</td>
<td>16 (22.2)</td>
<td>46 (63.9)</td>
<td>40 (55.6)</td>
<td>40 (55.6)</td>
<td>13 (18.1)</td>
<td>40 (55.6)</td>
<td>53 (73.6)b</td>
<td>21 (29.6)</td>
</tr>
<tr>
<td>BDS source</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>NZ</td>
<td>110 (31.1)</td>
<td>80 (22.6)</td>
<td>238 (67.2)</td>
<td>205 (57.9)</td>
<td>174 (49.2)</td>
<td>72 (20.3)</td>
<td>211 (59.6)</td>
<td>280 (79.1)</td>
<td>106 (29.9)</td>
</tr>
<tr>
<td>Other</td>
<td>10 (12.7)c</td>
<td>16 (20.3)</td>
<td>39 (49.4)b</td>
<td>50 (63.3)</td>
<td>28 (35.4)a</td>
<td>15 (19.0)</td>
<td>45 (57.0)</td>
<td>58 (73.4)</td>
<td>23 (29.1)</td>
</tr>
<tr>
<td>Weekly workload</td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>&lt;58 patients</td>
<td>56 (26.2)</td>
<td>54 (25.2)</td>
<td>129 (60.3)</td>
<td>132 (61.7)</td>
<td>102 (47.7)</td>
<td>49 (22.9)</td>
<td>129 (60.3)</td>
<td>179 (83.6)</td>
<td>68 (31.8)</td>
</tr>
<tr>
<td>58 or more</td>
<td>63 (29.7)</td>
<td>42 (19.8)</td>
<td>142 (67.9)</td>
<td>122 (57.5)</td>
<td>96 (45.3)</td>
<td>38 (17.9)</td>
<td>124 (58.5)</td>
<td>154 (72.6)b</td>
<td>58 (27.2)</td>
</tr>
<tr>
<td>All combined</td>
<td>120 (27.7)</td>
<td>96 (22.2)</td>
<td>277 (64.0)</td>
<td>255 (58.9)</td>
<td>202 (46.7)</td>
<td>87 (20.1)</td>
<td>256 (59.1)</td>
<td>338 (78.1)</td>
<td>129 (29.7)</td>
</tr>
</tbody>
</table>

Notes: a P<0.05  b P<0.01  c P<0.001
d Active coping strategies included consultations, changing work environment and changing relationships with patient/staff
Those most frequently used were interactions with people, sports, and forgetting about work. The least commonly-used strategies were smoking (3.5%), recreational drugs (2.8%), and prescribed drugs (2.8%). Fifteen males (4.6%) but no females reported that they smoked to deal with stress (P<0.05). A higher proportion of males than females reported using both recreational drugs and prescribed drugs to deal with stress, but this did not reach statistical significance. More male than female respondents reported using alcohol or sports to manage stress, while a higher proportion of female dentists reported that they spent money, or interacted with people. Changing the work environment was a strategy used by more males (83, 25.5%) than females (17, 15.7%). Dentists who had graduated within the previous 16 years were less likely than other age groups to report using alcohol. There was a gradient towards increasing proportions of dentists that reported spending money was used as a stress-coping strategy by higher proportions of more recent graduates. A similar gradient was observed with respect to “interactions with people”, but this failed to reach statistical significance. Fewer dentists practising in provincial cities (than in major cities or other areas) reported interactions with people as a strategy for dealing with job-related stress. The strategies used by overseas- and NZ-trained dentists were similar, except that a higher proportion of NZ graduates consumed alcohol, played sport, or engaged in hobbies. Fewer busier dentists (those who treated, on average, at least 58 patients per week) identified “interactions with people” or “changing relationship with patient/staff” as strategies for dealing with job-related stress.
4.7 A qualitative investigation of the experiences of immigrant dentists working in New Zealand - the Immigrant Dentist Study

4.7.1 Interviewees

Of the fourteen dentists interviewed, eight were from the Hamilton region, four from the Bay of Plenty, and two from Wellington. The dentists who took part in the study had undertaken their training in a variety of countries, including India (three), Iraq (three), the United Kingdom (two), Brazil, Egypt, Germany, France, the Netherlands, and the Philippines. They had worked in a range of further countries, including Ireland, Saudi Arabia, Jordan, Malaysia and Mauritius. Seven were male and seven female. Nine interviewees were aged between 35 and 50 years, while the remaining five were younger. Eleven participants had sat the NZDREX (one was exempted from the written component) while three had not been required to go through the NZDREX process (two from the United Kingdom and one from the Netherlands). There was a range in the time during which dentists had worked in their home country from none to several years. Similarly, there was a range (from 3 months to 13 years) in the time during which the dentists had been working in NZ. Some dentists had commenced work directly on moving to NZ, while others had been living in the country for up to six years prior to practising as a dentist here. Although five had undertaken specialty training, one in each of oral surgery, orthodontics and paediatric dentistry, while two had specialised in periodontics) prior to coming to NZ, only one had gained specialist registration in this country. One individual was currently going through the specialist registration process here (based on overseas training and experience), and one further individual had undertaken specialist training in NZ.
4.7.2 Reasons for moving to New Zealand

The predominant reasons for moving to NZ were lifestyle and quality of life:

“Better quality of life, better finances, better education for the children. Everything.” (Participant 9)

The dentists perceived that NZ was a good country to bring up children, with some saying that their own country was not a safe place to live. Four dentists had decided to live in NZ to be with their loved ones; two had come to NZ for a short period and then met their spouse-to-be, while two others moved here because a partner was resident in this country. Another dentist had come to NZ because there was a good income potential and an ability to practise top-quality dentistry. Other reasons for choosing NZ over other countries included: being able to register by examination rather than having to retrain; NZ being a cosmopolitan country accepting of people from all over the world; or for a change of life. One participant had suggested that it was easier to gain registration in NZ than Australia, and was planning to move to Australia in the near future.

4.7.3 NZDREX

The three dentists who had gained registration without sitting the NZDREX had found the process to be relatively straightforward. One of these was a periodontist who gained registration by a specialist assessment. However, the experiences of NZDREX dentists were more varied. Most dentists found the examination process very stressful and difficult:

“It was terrible. Awful...the most stressful time of my life.” (Participant 10)

“Very, very, very tough, because there’s no syllabus as such... you do not know what is given more importance here and what is not given much of importance”. (Participant 9)

Some dentists appeared a little more philosophical:

“I am not saying that it’s a bad or good system but this is the system you have to respect.” (Participant 5)
“[My husband] wrote the exam first. He didn’t make it through on his first attempt. But then he kind of got an idea of what the examiners were looking for, and that we felt was the key to the exam.” (Participant 7)

Some dentists felt that the English examination was a “waste of time” while others said that there was too much emphasis on the basic sciences. Several dentists commented on the lack of study guidelines and difficulty in accessing study material:

“It’s like starting over. Yes, there is no real guidelines. Like there is no supervisor that can tell you what to study, what sort of things are important or what they are looing for in the exams.” (Participant 3)

“At the beginning, there were no books, no guide, nothing, and I struggled to get some books from the School of Medicine in Auckland and Auckland libraries and through the internet. The difficulties was how to get the information, the books really, and left alone I sorted it out.” (Participant 4)

Some dentists mentioned that it was difficult to find out about particular methods and materials used in NZ which they were less familiar with in their own country. Examples included pinned amalgam restorations, Fuji IX, and tooth mousse. Two dentists commented that they struggled with the essay format of the examination, as they were more used to multiple-choice examinations and found it difficult to work out what was being asked.

Although most candidates were living in NZ, three dentists continued to live and work in India, travelling to NZ for each component of the exam:

“I think the process took us almost three years. We were quite happy to go back and forth and keep our life there, but visit here to keep this part going as well. Just do the bits”. (Participant 7)

This allowed them to keep earning a dentist’s income (all be it in a lower currency) during the examination process, but was seen by one dentist as being a more difficult option as far as the examination was concerned:

“Everybody says it’s much easier if you are in New Zealand, because you know what’s happening, you know, dentistry point of view, what people use here. You come across different people. You get used to the accent and, you know, all that, but finances are tight. You’ve got to work. You don’t have the piece of mind. You don’t have your family’s support.” (Participant 9)
4.7.4 Employment and expenses while studying for NZDREX

Candidates living in NZ worked in a range of jobs while preparing for the NZDREX. Some were completely unrelated to dentistry, such as working in a factory, a supermarket or as a caregiver. Four had been fortunate enough to gain employment within the dental industry as a dental assistant or a hygienist. Others had applied for jobs as dental assistants, but felt that they had been considered ‘overqualified’ or that nobody was interested:

“I asked just for observation, like if they give us a chance just to observe and see how things – and yes, nothing…. Nobody was really interested, especially with the age”. (Participant 3)

Two dentists had offered their services for free, at least initially:

“I went for free just watching and sort of asking if I could help and then I got a job offer in the place. And a lot of people they don’t really look for things so no one’s going to knock and say do you want a job.” (Participant 2)

All but one of the dentists who had worked in a dental surgery had found it worthwhile, not just in seeing the clinical dentistry, but also how practices work and how to manage patients:

“I consider myself quite lucky being practising as a hygienist at the beginning, you know, just to be with the mood of the patients, the atmosphere, the way they think about it.” (Participant 5)

“Very useful. I think I passed thanks to that.” (Participant 10)

Working as a hygienist provided a higher wage, enabling the dentists to survive on fewer hours of paid employment per week, and leaving more time for study. This was more favourable than dental assisting, which would be the only option since the introduction of the HPCA.

Most dentists commented that the NZDREX is a very expensive process and that it takes a long time. Several dentists had needed to borrow substantial amounts of money to fund the examination, mostly from family but some a finance company; one had used an inheritance.
“Yes. It was quite expensive. Because you earn in Indian rupees. When you’re working in a different currency it doesn’t always compare up.” (Participant 7)

The time between re-sits was identified as one of the biggest frustrations of the NZDREX process:

“After that I had to wait for one year to re-sit the exam because something, there were not enough spaces.” (Participant 5)

“It’s not just the money. It’s just a waste of time because you had to wait six months…” (Participant 3)

4.7.5 Revision course

Although there were some who were not able to afford it, approximately half of the dentists had undertaken a revision course before sitting the examination. Two dentists said that the course was not available when they first arrived in NZ. Those who had participated in the course had found it helpful and would recommend it to others, although some commented that it was not long enough, and that it could not possibly cover all that a candidate needs to know:

“If you managed to get a seat on the course or if you have the money to attend the course, then the course is very helpful. But apart from that there’s just no help” (Participant 9).

One dentist didn’t think the course would have been of benefit to him:

“I would never go on that course, no. … I don’t want to be taught. I just need somebody to examine.” (Participant 5)
4.7.6 Peer contact

Aside from the lectures and clinical practice, another benefit of the course was meeting other NZDREX candidates, who then formed a support/study group:

“The people who I met during my exam, they are all my friends now. We keep in touch and we all discuss our issues.” (Participant 9)

The majority of participants felt that contact with other dentists during the examination process was important. Some were lucky enough to be introduced to another dentist from their country, who was able to provide some guidance about the NZDREX process, and potential employment opportunities:

“Somebody gave me a phone number, saying there’s a dentists who’s just given the exam... and I asked him how was the exam. He said it’s very difficult. You really have to study and you’ve got to study everything” (Participant 9)

Others were less fortunate:

“No. No, nothing at all. And nobody contacted us and nobody would help. Nobody allowed you to work, and so yes, complete isolation.” (Participant 3)

“Frankly speaking, not many people helped... Everybody just says you can be asked anything. They do give us hints... like here they are fond of this here, fond of that.” (Participant 9)

Although most dentists appeared to have really struggled with the examination, some managed to remain positive about the process:

“What we both liked was, learning for this exam was a bonding experience for both of us... I believed I improved professionally by going through the exam.” (Participant 7)
4.7.7 Working as a dentist in NZ

Dentists gained their first job as a dentist in NZ in a number of ways. The UK dentists organised their employment before they moved to NZ. Although some NZDREX dentists found their jobs via the Internet, most found them through contacts after they had arrived in NZ. A few dentists had experienced difficulty finding work:

"Finding a job for an overseas dentist is not easy [because] according to the immigration requirements, it should be a salaried job for a minimum of 30 hours. So it was mandatory to take up a salaried job and not many people are ready to offer that [because] we are new to the country." (Participant 9)

A lack of local referees was another obstacle identified by two dentists:

"Most of the private dentists, they were a little bit hesitant of having you because you are overseas and they don't know what's your background." (Participant 3)

Only one dentist was working in his own sole-practitioner practice. The remainder were working in group practices, mostly on commission. Some dentists talked about the difficulties of purchasing a dental practice:

"I’m thinking, but actually I can't do it now. It'd cost too much." (Participant 4)

However, six dentists had bought their own practice. Some (even those who had very little when they arrived in NZ) had managed to purchase a practice within a year or two of sitting the examination. This suggests that the investment in undergoing the NZDREX paid off in the longer term.

4.7.8 Difficulties of working as an immigrant dentist

Dentists were asked about what they considered to be difficulties working as immigrant dentists in NZ. Some, (particularly those who were not required to undergo NZDREX) thought there were no problems at all; once they were registered, they had the same experiences as any other NZ dentist. Others identified a number of difficulties ranging
Communication was identified as a problem by only a few dentists:

“The job is stressful because you never know what the patient thinks of what you’ve said. And that gives a little bit of stress and you go home and think, did I say the right thing, did I do the right thing?” (Participant 9)

Most of the other dentists did not consider that communication was a problem, despite English being a second language for most.

“Actually there’s no communication issues. I find that very easy. It is easy to communicate with patients. They seem to understand me, that’s the important thing.” (Participant 7)

Although one dentist commented that patients do hesitate to see an overseas-qualified dentist most had not experienced any such problems. In fact, one dentist commented:

“I feel it’s more of the dentists not accepting than the patients…” (Participant 9)

There was a perception among many of the dentists—including those from the UK—that patients have more rights in this country, and that complaints were more likely and that this influenced their day-to-day practice:

“The complaints are bad in New Zealand because they allow the people – Oh thank god it didn’t happen to me – but the complaints here are too much…they give people too much rights.” (Participant 4)

“Here the people have, you know, more knowledge generally speaking… here I think 10 times before I do any simple form of treatment.” (Participant 5)

One dentist said that the patients don’t complain as much as one might expect:

“I find the patients very, very forgiving.” (Participant 10)
Some dentists commented on the high cost of dentistry in NZ and the lack of third-party payments:

"The cost of dentistry here is quite high so it’s often stressful dealing with the issue of charging patients... And from that of course, if the cost is high then the expectations are high, so there’s always both a high cost and a high expectation." (Participant 1)

Some dentists also commented on the difficulties of working with Accident Compensation Corporation (ACC) and State-funded dentistry, although others didn’t perceive this to be much of a problem.

Most interviewees thought that the dentistry performed in NZ was the same as in their home country. The only exceptions were two dentists from India and one from Brazil who had more limited equipment and materials than are available here. In contrast, the dentist from Germany commented on how little amalgam was used there than in NZ. The dentist from the Netherlands had experienced some difficulties with delays after ordering equipment in this country; materials were more readily available within Europe.

4.7.9 Fitting in to the NZ dental community

Overall, the immigrant dentists had found the local dentists to be quite welcoming, although some reported having some bad experiences:

“Yes, most of them have been extremely nice, extremely supportive. I guess you do get a few rotten apples everywhere. We did have a couple of bad experiences with some local dentists... a couple of bad experiences with a couple of employers here. So that really puts me off. Given a chance I don’t want to work for anyone.” (Participant 7)

One dentist commented on the competitive nature of dentistry in NZ ("They keep to themselves a bit... it’s very competitive" (Participant 11)) and another on the difficulty of determining appropriate fees when these issues cannot be discussed.

Some overseas-qualified dentists spoke about the excellent employers for whom they had worked:
“...a multi-associate practice, and we set aside at least two hours at lunchtime [a week], and I had peer contact with my senior partner on an evening basis almost twice a week, say, and he would review your clinical notes for the week and discuss any perhaps different treatment plans or issues. And similarly, if there was ever a patient dispute or anything like that then the senior partner would be involved and they would all be dealt with very openly. It was very good.” (Participant 1)

Sadly, this was not the case for all participants. Several spoke about the bad experiences of themselves and some of their peers as overseas-qualified dentists in NZ:

“I believe, I think it maybe just my opinion, maybe they are being taken advantage of. Unfair employment practices... Hours of work, pay, professional conduct... basically unprofessional conduct from an employer... all the people I know have had some kind of bad experience, so that’s not very good, is it?” (Participant 7)

“Most of them have changed, two jobs, or had employment issues. Like I told you I haven’t come across anyone who’s been kind of happy.” (Participant 9)

There were concerns in that, if the first job didn’t work out, this would affect the ability of a dentist to gain a NZ reference with which to move into another job. In contrast, one interviewee felt that the overseas dentists whom he had employed since purchasing his own practice had let him down.

4.7.10 NZDA and DCNZ

All but one of the dentists belonged to the NZDA, although two had not yet joined their local branch. The reasons given for joining were similar for all dentists and included: collegiality; to meet and communicate with colleagues (and potential referrers); to keep informed about current issues; improved access to continuing education; the discounted indemnity insurance; and back-up (“so you can ask for help”).

Most dentists agreed that branch meetings were useful, and attended them sporadically. Some dentists thought that the NZDA was more beneficial at the national level and expressed concerns that it was difficult to access branch meetings because of the distance
to the venue, having to work late nights, or because of difficulty arranging childcare. A few also felt that they were a little reluctant to attend as an ‘outsider’:

“Nice to go with somebody that you know... sometimes you feel a bit of an outsider... Because there’s the one dental school, everyone else seems to know each other... whereas when you’re the outsider, it’s like, ohh, who are you?” (Participant 8)

Other dentists felt that it was the branch level that NZDA membership was most useful:

“...the national level.... never really seems to do very much at all for you. And I still think it’s important to support professional bodies but it is quite interesting. There seems to be very little gain from them”. (Participant 1)

However, dentists who had needed to contact NZDA Headquarters due to difficulties arising in practice had nothing but praise for the organization:

“I had an issue once and they were very, very helpful. They helped me to whatever extent they could.” (Participant 9)

“Yeah, I think it’s very, very useful. And they’re really helpful, very, very helpful.... You can just pick up the phone and ask and they’re really helpful.” (Participant 3)

Another dentist who had experienced employment difficulties had decided not to contact the NZDA:

“We did think a couple of times whether we should take it up with them, when we have something bad done to us. In a country like this there is a chance for – to address grievances and see but I don’t know why, we just decided to let it lie.... If you made it more aware that there was support available, I think people might, maybe if they were stressed enough, they might take up on that”. (Participant 7)

The Dental Council was also perceived to be very helpful:

“Yes the Council is very helpful. They reply to every question that you ask, and if they don’t feel like replying they just write ‘you can look up the website’. So the Council is quite nice. They answer every query of yours any they kind of get to know you personally as you go getting the exams”. (Participant 9)
4.7.11 Mentors

Almost all of the dentists spoke about the importance of good mentors in aiding them not only through the NZDREX process, but also into dental practice:

“Not like a guide would hold your hand, but someone who knew what the system was”. (Participant 7)

Most felt that it would be best to have a NZDREX dentist as a mentor:

“Someone who went through the process, so they can identify with what you went through.” (Participant 7)

One dentist thought it would be useful to have mentorship through the specialist assessment process as well. All dentists thought that it was important to have someone they could contact to discuss issues. It was suggested that mentors should be linked to NZDA, prominent in the profession, active in continuing education, and willing to spend the time to help immigrant dentists. Some individuals wanted someone who would be able to discuss specific problems/cases, employment issues, ACC issues, and to help handle any disputes, complaints or misunderstandings that may arise.

Mentors need to be carefully selected to ensure that they are giving constructive advice. One dentist reported that she was told:

“Look, don’t bother to take the exam because number 1, it’s very, very hard and number 2, it’s expensive....So it’s like that put me off... so it took like five years for me to just think about it.” (Participant 12)

This dentist passed each examination on her first attempt!

Several dentists mentioned the problems related to lack of family and social support in NZ:

“I miss my family and it is difficult to bring them here.....the Dental Association or the Council... they must help the overseas dentists to bring their families... we are highly educated and we are working, we are hard workers, we pay tax and GST, we serve this country honestly, so we deserve this kind of support. And this may reduce the stress on the overseas [dentists]” (Participant 4)
4.7.12 Advice to dentists immigrating to NZ and suggestions for improvements to the NZDREX process

Most of the participants would advise any new immigrants to undertake the bridging course before attempting the NZDREX examinations. They felt that the new bridging course would be worthwhile, as it would save time in the long run by avoiding resits. However, they felt that meeting the cost of the course would be difficult for some.

Some dentists suggested that it would be useful to have a “Helpline” available where dentists could obtain advice. This could perhaps be run by the DCNZ. It could assist in providing information about the NZDREX process, where to obtain study materials, and perhaps to put dentists in touch with potential mentors who had already undertaken the examinations.

It was suggested that a support group for overseas dentists would be beneficial. Such a group could be run in each of the main centres, with a volunteer facilitator. The facilitator could hold suitable textbooks in their practice and introduce prospective candidates to each other to facilitate study groups. It was also suggested that it would be ideal if candidates could attend local NZDA branch meetings and continuing education courses during the examination process, perhaps at reduced cost.

Most dentists agreed that it would be ideal to have a time observing in a dental practice. This would allow the candidates to communicate with other dentists and to see how dental practices operate in this country:

“Help us to blend in, like maybe do a little bit of training, or even observation, just clinical observation in different surgeries or in a hospital base... It’s just sometimes the approach is different... New Zealand patients have a different culture, they have different ideas about treatment... we have to learn things of people.” (Participant 3)

Some dentists thought mentorship should continue after achieving NZDREX:

“They could model it exactly the same [as the Graduate Professional Development Programme]. If it’s good enough for new graduates then it should be fine for overseas dentists.” (Participant 1)
One dentist suggested the idea of an internship for overseas-qualified dentists for up to one year. Some thought it would be useful to work in a hospital department:

“…look at the patients… know how things work, and the rules… It would give them a good reference at least…” (Participant 3)

Other advice included:

“Respect the system and don’t take it for granted…. Whoever worked hard passed.” (Participant 5)

“Be strong. Be very strong. And be prepared for all kinds of obstacles.” (Participant 9)

Only two dentists suggested that they were not entirely happy in NZ, although a third stated that he would soon be moving to Australia. The majority felt they had settled into NZ well and planned to stay here:

“I tell them it’s great here and I love it. I won’t go back.” (Participant 2)

4.8  The occupational health of dentists working in New Zealand - the Occupational Health Study

4.8.1  Response rate

Thirteen questionnaires were returned because of incorrect address details, and six further dentists returned the questionnaire uncompleted because they were not currently practising in NZ. The 567 questionnaires returned from the remaining 731 dentists gave an effective response rate of 77.6%. One questionnaire was excluded because fewer than half of the questions had been answered, giving a total of 566 completed questionnaires, and an effective response rate of 77.4%.
4.8.2 Socio-demographic characteristics

Comparison of the characteristics of the responders with the practising dentists in NZ (using the Dentist's Register maintained by DCNZ) showed that there were no significant differences, with the Register data falling within the 95% confidence intervals for all of the survey estimates (Table 4.27).

Table 4.27 Comparison of respondents’ sociodemographic and degree characteristics with those of the actively-practising NZ dental profession as a whole (data are percentages)

<table>
<thead>
<tr>
<th>Gender</th>
<th>Respondents (95% CI)</th>
<th>NZ dental profession&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>68.0 (64.2 - 71.8)</td>
<td>70.1</td>
</tr>
<tr>
<td>Female</td>
<td>32.0 (28.2 - 35.8)</td>
<td>29.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age group&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Respondents (95% CI)</th>
<th>NZ dental profession</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowest to 29</td>
<td>12.0 (9.3 - 14.7)</td>
<td>12.1</td>
</tr>
<tr>
<td>30 to 39</td>
<td>21.6 (18.2 - 25.0)</td>
<td>23.4</td>
</tr>
<tr>
<td>40 to 49</td>
<td>28.1 (24.4 - 31.8)</td>
<td>29.0</td>
</tr>
<tr>
<td>50 to 59</td>
<td>23.2 (19.7 - 26.7)</td>
<td>21.4</td>
</tr>
<tr>
<td>60 and over</td>
<td>14.9 (12.0 - 17.8)</td>
<td>14.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country of qualification</th>
<th>Respondents (95% CI)</th>
<th>NZ dental profession</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Zealand</td>
<td>76.3 (72.8 - 79.8)</td>
<td>75.9</td>
</tr>
<tr>
<td>Other</td>
<td>23.7 (20.2 - 27.2)</td>
<td>24.1</td>
</tr>
</tbody>
</table>

<sup>a</sup>Data source: Dental Council of New Zealand 2008  
<sup>b</sup>1 participant did not answer this question

4.8.3 Current working practices

The practising characteristics of responding dentists are presented in Table 4.28.
<table>
<thead>
<tr>
<th><strong>Table 4.28</strong> Dentists’ practising characteristics&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All respondents</strong></td>
</tr>
<tr>
<td><strong>Type of practice</strong></td>
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<tr>
<td>Group</td>
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<tr>
<td>Solo</td>
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<tr>
<td><strong>Type of remuneration</strong></td>
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<tr>
<td>Employee salary</td>
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<tr>
<td>Employee commission</td>
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<tr>
<td>Self-employed</td>
</tr>
<tr>
<td><strong>Mean patient-contact hours per week</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Mean administrative hours per week</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Mean number of patients per day</strong></td>
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<tr>
<td></td>
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<tr>
<td><strong>Hand used to operate the dental drill</strong></td>
</tr>
<tr>
<td>Left</td>
</tr>
<tr>
<td>Right</td>
</tr>
<tr>
<td>Both</td>
</tr>
<tr>
<td><strong>Four-handed dentistry</strong></td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Sometimes</td>
</tr>
<tr>
<td><strong>Use sedation</strong></td>
</tr>
<tr>
<td>Yes</td>
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<tr>
<td>No</td>
</tr>
<tr>
<td><strong>Use amalgam</strong></td>
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<tr>
<td>Never</td>
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<tr>
<td>Sometimes</td>
</tr>
<tr>
<td>Regularly</td>
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<tr>
<td><strong>Oral health Services Agreement</strong></td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td><strong>Treat preschool children</strong></td>
</tr>
<tr>
<td>Never</td>
</tr>
<tr>
<td>Sometimes</td>
</tr>
<tr>
<td>Regularly</td>
</tr>
</tbody>
</table>

<sup>a</sup>some participants did not answer all questions
Almost three-quarters of respondents worked in group practice, and approximately one quarter in solo practice. Most dentists were self-employed while one-fifth were employees on commission, and 14.0% worked on a salary. Respondents had been working as dentists for a mean of 21.5 years (SD 12.4), and they had patient contact for a mean of 31.4 hours per week (SD 9.1, range 0-60). Gender differences existed, with men treating patients for a mean of 32.8 hours per week (SD 8.6), while women treated patients for 28.4 hours per week (SD 9.6, P<0.001). The mean number of patients seen per day was 13.2 (SD 6.1). Men, on average, treated 14.1 patients per day, while women treated a mean of 11.4 patients per day (SD 6.5 and 4.2 respectively, P<0.001). There was no significant difference in the mean number of administrative hours worked by men or women; 5.4 (SD 6.8) and 4.1 (SD 5.4) respectively.

NZ dental graduates worked a mean of 31.5 hours (SD 8.9), while those from overseas worked a mean of 30.9 hours (SD 9.9; P<0.05). There were no significant differences by country of initial dental qualification in the number of patients seen or the number of administrative hours worked. Self-employed dentists worked more contact hours than employee dentists (32.2, SD 8.4 and 29.9, SD 10.2 respectively; P<0.05). The former also treated more patients per day (14.1, SD 6.7 and 11.8, SD 4.2 respectively (P<0.001). There were no significant differences between self-employed and employee dentists in the time spent working on administrative tasks (4.9, SD 6.1 and 5.1, SD 6.9 respectively).

### 4.8.4 Dentists’ general health

Only 19 dentists (3.4%) reported being regular smokers; a further 28 (5.0%) admitted to smoking occasionally. The majority reported that they do consume alcohol (448, 79.4%), with reported usual consumption ranging from 0 to 70 units per week (mean 7.3; SD 7.6). The mean BMI was 25.1 (SD 4.0, range 15.1 to 55.5). Eight dentists (1.4%) reported using recreational drugs.

On average, dentists had taken 2.9 days off work due to illness in the previous year (SD 12.1, range 0 to 200), but had worked a mean of 4.6 days (SD 12.1, range 0 to 200) in the previous year when they had not felt physically well. A higher proportion of dentists with a BMI of 26 or more had taken 4 or more days off due to illness than those with a lower
BMI (41, 21.4% and 37, 12.8% respectively, P<0.05). There were no differences by age, country of training, self-employment status, smoking or alcohol use, or the number of patients seen daily. A greater proportion of women than men had taken four or more days off due to sickness in the previous year (39, 22.3% and 50, 13.3% respectively, P<0.01). A larger proportion of women than men reported working six or more days when they felt unwell in the preceding year, although this difference was not statistically significant.

Characteristics of the respondents’ self-reported general health are presented in Table 4.29.
Table 4.29 Self-reported general health (percentages in brackets)

<table>
<thead>
<tr>
<th>How do you rate your general health?</th>
<th>Gender</th>
<th>Age group</th>
<th>All combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>0-39 years</td>
</tr>
<tr>
<td>Excellent/Very Good</td>
<td>268 (69.6)</td>
<td>131 (72.4)</td>
<td>137 (72.1)</td>
</tr>
<tr>
<td>Good/Fair/Poor</td>
<td>117 (30.4)</td>
<td>50 (27.6)</td>
<td>53 (27.9)</td>
</tr>
<tr>
<td>How do you rate your physical fitness?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent/Very good</td>
<td>174 (45.2)</td>
<td>69 (38.1)</td>
<td>77 (40.5)</td>
</tr>
<tr>
<td>Good/Fair/Poor</td>
<td>211 (54.8)</td>
<td>112 (61.9)</td>
<td>113 (59.5)</td>
</tr>
<tr>
<td>What is your usual feeling?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Happy and interested in life</td>
<td>238 (62.1)</td>
<td>119 (66.9)</td>
<td>116 (61.7)</td>
</tr>
<tr>
<td>Somewhat happy</td>
<td>130 (33.9)</td>
<td>52 (29.2)</td>
<td>67 (35.6)</td>
</tr>
<tr>
<td>Unhappy</td>
<td>15 (3.9)</td>
<td>7 (3.9)</td>
<td>5 (2.7)</td>
</tr>
<tr>
<td>How would you describe your life?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very/Fairly stressful</td>
<td>254 (66.5)</td>
<td>138 (77.5)</td>
<td>132 (70.6)</td>
</tr>
<tr>
<td>Not very/Not at all stressful</td>
<td>128 (33.5)</td>
<td>40 (22.5)</td>
<td>55 (29.4)</td>
</tr>
<tr>
<td>To what degree do you experience pain and discomfort?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free from pain/discomfort</td>
<td>154 (40.2)</td>
<td>71 (40.1)</td>
<td>85 (45.2)</td>
</tr>
<tr>
<td>Not free from pain/discomfort</td>
<td>229 (59.8)</td>
<td>106 (59.9)</td>
<td>103 (54.8)</td>
</tr>
<tr>
<td>Overall, how satisfied are you with your health?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very satisfied</td>
<td>161 (41.9)</td>
<td>91 (51.1)</td>
<td>86 (45.7)</td>
</tr>
<tr>
<td>Somewhat or not satisfied</td>
<td>223 (58.1)</td>
<td>87 (48.9)</td>
<td>102 (54.3)</td>
</tr>
</tbody>
</table>

\*p < 0.05 \*p < 0.01 \*p < 0.001
\*Some respondents did not answer all questions
Seventy percent of respondents rated their health as very good or excellent, and almost half considered their physical fitness to be very good or excellent. The majority felt positive about life, although over two-thirds reported that their life was fairly or very stressful. Over half reported that they experienced some pain or discomfort.

Dentists who drank moderately (1-7 units per week) reported being more satisfied with their health; 14 non-drinkers (32.6%), 134 moderate drinkers (51.1%) and 73 (40.6%) heavier drinkers reported being very satisfied with their health (P<0.05). Three-quarters of dentists had taken at least one form of medication in the preceding 4 weeks; the mean number taken was 1.3 (SD 1.2, range 0-7). The drugs consumed by the greatest number of dentists were analgesics (220, 38.9%), cardiac or antihypertensive medications (81, 14.3%), and allergy medications such as antihistamines (77, 13.6%). One-quarter (144, 25.4%) had taken vitamin supplements, and 20 (3.5%) had taken homeopathic medicines. Eight individuals (1.4%) had taken recreational drugs in the previous four weeks. There were no differences by gender, age or smoking status. A larger proportion of dentists with a BMI of 26 or above had taken medications in the last year than those with a lower BMI (142, 72.4% and 181, 60.9% respectively, P<0.05).

4.8.5 Dentists' ocular health

Data on dentists' ocular health are presented in Table 4.30.
### Table 4.30 Factors relating to dentists' ocular health (percentages in brackets)

<table>
<thead>
<tr>
<th></th>
<th>Uses magnification regularly</th>
<th>Wears prescription glasses or lenses regularly</th>
<th>Uses eye protection regularly</th>
<th>Had eye examination in previous 2 years</th>
<th>Ever had eye injury at work</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>173 (45.2)</td>
<td>229 (59.8)</td>
<td>212 (56.4)</td>
<td>300 (78.3)</td>
<td>56 (14.6)</td>
</tr>
<tr>
<td>Female</td>
<td>40 (22.3)</td>
<td>102 (56.7)</td>
<td>131 (73.2)</td>
<td>140 (77.8)</td>
<td>18 (10.1)</td>
</tr>
<tr>
<td><strong>Age group (years)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 40</td>
<td>33 (17.4)</td>
<td>93 (48.9)</td>
<td>138 (72.6)</td>
<td>121 (63.7)</td>
<td>19 (10.0)</td>
</tr>
<tr>
<td>40 to 49</td>
<td>63 (40.1)</td>
<td>72 (45.6)</td>
<td>111 (70.3)</td>
<td>124 (78.5)</td>
<td>23 (14.6)</td>
</tr>
<tr>
<td>50 or more</td>
<td>116 (54.2)</td>
<td>166 (77.6)</td>
<td>93 (45.1)</td>
<td>194 (90.7)</td>
<td>31 (14.4)</td>
</tr>
<tr>
<td><strong>Number patients per day</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 12</td>
<td>115 (38.1)</td>
<td>166 (55.0)</td>
<td>200 (66.7)</td>
<td>228 (75.5)</td>
<td>37 (12.3)</td>
</tr>
<tr>
<td>13 or more</td>
<td>93 (38.3)</td>
<td>155 (63.8)</td>
<td>128 (53.8)</td>
<td>198 (81.5)</td>
<td>36 (14.8)</td>
</tr>
<tr>
<td><strong>Employment status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee</td>
<td>51 (26.4)</td>
<td>108 (55.7)</td>
<td>122 (63.5)</td>
<td>141 (72.7)</td>
<td>26 (13.3)</td>
</tr>
<tr>
<td>Self-employed</td>
<td>158 (43.7)</td>
<td>220 (60.4)</td>
<td>218 (60.9)</td>
<td>296 (81.3)</td>
<td>47 (12.9)</td>
</tr>
<tr>
<td><strong>Days worked when not well</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 or less</td>
<td>175 (40.2)</td>
<td>250 (57.5)</td>
<td>266 (62.1)</td>
<td>346 (79.5)</td>
<td>45 (10.3)</td>
</tr>
<tr>
<td>6 or more</td>
<td>32 (31.4)</td>
<td>61 (59.2)</td>
<td>61 (59.8)</td>
<td>72 (69.9)</td>
<td>24 (23.3)</td>
</tr>
<tr>
<td>All combined</td>
<td>213 (37.9)</td>
<td>331 (58.8)</td>
<td>343 (61.8)</td>
<td>440 (78.2)</td>
<td>74 (13.1)</td>
</tr>
</tbody>
</table>

\(^aP < 0.05\) \(^bP < 0.01\) \(^cP < 0.001\)
There was a positive age gradient in the number of dentists having had an eye examination in the preceding two years, wearing prescription glasses or contact lenses, and using magnification. Conversely, a larger proportion of dentists younger than 50 years than their older colleagues wore eye protection. A smaller proportion of dentists who saw 13 or more patients per day wore eye protection regularly than those who saw fewer than 13 patients. A larger proportion of male than female dentists regularly used magnification. Conversely, a higher proportion of female than male dentists regularly used eye protection. More than one in seven dentists had experienced an eye injury at work.

4.8.6 Other work-related adverse health events

Data on respondents’ experience of other work-related adverse health events are presented in Table 4.31.
| Table 4.31 Practitioners’ experience of work-related adverse health events  
| (percentages in brackets) |
|---------------------------|----------------|----------------|----------------|----------------|
|                           | Needlestick injury in previous year | Work injury excl eyes | Violent or abusive incident | Workplace bullying |
| **Gender**                | Male 53 (13.9) | 83 (22.0) | 113 (29.5) | 57 (14.8) |
|                           | Female 42 (23.3)| 48 (27.1) | 48 (26.7) | 51 (28.3) |
| **Age group (years)**     | Less than 40 39 (20.5) | 37 (19.5) | 48 (25.3) | 37 (19.5) |
|                           | 40 to 49 21 (13.3) | 38 (24.5) | 50 (31.8) | 41 (25.9) |
|                           | 50 or more 34 (16.0) | 55 (26.3) | 62 (29.0) | 29 (13.5) |
| **BMI**                   | Up to 25 60 (20.3) | 71 (24.5) | 77 (26.1) | 60 (20.3) |
|                           | 26 or more 23 (11.9) | 46 (23.7) | 70 (35.7) | 39 (19.9) |
| **Employment status**     | Employee 48 (24.6) | 40 (20.8) | 53 (27.2) | 48 (24.6) |
|                           | Self-employed 47 (13.0) | 90 (25.1) | 105 (28.9) | 59 (16.2) |
| **Days worked when not well** | 5 or less 67 (15.4) | 94 (22.0) | 114 (26.2) | 78 (17.9) |
|                           | 6 or more 25 (24.0) | 33 (32.0) | 37 (35.6) | 26 (25.0) |
|                           | All combined 95 (23.6) | 131 (23.6) | 161 (28.6) | 108 (19.1) |

*P < 0.05  **P < 0.01  ***P < 0.001
Employee dentists, women and those with a BMI less than 25 were most likely to have experienced a needlestick injury in the previous year. Dentists who reported that they had worked 6 or more days when they felt unwell in the previous year were more likely to have experienced an eye injury, needlestick injury or other work injury.

Almost one-fifth (97, 19.1%) of dentists reported that they had experienced workplace bullying; this proportion was higher among females, those aged between 40 and 49, and employee dentists were more likely to have experienced workplace bullying than their colleagues. Individuals who had taken four or more days off work due to illness in the last year were also more likely than their colleagues to have reported experiencing workplace bullying (26, 29.2% and 82, 17.8% respectively, P<0.05). Respondents who drank more heavily were least likely to report that they had experienced workplace bullying; 25 dentists (13.8%) who reported consuming more than 7 units of alcohol per week had experienced workplace bullying, compared to almost one-quarter (61, 23.2%) of those who drank 1-7 units per week and more than one-quarter (11, 25.6%) of those who did not consume alcohol (P<0.05). Although more NZ-trained than overseas-trained dentists drank 7 or more units per week (174, 41.1% and 36, 27.3% respectively, P<0.001), there were no significant differences between the two groups with respect to their experience of workplace bullying.

A greater proportion of dentists working in solo practice had experienced a violent or abusive incident than those in group practice (53, 36.6% and 106, 25.7% respectively, P<0.05). Conversely, a greater proportion of dentists working in group practice had experienced an eye injury than those in solo practice (62, 15.0% and 12, 8.3% respectively, P<0.05). There were no differences in practitioners’ experience of work-related adverse health events by the number of patients seen daily.
4.8.7 Dermatoses

Data on practitioners’ experience of dermatitis-type conditions are presented in Table 4.32.

Table 4.32 Prevalence of practitioners’ dermatitis-type conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>During the previous 12 months</th>
<th>During practising life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red swollen hands</td>
<td>25 (4.4)</td>
<td>30 (5.3)</td>
</tr>
<tr>
<td>Red hands or fingers</td>
<td>33 (5.8)</td>
<td>53 (9.4)</td>
</tr>
<tr>
<td>Dry cracked hands</td>
<td>118 (20.8)</td>
<td>156 (27.6)</td>
</tr>
<tr>
<td>Vesicles on hands or fingers</td>
<td>29 (5.1)</td>
<td>47 (8.3)</td>
</tr>
<tr>
<td>Scaling hands or fingers</td>
<td>43 (7.6)</td>
<td>55 (9.7)</td>
</tr>
<tr>
<td>Itching hands or fingers</td>
<td>116 (20.5)</td>
<td>158 (27.9)</td>
</tr>
<tr>
<td>Irritation of eyes, airway or nose</td>
<td>160 (28.3)</td>
<td>180 (31.9)</td>
</tr>
<tr>
<td>Any symptom</td>
<td>267 (47.2)</td>
<td>317 (56.0)</td>
</tr>
</tbody>
</table>

Dry cracked hands, itching hands or fingers, and irritation of the eyes, airway or nose were the most commonly experienced problems. A greater proportion of females than males reported experiencing each of the dermatitis symptoms in the previous 12 months, except for vesicles on hands or fingers and scaling of the hands or fingers (data not shown). They also reported a higher experience of most symptoms within their practising lives. A larger proportion of younger than older dentists reported having experienced red hands and fingers, dry cracked hands, vesicles on hands or fingers, and itching of hands and fingers in the previous 12 months. They were also more likely to report having experienced dry cracked hands or itching hands or fingers during their practising life (data not shown). Dentists who treated fewer patients per day had a higher prevalence of dermatitis-type symptoms than those who treated more patients per day (143, 46.9% and 90, 37.0% respectively, P<0.05).
### 4.8.8 Headaches and temporomandibular joint pain

Data on respondents’ experience of headaches and temporomandibular joint (TMJ) pain are presented in Table 4.3

**Table 4.3** Practitioners’ experience of headaches and temporomandibular joint pain (percentages in brackets)

<table>
<thead>
<tr>
<th></th>
<th>Headaches in last 12 months</th>
<th>Length of time with headaches in last 12 months</th>
<th>TMJ pain in last 12 months</th>
<th>Length of time with TMJ pain in last 12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Up to 1 week 8 days or more</td>
<td>Up to 1 week 8 days or more</td>
<td>Up to 1 week 8 days or more</td>
</tr>
<tr>
<td>Male</td>
<td>208 (54.5)c</td>
<td>340 (88.3)</td>
<td>45 (11.7)f</td>
<td>51 (13.3)f</td>
</tr>
<tr>
<td>Female</td>
<td>145 (80.6)</td>
<td>135 (74.6)</td>
<td>46 (25.4)</td>
<td>50 (27.8)</td>
</tr>
<tr>
<td>Trained in NZ</td>
<td>257 (59.8)b</td>
<td>369 (85.4)</td>
<td>63 (14.6)</td>
<td>78 (18.1)</td>
</tr>
<tr>
<td>Trained overseas</td>
<td>96 (72.7)</td>
<td>106 (79.1)</td>
<td>28 (20.9)</td>
<td>23 (17.4)</td>
</tr>
<tr>
<td>Employee</td>
<td>135 (69.6)a</td>
<td>162 (83.1)</td>
<td>33 (16.9)</td>
<td>45 (23.1)a</td>
</tr>
<tr>
<td>Self-employed</td>
<td>216 (59.5)</td>
<td>308 (84.2)</td>
<td>58 (15.8)</td>
<td>56 (15.4)</td>
</tr>
<tr>
<td>0-39 years</td>
<td>145 (76.3)c</td>
<td>148 (77.9)</td>
<td>42 (22.1)f</td>
<td>49 (25.8)</td>
</tr>
<tr>
<td>40-49 years</td>
<td>106 (67.1)</td>
<td>130 (81.8)</td>
<td>29 (18.2)</td>
<td>36 (22.8)</td>
</tr>
<tr>
<td>50+ years</td>
<td>101 (47.4)</td>
<td>179 (91.2)</td>
<td>19 (8.8)</td>
<td>16 (7.5)</td>
</tr>
<tr>
<td>Up to 12 pts per day</td>
<td>200 (66.0)</td>
<td>247 (81.0)</td>
<td>58 (19.0)</td>
<td>64 (21.1)a</td>
</tr>
<tr>
<td>13 or more pts per day</td>
<td>140 (58.1)</td>
<td>212 (87.2)</td>
<td>31 (12.8)</td>
<td>33 (13.6)</td>
</tr>
<tr>
<td>All combined</td>
<td>353 (62.8)</td>
<td>475 (83.9)</td>
<td>91 (16.1)</td>
<td>101 (17.8)</td>
</tr>
</tbody>
</table>

*p < 0.05  p<0.01  p<0.001
More females and employee dentists had experienced headaches and temporomandibular joint (TMJ) pain in the previous year than other dentists, as had overseas-trained dentists, while more of those treating fewer than 12 patients per day reported experiencing TMJ pain than busier colleagues. The prevalence of symptoms of headaches and temporomandibular pain in the last 12 months was lowest in the oldest age group and highest in the youngest age group.

### 4.8.9 Musculoskeletal problems

Data on the musculoskeletal symptoms experienced by respondents are presented in Table 4.34.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Symptoms in last 12 months N (%)</th>
<th>Symptoms preventing normal tasks N (%)</th>
<th>Symptoms last 7 days N (%)</th>
<th>Days off work due to symptoms in last year N (range of days)</th>
<th>Seen health professional due to these symptoms in last 12 months N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neck</td>
<td>332 (58.7)</td>
<td>65 (11.5)</td>
<td>112 (19.8)</td>
<td>17 (1-7)</td>
<td>129 (22.8)</td>
</tr>
<tr>
<td>Shoulders</td>
<td>257 (45.4)</td>
<td>52 (9.2)</td>
<td>95 (16.8)</td>
<td>12 (1-7)</td>
<td>115 (20.3)</td>
</tr>
<tr>
<td>Elbows</td>
<td>57 (10.4)</td>
<td>15 (2.7)</td>
<td>23 (4.1)</td>
<td>2 (1-7)</td>
<td>22 (3.9)</td>
</tr>
<tr>
<td>Wrists/hands</td>
<td>141 (24.9)</td>
<td>49 (8.7)</td>
<td>56 (9.9)</td>
<td>4 (1-88)</td>
<td>43 (7.6)</td>
</tr>
<tr>
<td>Upper back</td>
<td>169 (29.9)</td>
<td>41 (7.2)</td>
<td>70 (12.4)</td>
<td>7 (1-3)</td>
<td>79 (14.0)</td>
</tr>
<tr>
<td>Lower back</td>
<td>325 (57.4)</td>
<td>86 (15.2)</td>
<td>120 (21.2)</td>
<td>16 (1-48)</td>
<td>128 (22.6)</td>
</tr>
<tr>
<td>Hips/thighs</td>
<td>84 (14.8)</td>
<td>19 (3.4)</td>
<td>30 (5.3)</td>
<td>2 (1-8)</td>
<td>40 (7.1)</td>
</tr>
<tr>
<td>Knees</td>
<td>118 (20.8)</td>
<td>26 (4.6)</td>
<td>54 (9.5)</td>
<td>5 (1-32)</td>
<td>47 (8.3)</td>
</tr>
<tr>
<td>Ankles/feet</td>
<td>74 (13.1)</td>
<td>21 (3.7)</td>
<td>34 (6.0)</td>
<td>3 (1-4)</td>
<td>34 (6.0)</td>
</tr>
</tbody>
</table>
There was a high prevalence of neck, shoulder and back pain, with almost one-fifth of dentists having experienced neck pain, and a further one-fifth having experienced lower back pain in the previous seven days. Although almost half had experienced neck pain within the previous 12 months, only one-third had experienced symptoms in the preceding 7 days. Few dentists had taken time off work due to musculoskeletal symptoms in the previous year, but many had required care from a health professional. Dentists who were overweight were more likely than their lighter colleagues to have experienced elbow pain (25, 13.4% and 22, 7.9% respectively, P<0.05), knee pain (48, 26.5% and 53, 18.9% respectively, P<0.05) or ankle or foot pain (36, 19.9% and 32, 11.3% respectively, P<0.01) in the previous 12 months. Female dentists had a higher prevalence of most types of musculoskeletal pain than male dentists, including: shoulder (100, 57.5% and 157, 42.4% respectively, P=0.001), neck (128, 72.3% and 204, 54.5% respectively, P<0.001), wrist/hand (62, 35.6 and 79, 21.5% respectively, P<0.001), and upper back pain (62, 35.6% and 79, 21.5% respectively, P<0.001). Conversely, male dentists had a higher prevalence of elbow pain (46, 12.6% and 11, 6.4% respectively, P<0.05). Dentists who treated fewer patients per day had a higher prevalence of some musculoskeletal symptoms than their colleagues who treated more patients including; shoulder pain (149, 50.9% and 100, 42.4% respectively, P<0.05), neck pain (194, 64.9% and 130, 55.1% respectively, P<0.05), and wrist/hand pain (85, 28.9% and 51, 21.9% respectively, P<0.05).
Chapter 5  

Discussion

5.1 Introduction to the Chapter

In this chapter, the findings of the studies are discussed, with reference to the recent literature on each topic. Each study is discussed in turn, with comparisons being made between studies where appropriate. Finally, the findings are brought together and discussed in terms of their contribution to our knowledge and understanding of the NZ dental workforce.

5.2 The working practices and job satisfaction of male and female dentists in New Zealand - the Gender Study

5.2.1 Introduction

This cross-sectional study investigated the working practices and job satisfaction of a random sample of 468 male and 382 female dentists. The aim of the study was to describe and compare the working practices and job satisfaction of a representative sample of male and female dentists. A greater proportion of female dentists had taken a career break of six weeks or more, with the main reason being to care for children. Larger proportions of women worked as associates in practice (rather than owning their own practice), and worked part-time. Men were more active in continuing professional education and had higher mean career satisfaction scores.

5.2.2 Strengths and weaknesses of the study

Before discussing the study’s findings in detail, it is appropriate to examine its weaknesses and strengths. The response rate of 78.1%, although not ideal, is typical of this type of study (Locker, 2000; Newton et al., 2002). Because the survey was anonymous, it is not possible to accurately determine the differences between responders and non-responders. The response rate was higher for women than men, perhaps because of women’s greater
interest in the issues being investigated. The respondents were slightly younger than the dental profession overall. This can be explained by the fact that there were higher proportions of women in the study than in the dental profession as a whole, and that, in NZ, female dentists are (on average) ten years younger than their male counterparts (Ayers et al., 2008a). Similarly, a slightly lower percentage of dentists in the sample than in the entire dental profession were NZ graduates. Females comprise a higher proportion of the overseas graduate dentists in this country. The main emphasis of the study was the differences in working practices by gender, so women were purposively sampled in order to maximise the power of the study. Owing to the sample including only dentists with a current APC, we excluded most of those who were either working overseas or on a career break lasting longer than a year. Thus, valuable information about dentists on extended career breaks or working overseas was not able to be obtained.

5.2.3 Career breaks

5.2.3.1 Current career breaks

Although only 36 respondents were taking a career break at the time of the study, females far outnumbered males in this group. In accordance with previous findings (Murray, 2002), almost half of those on career breaks were caring for children. Almost one-third had been off work for more than a year but still held an APC. Despite holding an APC, approximately one-third of those on a career break were either not planning to recommence their dental career or were unsure. Newton and colleagues (2001) reported that 50% of dentists on career breaks did not plan to return to the occupation.

5.2.3.2 Previous career breaks

Although more women than men had taken a career break, there was no gender difference in the length of those breaks. However, there were gender differences in the reasons for taking time off, with most women (but very few men) doing so to care for children. Larger proportions of men had had time off because they were either seeking work, or having a break for study or because of personal choice. Newton et al. (2001, 2000b) reported that
around 60% of female and 30% of male dentists in the UK had taken a career break. The main reason for men taking a break was personal illness; for women, it was child-rearing. In contrast to the current study's findings, UK women took longer career breaks than males. However, when child-rearing was excluded, there were no gender differences in the proportion taking career breaks (Newton et al., 2000b). It has been suggested that, in the UK, female dentists take shorter career breaks than previously (Seward and McEwan, 1987).

Career breaks have also been associated with shorter working hours on return to the profession. Newton and colleagues (2001) calculated that female dentists who take a career break have a working life which is approximately 25% shorter than dentists who do not. It is likely that a similar situation exists in NZ, as more women than men had taken a career break, and more women than men worked part time. In addition, women dentists in our study planned to retire earlier than their male colleagues.

5.2.3.3 Difficulties returning to work

It is unclear why more women than men in our study reported experiencing difficulty returning to work after a career break, particularly given that there were no gender differences in the length of career breaks. It may be that when women return to work after having children, they are then striving to balance their careers with the demands of motherhood. Pack et al. (1987) also reported that many women experience difficulties upon their return to dentistry after a career break. In the current study, there was considerable respondent interest in participating in a refresher course before returning to work, presumably for those who had taken extended periods of leave. However, in the UK, females' utilisation of schemes such as “Keeping in Touch” and “Getting Back to Practice” has not been as great as had been expected (Murray, 2002). It is not clear whether such a programme would be of value in NZ, particularly given the lower numbers which would be involved.
5.2.4 Current working practices

5.2.4.1 Practice ownership

As has previously been reported in the UK (Murray, 2002; Newton et al., 2000a) and the USA (American Dental Association, 1997), a larger proportion of male (than female) dentists in the current study owned their own practice, with relatively more women working as associates. For women who work part-time, practice ownership may not be economical; they may also wish to avoid the extra stress and responsibility involved in practice ownership (such as employing staff, equipment maintenance, and so on). A larger proportion of women than men worked in the hospital setting. A pattern of more women dentists working for a salary in publicly-funded clinics or Universities has also been reported elsewhere (Naidoo, 2005; Kruger and Tennant, 2004; Newton et al., 2000b; De Wet et al., 1997). This too may reflect a desire (or necessity) to work set hours and avoid the additional commitment and responsibility of running a practice. Anecdotal evidence suggests that many male dentists employ their wives to assist in the day-to-day running of the dental surgery, but the converse is less commonly seen.

5.2.4.2 Hours of work

In the current study, women worked seven hours fewer per week (on average) than their male counterparts. With the increasing proportion of women in the dental workforce, this represents a steadily increasing loss of “manpower hours” (and, by implication, productivity); a situation that is likely to be compounded as greater numbers of women enter undergraduate dental training in NZ (Rich, 2006). Larger proportions of women than men work part-time, and the reasons most often given for part-time employment are caring for children and personal choice (Matthews and Scully, 1994; Murray, 2002; Newton et al., 2000b). It may also reflect (or explain) the fact that fewer female than male dentists reported being the principal income earners in their family. If the income is not essential for the household, women may be less likely to work full-time. Similar observations have been reported from other recent studies (Naidoo, 2005; Kruger and Tennant, 2004; Murray, 2002; De Wet et al., 1997; Matthews and Scully, 1994; Brennan et al., 1992;).
5.2.4.3 Influence of children on working practices

Previous research indicates that it is only after the birth of children that male and female work patterns differ (Matthews and Scully, 1994; Brennan et al., 1992; Price, 1990; De Wet et al., 1997; Newton et al., 2000b; Seward and McEwan, 1987; Baldwin et al., 1998). For example, Newton and colleagues (2000b) reported that, in the UK, male dentists work more hours when they have childcare responsibilities, while their female colleagues work fewer hours. Presumably this is because the male dentists feel that they need to work more to support the family, while females are more likely to have the principal responsibility for looking after the children (and, according to our study, are less likely to be the principal bread winner). In a study of women dentists in the US, the likelihood of working more than 29 hours per week was lower with greater numbers of children (Price, 1990). Brennan and colleagues (1992) reported that the annual hours worked in Australian dental practice were the least for women with children aged younger than two years, intermediate for those with older children, and greatest for those with no dependent children. By contrast, men with children aged younger than two years worked the longest hours, while those with older children continued to work significantly more hours per year than those with no children. Consistent with the findings of Brennan et al., Matthews and Scully (1994) reported that female dentists worked more hours as their children get older; they concluded that women are only temporarily less productive in the dental labour force. Furthermore, it has been reported that women without children tend to follow a 'perceived male work pattern' (McEwan and Seward, 1988).

Gender working patterns may vary by locality. For example, Kruger and Tennant (2004) found that, in rural and remote Western Australia, dentists without children worked longer hours than those with children, irrespective of dentist gender.

The issues discussed above are not unique to dentistry; similar work patterns and gender issues have been reported in medicine and in general (Paice, 2001).
5.2.5 Student loans

In the present study, significantly more female than male dentists had a student loan. It is assumed that these loans arose predominantly from undergraduate education. Women dental graduates in the US have been reported to have almost twice the educational debt of male dental graduates. Female dentists also had more debts of other types than male dentists (American Dental Association, 1997). As women, on average, work fewer hours than men, and are more likely to take career breaks, it follows that it will take them longer to pay back their student loans. Furthermore, it has frequently been reported that female dentists earn less than male dentists, even when controlling for factors such as hours worked, size of practice, age of practitioner and number of employees (Devlin 1989, cited by Stokes et al., 1992; Brown and Lazar, 1998). This makes it more difficult to repay debt (particularly as, in NZ, student loan repayments are based on level of income and are removed at source with income tax for employees). Women have also been reported to hold lower positions within academia and other publicly funded dental jobs (Newton et al., 2000a; Spencer and Lewis, 1988). However, more recent research suggests that (at least in the USA) gender is now not such a strong determinant of dentists’ income, with multiple regression models showing no influence of dentists’ gender on total income (del Aguila et al., 2005). The authors did report, however, that female dentists worked approximately 10% fewer days, treated around 10% fewer patients and performed about 10% fewer procedures and therefore earned 10% less than male dentists (del Aguila et al., 2005).

The extent to which debt influences the work/life decisions of students and health professionals in areas such as vocational training, career choice, work location and deciding whether and when to leave and return to NZ is unclear (Medical Reference Group, 2006). Government student loans are now interest-free while graduates are working in NZ. This reflects the efforts of the Government to encourage recent graduates to stay in NZ, thereby reducing the “brain drain”. However, the policy will also be of assistance to female (and male) graduates who choose to work part-time, as the size of their loans will not increase while their income levels are reduced (as was previously the case). It has been reported that medical graduates leave University with higher levels of debt than non-medical students, but repay the loans at a much faster rate than other graduates (Medical
Reference Group, 2006), presumably because of their higher-than-average income. It is highly likely that a similar situation exists for dental graduates.

5.2.6 Postgraduate education

In this study, more male than female dentists held postgraduate qualifications. This may reflect males’ greater interest in (or opportunity for) postgraduate training, or perhaps that males are more able to fit postgraduate study into their schedules. It could (in part) be explained by the fact that the women respondents were, on average, 10 years younger than the male participants and some may not yet have undertaken planned post-graduate education. Women (particularly those with children) may find it more difficult to commit to postgraduate study. Naidoo (2005) reported from a survey of 280 female dentists in South Africa that few had specialised, but up to 68% of respondents would like to have done. Reasons for not having undertaken further education included home responsibilities, inflexible working conditions, financial constraints, lack of career guidance, unavailability of part-time training and geographical location of training facilities. These results should be interpreted with caution however, as the response rate of the study was only 29%.

Lower incomes of female dentists may be another factor contributing to the lower participation of female dentists in continuing education, as they may be reluctant to undertake postgraduate qualifications (at considerable expense and with a temporary loss of income) when they still have a large undergraduate loan.

More male than female dentists were registered as specialists, indicating either that men were more interested in specialist work or found it easier to complete specialist training. In the past this was usually a Masters’ degree, but the School of Dentistry now offers a Doctor of Clinical Dentistry (DClinDent). Newton and colleagues (2000b) reported that men were four times more likely to take time off for study than were women (the ratio was 2.6 times in the current study, but the confidence intervals for the estimates for males and females overlapped, meaning that there was no statistically significant difference between the two studies), although the number of postgraduate qualifications achieved by men and women were equivalent. That most women who had specialised either did so before having
children, or did not have children, suggests that it is difficult to undertake specialist training as a mother. This did not appear to be such a big issue for men, as 43% of male respondents had undertaken specialisation around the time their children were born, and 22% after having children. Anecdotal evidence suggests that several issues are involved, including the need to move to Dunedin (or overseas) to undertake specialist training, and the considerable time and financial commitment required.

5.2.7 Continuing Professional Development (CPD)

5.2.7.1 Overview

Overall, NZ dentists in this study were active in continuing education with 88% belonging to NZDA; 59% reading two or more journals regularly; and 74% undertaking at least 20 hours of CPD in the previous year. Almost two-thirds had been to a NZDA branch meeting in the last year.

A fairly recent review of the continuing education activity of dentists in the UK found that 98% read at least 1 journal regularly; 66% read between one and three different journals, 29% between four and six, and 3% read seven or more. Almost all (98%) had attended a course and 46% had attended a conference in the previous year, and 83% belonged to a professional organisation or society. Almost one-third were members of a journal club or study group. However, only 28% had used a computer-assisted learning (CAL) package and 11% had undertaken clinical audit in the preceding year. Characteristics of dentists affecting participation in at least 50 hours of CPD included less experience as a dentist, holding a post-graduate qualification, undertaking part-time educational related work (such as tutoring), being an owner or partner of a practice, and working in a group practice (Bullock et al., 2003). The findings of this study should be interpreted with caution, as, at 54%, the response rate was not ideal.

5.2.7.2 CPD and gender

Although the current data compared favourably with the review of continuing education activity of UK dentists discussed above (Bullock et al., 2003), some areas for improvement
were identified. In the NZ study, male dentists were more active in CPD, as indicated by memberships of dental societies, regularity of reading dental journals and attendance at formal CPD, than their female colleagues. Recent UK findings are unclear as to whether women read professional journals less frequently than men (Newton et al., 2000b; Buck and Newton, 2002), although female dentists have been reported to spend less time at continuing education courses than males (Buck and Newton, 2002). This is of concern, as dentists who do not attend continuing education sessions are at greater risk of professional isolation.

There may remain the perception that membership of dental colleges and societies is more of a male domain. For example, more male than female dentists belonged to the Royal Australiasian College of Dental Surgeons, and fewer women reported that they found dental branch meetings useful or that they felt welcome at them. Perhaps existing dental meetings need to be made more female-friendly; alternatively, additional groups could be formed that cater more to the specific needs of women. For example, study groups could take place within school hours, with topics of greater interest to female practitioners, as it might be that women have different interests within dentistry than men. Thought should be given to measures that can make continuing education more readily achievable for women (such as the availability of childcare at conferences and web-based learning). While women need to take responsibility for their own education (and are quite capable of organising their own study groups!), course organisers should make an effort to ensure that they can access continuing education as easily as men.

5.2.7.3 CPD and rural practitioners

Access to CPD (including peer contact) can be more difficult for rural practitioners. It has been suggested that solo-practitioners in particular are more isolated and at greater risk of being out of date, and that peer review is particularly important for this group (Maidment, 2006). In particular, dentists in solo-practice may have less flexibility making it more difficult to get time off practice to attend conferences and courses. Bullock et al. (2003) reported that some dentists (20%) desired greater access to media-based CPD (such as CAL, internet, CD-roms, and videos), and the authors suggested that greater availability or awareness of CAL packages and internet might result in higher rates of participation in
continuing education. (Bullock et al., 2003). Of course the use of such media has increased substantially since this study was published; high quality continuing education programmes are available via the internet and by DVD.

5.2.8 Career satisfaction

5.2.8.1 Overview

Overall career satisfaction appeared higher than in a recent UK study, in which just under half agreed with a statement that they wished to change career, and 57% agreed that they were satisfied with their career in dentistry, with no differences in job satisfaction by age or gender (Gilmour et al., 2005). Harris and colleagues (2008) subsequently reported that, for dentists in the UK, global job satisfaction was linked with their type of practice (general dental service, personal dental service, private practitioner or mixed), with 46.2% of NHS practitioners but 83.3% of private practitioners being satisfied or very satisfied with their job.

Job satisfaction of dentists appears to vary substantially by country; only 41% of a sample of dentists from Turkey were satisfied with their jobs (Sur et al., 2004), while as many as 81% of dentists were satisfied with their jobs in Lithuania (Puriene et al., 2008). A recent study of dentists in South Korea reported that 51% were neutral and only 36% were satisfied with their job (Jeong et al., 2006). In comparison, de Wet and co-workers (1997) found that 61% of male and 65% of female practitioners in South Africa would choose dentistry as a career again. In the USA, Logan and colleagues (1997) reported that approximately 60% of Iowa dentists were satisfied with their careers, while Shugars et al. (1990) found that 50% of Californian general dental practitioners were satisfied. In the 1995 Survey of Dentists in the USA, 62% of male and 57% of female dentists were “very satisfied” with their profession (American Dental Association, 1997). However, it is difficult to accurately compare levels of career satisfaction across studies because of the different ways in which it has been measured in each study. Differences in working environments and personal backgrounds may explain some of the inter-country variation.
5.2.8.2 Career satisfaction and gender

In the current study, more male than female dentists stated that dentistry had fulfilled their career expectations, and that they would choose to study dentistry again; moreover, their mean career satisfaction score was higher. Recent overseas studies have reported reasonable levels of career satisfaction for female dentists, although comparison was not made with their male colleagues. Murray (2002) reported that two-thirds of a sample of women dentists in the UK said that their dental career had fulfilled their expectations, that they would choose to study dentistry again, and that they recommended dentistry to other women. More recently, Naidoo (2005) reported that 67% of female dentists in South Africa said that their dental career had fulfilled their expectations, and 65% had recommended dentistry as a career option to other women.

There are several possible reasons for women having lower career satisfaction than men (as was seen in the current study). The lower incomes earned by female dentists may be a factor, as net income has been reported to be the single most important indicator of the economic attractiveness of a career in dentistry (Brown and Lazar, 1998), and an important factor relating to dentists' job satisfaction (Anderson, 1995; Jeong et al., 2006; American Dental Association, 1997). Some women may feel that they do not reach their full potential in dentistry, perhaps because they are concurrently managing a household and family, or are unable to undertake postgraduate study. They may feel that their partner's career assumes more importance. Women are also more likely to take responsibility for dependent parents and this may impact on their career (Paice, 2001). Although female dentists are more likely to work in the public sector (Kruger and Tennant, 2004), women tend to be under-represented in senior academic and management positions, and in the top distinction awards (Paice, 2001). A salaried position may restrict the extent to which a dentist can control her work environment and this (in turn) may impact on job satisfaction.

In the current study, almost half of male (but only one-quarter of female) dentists considered that their partner had made career adjustments to suit their dental career. Lack of flexibility on the partner's part might limit a woman's career opportunities. Because only 35% of females (but 85% of males) were the principal earners in their family, it might
be unrealistic to expect the partners to make such adjustments; conversely, if they had, perhaps more women would subsequently be the main breadwinner!

5.2.8.3 Career satisfaction and specialisation

In the current study, the career satisfaction of dental specialists was higher than that of general practitioners. Such an association between specialty training and career satisfaction has been reported in other studies. Denton and colleagues (2008) and Jeong and colleagues (2006) found an association between postgraduate education and work engagement. A study of dentists working in Lithuania (Puriene et al., 2007) found that postgraduate study had a more positive impact on overall job satisfaction than characteristics of the work environment. Gilmour and co-workers (2005) found that dentists with a special area of interest (even if they were not registered as specialists) had higher job satisfaction than other dentists in Staffordshire (UK). In the US Survey of Dentists (American Dental Association, 1997), female specialists were more likely than male specialists, or general practitioners of either gender, to be satisfied with their job.

Specialisation could be one means of improving career satisfaction for some female dentists, although this would be tempered by the expense and stress associated with specialist training. A better alternative might be restructuring general practice to increase satisfaction. This might include greater use of auxiliaries to undertake the more mundane or repetitive tasks, leaving the general practitioner to undertake the more complex and rewarding (mentally and financially) aspects of dentistry. Improving access to continuing education and peer support might also improve the career satisfaction of female practitioners.

5.2.9 Retirement from dentistry

It has been estimated that, in the USA, 85% of dentists retire between 55 and 65 years of age, with the mean age at retirement being 62 years (Beazoglou et al., 2000). However, this calculation was based on data from 1985, which is now quite out of date. In the present study, 58% of dentists indicated that they plan to work beyond 60 years of age. There were
differences in retirement plans by gender; almost two-thirds of women in the current study planned to retire before 60 years, whereas fewer than one-quarter of men planned to do so.

The anecdotal reports of dentists experiencing difficulties in selling their practices, and the reduced ability to claim a significant ‘good will’ payment may force dentists to practise longer before being financially able to retire. Historically, many dentists have relied on the sale of their practice to support their retirement. In a recent study from the USA, it was reported that almost three-quarters of dentists were moderately, heavily or exclusively dependent on the sale of their practices to finance retirement (Beazoglou et al., 2000). Fortunately, the lower number of NZ dental graduates choosing to work in NZ and purchase dental practices is being offset to a degree by new immigrant dentists. However, it appears that dentists who are new to NZ tend not to consider practice ownership in the first few years (Ayers et al., 2008b).

5.2.10 Implications of the findings

Data from this study confirm anecdotal reports that women are less active in the dental workforce than men: a larger proportion of women than men take career breaks; women, on average, work fewer hours per week than men; and women dentists plan to retire earlier than male dentists. This suggests that, over a practising lifetime, female dentists will work considerably less than male dentists. This will serve to further attenuate the dentist:population ratio in the future, particularly if large numbers of women continue to enter dental training. Given that New Zealand’s dentist:population ratio was 40.9 FTE dentists per 100,000 population in 2006 (Shearer et al, 2007), and the population is projected to increase further over the next 25 years, this is an area of concern. New Zealand’s dentist:population ratio is already considerably lower than that of many other developed countries including Iceland (93.6), Germany (78.4), United States (58.7), the United Kingdom (49.3) and Australia (49.2; Shearer et al, 2007).

Female dentists in NZ are less active in continuing education, less likely to have specialised, and more likely to have a student loan than their male counterparts. They also report lower levels of career satisfaction. Further research to determine ways to improve
the career satisfaction of female dentists would be useful; if women had greater career satisfaction, they might choose to spend more time in the dental workforce.

5.3 The working practices and job satisfaction of dental therapists in New Zealand - the Therapist Study

5.3.1 Introduction

This study examined the working patterns and career satisfaction of dental therapists who were listed on the Dental Council of New Zealand's database in September 2004. The aim of the study was to investigate the working patterns, continuing education commitment, and career satisfaction of dental therapists in New Zealand. Dental therapists who participated in the study had a relatively high mean career satisfaction, but were not satisfied with their income, and only 41% felt a valued part of the dental community. Over half of the dental therapy workforce plans to retire within 10 years.

5.3.2 Strengths and weaknesses of the study

Despite the study's high response rate (83%), it was not possible to accurately determine how responders differed from those who chose not to participate. However, the demographic details of the respondents were found to be almost identical to those reported in the 2003 dental therapy workforce survey (Dental Therapy Technical Advisory Group, 2004) in which 80% were aged over 40, 91% were NZ European, and 98% were female. Estimates from the present study are 83%, 91% and 98% respectively. Thus, assuming that responders did not differ from non-responders with respect to other characteristics, the sample can be considered to be representative of practising dental therapists in NZ.

Individuals who have previously worked in dental therapy but who had not applied for registration as a dental therapist (that is, they were no longer practising dental therapy) were not able to be included in the study due to the extreme difficulty identifying and recruiting them. This problem will perhaps have led to the loss of valuable information.
5.3.3 Characteristics of the respondents

Dental therapists in NZ are nearly all female, and, in this study, had an average age of just under 48 years. This group is unique in the health workforce. For example, although nursing is traditionally considered to be a female-dominated occupation, and there are concerns about the aging nursing workforce, 9.2% of nurses employed by DHBs are male and the mean age is considerably less, at is 43 years (District Health Boards New Zealand, 2007). There is certainly a cause for concern about the future of the dental therapy workforce!

On a more positive note, about one in ten of respondents self-identified as Māori and 1.2% as Pacific. This compares more favourably with the nursing workforce, in which 4% self-identify as Māori and 2% of Pacific Island ethnicity. However, in the DHBNZ report, ethnicity data were missing for almost 25% of health workers (District Health Boards New Zealand, 2007). Māori and Pacific are still under-represented in the dental therapy workforce as, in the 2006 Census, 14.6% of individuals identified as Māori and 6.9% as Pacific.¹

5.3.4 Current working practices

As expected, most respondents were employed as dental therapists within the SDS. Most dental therapists worked in more than one clinic, with one-quarter working in at least five. This reflects the current SDS delivery model, which utilises many school dental clinics for relatively brief periods over the year (Ministry of Health, 2003). This is likely to change as the new “hub-and-spoke” model of the modified child and adolescent oral health service is implemented over the next few years (Ministry of Health, 2006a).

Because very few respondents were interested in working longer hours (and many more would prefer to do fewer hours), inviting therapists to work more hours may not be a

¹ www.stats.govt.nz
viable option for increasing the productivity of the workforce. However, there is potential for greater utilisation of assistants, as almost half the respondents stated that they rarely or never used a dental assistant. When aided by a dental assistant, the clinical productivity of a dental therapist can be increased by 40%.²

5.3.5 Clinical duties

The main duties undertaken regularly by therapists were basic services such as dental examinations, restorations, fissure sealants, and the removal of primary teeth. Some therapists perform pulpotomies (although pulp capping was a more frequently used procedure), but the placement of stainless steel crowns was rare. It is likely that, subsequent to this survey, the proportion of dental therapists providing pulpotomies and stainless steel crowns has increased, as training modules have been developed to teach these procedures to dental therapists, and the HPCA allows therapists to hold such additional scopes of practice. The emphasis on dental health education was not as great as on basic restorative services, perhaps because therapists in this study felt that it was more important to spend the limited clinical time available treating existing disease. It is hoped that the reconfiguration of child and adolescent oral health services will result in a greater emphasis on dental disease prevention and early intervention (Ministry of Health, 2006b).

5.3.6 Continuing professional development (CPD)

Most of the dental therapists who participated in this study were actively involved in continuing education (through reading journals and attending courses). This reflects commendable efforts by the profession and their employers to maintain their fitness to practise. However, with the implementation of the HPCA Act, all dental therapists will now need to meet the annual CPD requirements. There is anecdotal evidence that dental therapists expect their employers to fund them to attend continuing education sessions during their practising hours. Most DHBs provide CPD days once or twice a year during the school holidays, but dental therapists are invited more frequently to attend courses.

² Personal communication; Diane Pevreal, Manager, School Dental Service, Waikato District Health Board
throughout the year alongside other oral health professionals. This (now compulsory) time out of clinical practice will impact on the number of “chairside hours” each dental therapist works annually.

5.3.7 Career breaks

Most respondents had taken at least one career break, with a mean total time taken of 6.5 years per dental therapist. This represents a considerable loss in “workforce” hours. Older therapists had taken more time off than younger therapists, probably because they had been in the workforce for longer. As might be expected in a predominantly female workforce, child rearing was the main reason given for taking career breaks. The mean period taken off for child-rearing was longer for therapists in the older age group. This may be partly because the younger therapists have not yet finished having their families, but may also indicate that career breaks for child rearing are shorter now than previously. It is unknown how many dental therapists choose not return to the workforce after raising children. Extended holiday or travel was another common reason for breaks, although their mean duration was much shorter than those for child rearing, and it was similar for both age groups. Initiatives to reduce the length of career breaks taken by dental therapists could potentially increase workforce productivity. The availability of good-quality, affordable childcare is of prime importance in this respect, and the financial advantage of returning to work must considerably outweigh the cost of the required childcare. Refresher courses for dental therapists wishing to return to clinical practice have recently become available in NZ, and uptake has been promising.3

5.3.8 Career satisfaction

Career satisfaction in this study was relatively high (at 7.1 on a 10-point scale), and similar to that reported for UK dental therapists (mean score 7.3; Gibbons et al, 2000). By contrast, dental nurses in Trinidad and Tobago (TT) were reported to have a mean career

3 Personal communication; Alison Meldrum, Director, Dental Therapy and Hygiene, University of Otago
satisfaction score of only 5.2 (Naidu et al., 2002). Dental therapists in TT undergo training modelled on the original School Dental Nurse training which was used in NZ. Therapists there have a more restricted role than dental therapists in the UK and NZ, as they are able to treat only children aged less than 12 years, in Government Clinics or under the supervision of a dentist in private clinics. It might be that, with recent changes in NZ and the UK, therapists in these countries feel more optimistic about their careers. However, any conclusions from such comparisons should be made with caution, because although the response rate was good (76%), the number of dental therapists in TT is small (50), limiting the statistical power of the study. There were considerable age differences across the three studies; the mean age of therapists in Trinidad and Tobago (39 years) was significantly less than those in NZ (48 years) and the UK (45 years). Other factors such as working conditions, type of payment, healthcare system and experiences of the participants and possible cultural differences in the interpretation of “career satisfaction” could not be considered in any depth using the data from these studies (Naidu et al., 2006). Further investigation of these issues would be of interest.

Newton and Gibbons (2001) reported age differences in career satisfaction among UK therapists, with lower satisfaction among younger therapists. They suggested that role conflict could adversely affect career satisfaction; dental therapists (mostly women) may experience substantial role conflict, given that many have childcare responsibilities. No such association was found in the current study. The reason for this is unclear, although it may be that, because NZ dental therapists take longer career breaks for child rearing, and role conflict is minimised.

It is concerning to note that, at variance with the high career satisfaction scores, over half of the dental therapists surveyed stated that they did not feel that they were a valued part of the dental community. This may be related to the historical relationship between dentists and dental therapists in NZ. The School of Dentistry now trains dental auxiliaries alongside dental students as part of a plan to better integrate the dental workforce. However, it will take time for what will be a major change in the professional culture of dentistry to come about.
Also at variance with the high career satisfaction scores was the finding that over half the respondents indicated that they would not choose to pursue a career in dental therapy if they had their time again. This may relate more to dissatisfaction with their income than to their overall career. The low mean score for income satisfaction indicates that most dental therapists (particularly those aged 45+) are unhappy with their current remuneration, suggesting that the current SDS salary scales do not allow for adequate progression for long-term employees. The Dental Therapy Technical Advisory Group (2004) identified remuneration as a contributor to the difficulties in recruiting and retaining dental therapists.

5.3.9 Potential changes following the HPCA Act

This study was conducted immediately prior to the implementation of the HPCA Act, which introduced the registration of dental therapists, allowed for an expansion of their scope of practice, and has enabled them to move to private practice. The findings of the current study indicate that about half of therapists are interested in moving to private practice and extending their services to adults (although the current dental therapy scope of practice precludes treatment of adults). Such a diaspora might benefit some adult groups (particularly those with low incomes), and may improve the career and income satisfaction of therapists, but it could be a serious threat to the viability of the SDS. It may be anticipated that the proposed changes to the SDS delivery model will improve the career satisfaction of dental therapists working within DHBs, for example, by providing up-dated facilities and equipment, and more team working environments. However, it is not likely to impact significantly on income satisfaction, except perhaps for those who choose to work longer hours. While it may be predicted that competition by employers to take on dental therapists will drive salaries up, in reality it is extremely unlikely that the SDS could afford to provide higher salaries, even if the private sector does.

5.3.10 Workforce implications

The finding that over half of the dental therapy workforce plans to retire within 10 years is of great concern from a workforce planning perspective. The main reason for this relates to the age structure of this particular workforce. Considerable effort is required to maximise
the “manpower” hours from the existing workforce (for example, reducing career breaks, increasing hours of work and keeping therapists in the profession), as well as promoting dental therapy as an attractive career to prospective students. There is a need to continue to monitor the dental therapy workforce to determine the longer-term effects of the HPCA Act, and to inform workforce planning.

Employers need to consider methods of improving dental therapists’ income satisfaction. While incentives such as student loan repayments may be beneficial in recruiting and retaining recently qualified therapists, strategies to aid established dental therapists are more limited. Seniority payments might be one mechanism, and these could be combined with a clearer career structure and opportunities for further progression. With increasing time since the implementation of the HPCA Act, there may be a greater move of dental therapists into the private sector, where they will presumably be able to command higher incomes. This will particularly be the case for those who are dual-trained in dental therapy and dental hygiene. Further research to determine the career and income satisfaction of such oral health workers would be beneficial.

5.4 The working practices and job satisfaction of dental hygienists in New Zealand - the Hygienist Study

5.4.1 Introduction

This study reports the findings of a survey of the working patterns and job satisfaction of dental hygienists on the DCNZ database in July 2004. The aim of the study was to investigate the working patterns, continuing education commitment and career satisfaction of dental hygienists in New Zealand. Many dental hygienists take substantial career breaks for childrearing, often choosing to work part-time when they return. Dental hygienists in NZ show a strong commitment to continuing education, and show high levels of satisfaction with their careers and remuneration.
5.4.2 Limitations of the study

A satisfactory response rate (73.2%; Locker, 2000) was achieved after two mailings. This compared favorably with some other recent surveys of dental auxiliaries (Steele et al., 1997; Callis and Wohlgemuth, 2000; Bader and Sams, 1992) but was slightly lower than that reported in other studies (Hillam, 2000; Boyer, 1990). It is possible that non-responders differed systematically from responders, but there are no data available to explore this issue. Another limitation was that the number of respondents was relatively low (213), somewhat compromising the statistical power of the study.

Individuals who had previously worked as a dental hygienist (or Section 11 worker) but who had not applied for registration with the Dental Council were not able to be included in the study due to the extreme difficulty of identifying and recruiting them. This may have led to the loss of valuable data. The overlap between Section 11 workers, orthodontic auxiliaries and dental hygienists may be less than distinct, causing confusion in the recent registration process (and DCNZ database construction) and hence in this study.

Despite these limitations, the study provides useful information on the career satisfaction and working practices of dental hygienists in NZ.

5.4.3 Characteristics of the respondents

As the first dental hygienists in NZ were army-trained (commencing in 1974), approximately half were male (Jefferies et al., 1983). However, the more recent training programmes (including the Otago Polytechnic course which commenced in the mid-90s and the subsequent University courses which are now run in Otago and Auckland) have had mostly female students. In this study, over 95% of respondents were female, confirming that the hygienist workforce in NZ now demographically resembles this profession in other countries more closely (Gibbons et al., 2001, Ross et al., 2005). The mean age of hygienists in this study was very similar to the 38 years reported in the United Kingdom (Gibbons et al., 2001) but was somewhat higher than the 30 years previously reported here in NZ (Orlando and Pack, 1997). Few respondents entered the profession
directly from high school; the mean age of 37.7 years and mean time since qualification of 8.8 years indicate an average age of 28.9 at the time of qualification. It is likely that, as in other countries (Gibbons et al., 2001), many individuals enter hygienist training after working as dental assistants for a period. Anecdotal evidence suggests that this is the case in NZ.

The number of dental hygienists self-identifying as Māori or Pacific Island is lower than desirable, given the current emphasis on reducing health inequalities, and the fact that those proportions were considerably lower than in the wider population. However, a number of other ethnic groups were represented. The proportion of NZ-trained dental hygienists was less than reported earlier, indicating that the projected increase in the proportion of NZ-trained hygienists (Orlando and Pack, 1997) has not taken place. However, this finding should be interpreted with caution, as many respondents did not state a country of qualification, and some did not report having a relevant qualification. The hygienists currently practising in NZ are, on average, more experienced than those surveyed earlier (a mean 8.8 and 5.5 years respectively in practice).

Governmental policy (for example, interest-free student loans, funding of training) is instrumental in determining the number of dental hygienists. In recent years, overseas-qualified dentists represented a significant component of the dental hygiene workforce in NZ. It is not known how long these individuals worked as dental hygienists; it may have represented temporary employment prior to completing the DCNZ registration examinations. However, with the new registration requirements for dental hygienists, it is no longer possible for overseas-trained dentists to register as dental hygienists in this country.

5.4.4 Current working practices

Consistent with the findings of previous studies, both in NZ (Steele et al., 1997; Orlando and Pack, 1997) and overseas (Hillam, 2000; Gibbons et al., 2001; Callis and Wohlgemuth, 2000; Ross et al., 2005), a large proportion of the workforce works part-time. However, the mean number of hours worked per week by NZ hygienists has doubled,
from 15.2 hours in 1996 (Orlando and Pack, 1997) to 30.4 hours in the present study. Accordingly, fewer hygienists were looking to increase their working hours now than previously (Orlando and Pack, 1997). As reported elsewhere (Gibbons et al., 2001), hygienists with childcare responsibilities were more likely to report working part-time. In accordance with overseas studies, many respondents work in more than one practice (Hillam, 2000; Gibbons et al., 2001; Ross et al., 2005). However, more NZ hygienists in the current study reported working in only one practice than previously reported (Steele et al., 1997; Orlando and Pack, 1997). A similar trend has been noted in Scotland (Callis and Wohlgemuth, 2000). This may reflect an increasing demand for dental hygiene services, meaning that individuals can achieve enough hours of employment in one practice. It could also be related to an anecdotal increase in the number of group dental practices, allowing a hygienist to treat patients of several dentists in one setting. The greater acceptance of hygienists within the profession (and by the public) in NZ may also have played a role.

5.4.5 Clinical duties

It has been suggested that the range of duties performed by many dental hygienists is limited (Christensen, 1995). This study indicates that there is potential for dental hygienists to further diversify in the tasks they perform. For example, only 13% reported placing fissure sealants regularly. This is lower than the 20% of 1995 Otago graduates reported to place fissure sealants daily (Steele et al., 1997) but is higher than the 5% reported for a larger sample of NZ hygienists two decades ago (Orlando and Pack, 1997). The provision of fissure sealants may be related to a number of factors such as the training of the workers, demand for fissure sealing versus other procedures, the age-structure of the patient population (with fissure sealants more likely to be placed in younger patients) and the funding of dental care. For example, recent changes in the reimbursement arrangements for dental services for adolescent patients from a fee-for-service to a capitation-based system may result in a decrease in the provision of fissure sealants in NZ. In the United Kingdom, nearly 70% of dental hygienists place sealants regularly (Gibbons et al., 2001).
Another example is the administration of local anaesthetic; this was performed regularly by only 1.2% of dental hygienists in this study, but by 63% in the United Kingdom (Gibbons et al., 2001). Until recently, dental hygienists have not been legally allowed to administer local anaesthetic in NZ. Orlando and Pack (1997) reported that 70% of dental hygienists felt restricted by not being able to administer local anaesthetic.

The 49% of respondents who reported taking radiographs regularly is a much greater proportion than reported in previous studies (Gibbons et al., 2001; Steele et al., 1997; Orlando and Pack, 1997). Radiography is now included in the training of dental hygienists in NZ.

Many respondents in the current study indicated that they take impressions and place or remove orthodontic bands or wires regularly. It is likely that many of these respondents were orthodontic auxiliaries, rather than qualified dental hygienists. Thomson reported in the 2006 Workforce Analysis that 97 of 379 “hygienists” (26%) on the DCNZ Dental Register were orthodontic auxiliaries (Thomson, 2007). While the employment of orthodontic auxiliaries is relatively common in NZ, these activities are undertaken much less frequently by dental hygienists in the UK (Gibbons et al., 2001).

The provision of dietary counseling was higher in the current study than in a previous NZ study (Orlando and Pack, 1997), while fluoride application was undertaken with similar frequencies in both studies. More respondents in this investigation reported taking impressions regularly than in the earlier studies (Steele et al., 1997; Orlando and Pack, 1997). This may be because this study included orthodontic auxiliaries who may spend a significant portion of their time taking impressions and pouring models, or perhaps an increasing demand for more complex restorative procedures (such as crown and bridge) in this country.

There were some differences between NZ-trained hygienists and those trained overseas with respect to the duties they performed regularly. The finding that more overseas-trained than NZ-trained dental hygienists undertake dietary counseling regularly may reflect a difference in emphasis between the training programs. Conversely, a higher proportion of
NZ-than overseas-trained dental hygienists reported that they regularly undertook team management. The reasons for this are unclear and could be explored in future studies.

Over 80% of respondents indicated a desire to expand the range of procedures they perform. Similar interest in broadening the scope of practice has been observed in other studies (Callis and Wohlgemuth, 2000; Ross et al., 2005; Orlando and Pack, 1997). In recent years, dental hygiene training in NZ has become more comprehensive. Maximising the scope of practice has been reported to provide greater diversity for hygienists, thus increasing their career satisfaction (Christensen, 1995). The new Bachelor of Oral Health training programmes in NZ allow students to train in both dental therapy and dental hygiene, enabling them to perform a wider range of clinical procedures after graduation (providing they maintain both scopes of practice).

5.4.6 Career breaks

As in other studies (Hillam, 2000; Gibbons et al., 2001; Callis and Wohlgemuth, 2000), career breaks were common, with almost 60% of respondents having taken at least one. The mean duration of 3.6 years (and median of 1.4 years) was considerably longer than the mean of 30 months (and median of 11 months) reported for the UK (Gibbons et al., 2001). In both studies, there was considerable variation in length of career break. Consistent with other studies (Hillam, 2000; Gibbons et al., 2001; Ross et al., 2005), the most commonly cited reason for taking a career break from dental hygiene practice was bearing and raising children.

5.4.7 Continuing professional development

A strong commitment to continuing education was evident among the participants in this study. Previous studies have reported high attendance at continuing education courses (Gibbons et al., 2001; Steele et al., 1997; Ross et al., 2005), despite concerns about the availability of continuing education (Hillam, 2000). It is expected that the requirements for annual registration will lead to an increased availability of (and involvement in) continuing
education courses. In recent years, there has been a trend for increasing team attendance at conferences and courses. For example, the NZDA conference now has a day planned specifically for dental hygienists (and therapists), with overlap between the dentist, dental hygienist and dental therapist sessions.

5.4.8 Career satisfaction

Several years ago, dentists voiced concerns about career structures and job satisfaction for hygienists in NZ (Pack, 1984). More recently, concerns regarding job satisfaction and remuneration have been raised in the United Kingdom (Callis and Wohlgemuth, 2000; Ross et al., 2005). Although elaborate tools to measure dental auxiliaries' career satisfaction have been developed in the USA (Bader and Sams, 1992; Chapko et al., 1986), this study used the simpler measure recently used in the UK, facilitating comparisons between the studies (Gibbons et al., 2001).

In this study, as reported elsewhere (Gibbons et al., 2001), the mean job satisfaction of older dental hygienists was higher than that of younger hygienists. This may reflect the flexibility of a dental hygiene career, where family life and part-time work can be optimally balanced. Conversely, it may represent a degree of selection bias because hygienists who enjoy their job are more likely to return to work after childbearing, while others may have left the workforce (Gibbons et al., 2001).

High levels of career satisfaction among dental hygienists have been reported (Hillam, 2000; Gibbons et al., 2001; Boyer, 1990; Schou et al., 1986). In this study, levels of career satisfaction were similar but income satisfaction scores higher than previously reported in NZ (Orlando and Pack, 1997). This may reflect an increasing demand for dental hygienists, enabling them to command higher incomes, or it may relate to the greater number of hours worked by dental hygienists in comparison with the previous study. This could have implications for the publicly funded health sector in NZ, as any publicly-funded dental hygiene positions developed will need to offer remuneration comparable to that in the private sector if they are to appear attractive.
5.4.9 Retirement

It has been suggested that dental hygienist ‘burnout’ is common, and that some hygienists leave the profession after a short time (Christensen, 1995). Elsewhere, it has been reported that most hygienists remain in employment for at least 30 years, with only one-third retiring early (Callis and Wohlgemuth, 2000). Hillam (2000) concluded that hygienists continue to work in their chosen career at least as long as female dentists do in theirs. One-third of respondents in this study intend to cease practice within the next decade, suggesting that the current emphasis on recruiting students into dental hygiene training schemes needs to continue.

5.4.10 Workforce implications

The registration of hygienists brought about by the HPCA Act will have impacted considerably on the workforce; overseas-qualified dentists and individuals without formal qualifications are no longer permitted to work as dental hygienists in this country. Hygienists appear to be satisfied with their careers and remuneration and feel a valued part of the dental community. However, the dental hygienist workforce should continue to be monitored in order to determine the longer-term effects of the HPCA Act and the new Bachelor of Oral Health training programmes, and to inform workforce planning.

5.5 Comparison of the working practices and job satisfaction of dentists, dental therapists and dental hygienists

5.5.1 Introduction

In this section, the similarities and differences in the working practices and job satisfaction of the three groups of oral health professionals (dentists, dental therapists, and dental hygienists) will be discussed, using the data from the Gender Study, the Therapist Study and the Hygienist Study. Of particular interest are the differences between therapists and
hygienists; as the new dual-trained auxiliaries move into the workforce, employers should make an effort to ensure that they have appropriate working practices and as high a level of career satisfaction as possible, so as to maximise their retention and the productivity of the workforce.

5.5.2 Socio-demographic characteristics

In Table 5.1, the socio-demographic characteristics of oral health professionals are presented, along with the population percentages for the 2006 Census. Unfortunately it was not possible to determine the mean age of dentists (as the questionnaire asked dentists to indicate their age group rather than age in years). Similarly, the proportion of female dentists in the dentist workforce could not be determined as extra females were sampled in order to improve the power of the study (as opposed to a random sample of the entire dental profession).

Despite these limitations, it is apparent that there were significantly more males in the dental hygienist workforce than in the dental therapy workforce. A greater proportion of the dental therapist workforce than the hygienist and dentist groups self-identified as European. Higher proportions of dental therapists than dentists identified as Māori, but the proportion of hygienists identifying as Māori did not significantly differ from the proportion of dental therapists. Very few dental therapists self-identified with other ethnic groups. Of particular concern is the observation that very few oral health professionals identified as Pacific, despite Pacific people representing almost 10% of the NZ population. This is a concern that has been raised within the health workforce as a whole, along with the under-representation of Māori (Medical Reference Group, 2006).
Table 5.1 Comparison of socio-demographic characteristics of oral health professionals (data are percentages; confidence intervals in brackets)

<table>
<thead>
<tr>
<th></th>
<th>Dentists N= 850</th>
<th>Dental therapists N=566</th>
<th>Dental Hygienists N=213</th>
<th>2006 census a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%Male</td>
<td>70.8 b</td>
<td>1.2 (0.93-1.47)</td>
<td>4.7 (1.9-7.5)</td>
<td>48.8</td>
</tr>
<tr>
<td>%Female</td>
<td>29.2 b</td>
<td>98.0 (96.8-99.2)</td>
<td>95.3 (92.5-98.1)</td>
<td>51.2</td>
</tr>
<tr>
<td>Ethnicity c</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>European</td>
<td>68.2 (65.1-71.3)</td>
<td>91.2 (88.9-93.5)</td>
<td>72.8 (66.8-78.8)</td>
<td>67.6</td>
</tr>
<tr>
<td>Māori</td>
<td>2.9 (1.8-4.0)</td>
<td>9.9 (7.4-12.4)</td>
<td>5.6 (2.5-8.7)</td>
<td>14.6</td>
</tr>
<tr>
<td>Pacific</td>
<td>&lt;0.1 (0.0-0.3)</td>
<td>1.2 (0.3-2.1)</td>
<td>0.5 (0.0-1.4)</td>
<td>9.2</td>
</tr>
<tr>
<td>Other</td>
<td>31.6 (28.5-34.7)</td>
<td>4.4 (2.7-6.1)</td>
<td>25.4 (19.6-31.2)</td>
<td>6.9</td>
</tr>
<tr>
<td>Mean age</td>
<td>45.6 b (12.2)</td>
<td>47.7 (8.8)</td>
<td>37.7 (8.6)</td>
<td>NA</td>
</tr>
</tbody>
</table>

awww.stats.govt.nz  bSource – DCNZ 2006 workforce data  cRespondents were permitted to identify with more than one ethnic group

5.5.3 Working practices

The working practices of dental therapists and hygienists were quite different. Only 2% of dental therapists spent a portion of their working week outside the public sector. By comparison, the vast majority of hygienists worked in the private sector, with fewer than 8% doing any practice in the public sector. Dental therapists worked for a mean of 34 hours per week (SD 7) and hygienists undertook 30 hours of clinical practice weekly (SD 10). While almost all of the therapists worked within DHBs (that is, they had a single employer, although most worked in more than one school or clinic per year), over one-third of hygienists worked for two or more different dental practices (and presumably had two or more employers, or sources of income if self-employed). Dentists worked an average of 33 hours per week and most were self-employed.
5.5.4 Career breaks

Over four-fifths of dental therapists (82%) had taken a career break, and the mean break time taken in breaks was 6.5 years. The reason most often given for the career breaks was child-rearing (88%). In comparison, less than half of hygienists (47%) had taken a career break, and the mean time taken in breaks was 3.5 years. As for therapists, the main reason for taking a break was child-rearing. There are several possible explanations for the differences in the time taken in career breaks. First, dental therapists were (on average) ten years older than dental hygienists; there may be more women in the latter group who have not yet completed their families. In addition, when the older therapists had young families (for many, 30 or more years ago), fewer women worked and childcare was less readily available. A less important reason may be the slightly larger proportions of males in the hygienist workforce than in the therapist workforce. Another explanation is that hygienists earn considerably more per hour than therapists, and this may make returning to work more financially viable. In addition, hygienists may have greater flexibility in their working hours, perhaps working during evenings or weekends depending what fits into the family schedule. It may be that greater flexibility in the working hours of dental therapists is required. Job-sharing arrangements and part-time employment are not common within the SDS. Further investigation of these possibilities would be useful.

Fewer than half of the dentists had taken career breaks. Many of these breaks had been taken for reasons other than child-rearing, such as personal choice, travel or study. The ‘big OE’ has long been a feature of the dental practice culture in NZ. It has been reported that almost sixty percent of general dental practitioners practising in this country have spent some time working overseas. (Wong et al., 2006).

5.5.5 Continuing professional development

Dentists were the most active in continuing education of the three groups, with almost three-quarters having undertaken at least 20 hours of CPD in the previous year. Six out of ten dental therapists but only four of ten hygienists had met the same target. Dentists have had a requirement for compulsory CPD for several years now, whereas auxiliaries have only recently become registered and had this requirement enforced. It might be that,
because most dentists are self-employed, they find it easier to take time off to attend conferences than auxiliaries who would have to seek their employer’s approval for conference leave (and negotiate about who will be paying for it!). The increasing trend for team CPD may help employee oral health workers to attend courses at the same time as their employer dentists.

### 5.5.6 Career satisfaction

The mean career satisfaction scores were similar for each of the occupational groups. Conversely the magnitude of the income satisfaction scores was quite different between dental therapists and dental hygienists. However, these differences were not statistically significant, most likely due to a lack of statistical power (too few hygienists in the sample) but possibly also due to the considerable variation in scores between individuals (reflected in the wide standard deviations). Dental hygienists worked mainly in private practice, while dental therapists worked within the SDS. It is assumed that the hygienists were earning considerably more than the therapists; this is likely to explain the difference in income satisfaction to a large extent.

### 5.5.7 Retirement

Data from the Gender Study demonstrated that female dentists planned to retire earlier than males – less than one out of four male dentists planned to retire before 60 years, while almost two-thirds of female dentists planned to do so. More than half of dental therapists planned to retire within the next 10 years, while only four of ten hygienists planned to do so. This may be explained, at least in part, by the 10-year difference in the mean age between the two groups. Differences in career/income satisfaction may also play a role.
5.6 Changes in the New Zealand dentist workforce over a nine-year period - the Longitudinal Study

5.6.1 Introduction

In this study, trends in the NZ dentist workforce over a nine-year period (from 1997 to 2005) were explored using data from the annual DCNZ workforce questionnaires. The aim of the study was to identify and describe trends in the New Zealand dentist workforce over a nine-year period (from 1997 to 2005). Cross-sectional analysis identified characteristics of the complete workforce in each year. Subsequent longitudinal analysis outlined changes in the practising characteristics of those practitioners who were working in each of the three years.

The number of dentists practising in NZ increased by 18.6% over the nine-year period, while the population increased by 11.3% over the period from 1996 to 2006 (www.stats.govt.nz). Thus, the dentist-to-population ratio increased from 390 per 100,000 to 420 per 100,000 over the period.

5.6.2 Strengths and weaknesses of the study

Using the DCNZ questionnaire data enabled the sample size to be maximised; the response rates were 96.5%, 95.1% and 99.3% in 1997, 2001 and 2005 respectively. However, there was a degree of item non-response (that is, failure to answer particular questions) which varied throughout the questionnaire. Limiting the sample to those dentists who were practising in all three years reduced the number of individuals in the longitudinal cohort, but did allow this analysis to be undertaken for the first time.

Although the use of “first ethnicity” ensured that the findings were consistent with other DCNZ publications, this may have resulted in an under-estimate of the number of different ethnic groups represented. In the 2006 Census, over 10% of New Zealanders identified with more than one ethnic category. For this reason, the first ethnicity method is no longer
the approach favoured by Statistics NZ (www.stats.govt.nz). In reality, however, the impact of this upon the findings of the current study is likely to be minor as, in other reports, only 4% of NZ dentists specified a second ethnic group (Thomson, 2007).

5.6.3 Socio-demographic characteristics

Individuals were classified based on the ethnic group with which they primarily identified. The observed minor variation in the proportions of different ethnic groups over the period (in the longitudinal analysis) is to be expected, as individuals may change over time in the way they view their own ethnic identity (Statistics New Zealand, 2005). It is of concern that the proportion of Māori in the dentist workforce remained stable at less than 1%, while the percentage of Māori in the general population is approximately 14% (www.stats.govt.nz). Although there is an affirmative entry policy at the School of Dentistry, other barriers must exist which are limiting the numbers of Māori choosing to study dentistry.

The observed increase in the proportion of non-NZ-European dentists working in NZ over the observation period is likely to reflect both an increase in the number of dentists registering from overseas, and an increase in the number of students from other ethnic groups who were training in NZ through the late 1990s and early 2000s. Recent changes to the University of Otago Dental School selection process appear to have decreased the number of students without English as their first language (Rich, 2006). The number of graduate dentists leaving NZ to work overseas may be an additional factor, although it has been observed that graduates with parents living in this country were more likely to remain or return to NZ (New Zealand Dental Association, 2006a and b).

The mean age of dentists in the full sample increased from 44 to 46 over the study period. This may reflect an increase in the numbers of young dentists going overseas and/or an increase in overseas-qualified dentists coming into NZ (who, it is assumed, are older than recent dental graduates).
5.6.4 Location of practice

As would be expected, most dentists worked in private practice and were self-employed. It was not possible to determine whether dentists were in solo or group practice in each year, or whether they owned the establishment in which they were working.

Not surprisingly, the majority worked in major cities. Over the observation period, there was a decrease in the number of dentists working in small towns; this reached statistical significance for the complete workforce, but not the longitudinal cohort, probably because of the smaller numbers involved (type 2 error). This finding is consistent with anecdotal evidence which suggests that there is an ageing dental workforce in small towns, and that many rural health professionals are unable to sell their practices (Rural Expert Advisory Group to the Ministry of Health, 2002), thus being forced to simply “shut up shop” or “walk away” when retiring (New Zealand Dental Association, 2006a and b).

The higher proportion of female than male dentists working in the major cities may reflect a greater potential for employment (such as DHBs and community clinics), greater earning potential, or concerns about managing the demands of a rural practice. It has been reported that attracting health professionals to rural areas in NZ may be compromised by heavy workloads, after-hours requirements, a lack of supporting medical and other services, and difficulties in taking leave (Health Workforce Advisory Committee, 2002). Such issues may be of particular concern to female dentists, particularly if they have childcare responsibilities. The under-representation of women in rural medicine has been reported in Australia (Wainer et al., 2001). The key problems identified in Australia are that organisational arrangements are not sufficiently flexible to meet the lifestyle needs of female rural practitioners, and that these women experience additional difficulties because of societal attitudes (Wainer et al., 2001). A recent Western Australian study also found fewer female dentists working in rural and remote areas (Kruger and Tennant, 2004). The authors suggested that a lack of employment opportunities for partners (many of whom have professional qualifications) was a further issue contributing to the under-representation of female dentists in rural practice.
As would be expected, the majority of specialists worked in the major cities (where, presumably, the larger populations ensure a broad and consistent referral base and associated practice viability). However, it may also mean that it is harder for people living in rural areas to access these services, and that rural dentists have less specialist support (New Zealand Dental Association, 2006b). The corollary is that rural dentists may have a more varied (and interesting) practice, as it is more difficult for them to confine their scope to a limited range of procedures. A number of specialists do travel to rural areas for 'branch clinics' in areas such as Thames, Rotorua and Queenstown, but anecdotal evidence suggests that it is often more difficult for patients to get timely care at these clinics, and they often end up travelling to the city practice for treatment appointments. The cost of establishing a specialist practice precludes most specialists from being able to provide comprehensive care in small towns.

5.6.5 Non-practising dentists

A “purge” of the DCNZ Register was undertaken in March 2003. Dentists who were not intending to practise in NZ for the following year had to choose between being removed from the Register or paying a fee to remain on the Register with non-practising status. This resulted in 268 dentists (11.1% of registered dentists) being removed from the Register, and 299 (12.3%) remaining on it as non-practising dentists (Dental Council of New Zealand, 2004). This “purge” explains the observed decrease in the number of dentists who held an APC but were not practising dentistry.

5.6.6 Hours of work

There was a sizeable increase in the proportion of the dentist workforce who were working part-time, although the pattern in the mean number of hours worked per week was unclear. It might have been expected that there would be an increase in the mean number of hours worked per week following the “purge” of the Register, but this was not observed. The mean number of hours worked overall (and by generalists) was higher in 2001 than in the other two years.
In the longitudinal sample (the dentists who were working in each of the three years), there was a substantial decrease in the proportion working full-time over the observation period. This may reflect the changing age distribution of the sample over time; some practitioners may progressively reduce their working hours as they approach retirement. At the other end of the age range, dentists entering the child-bearing years may choose to work part-time, at least for a period. This might be particularly so for female practitioners, who, in each of the three years, worked fewer hours per week (on average) than male dentists. This is consistent with other findings, both here and overseas (Russell, 2002; Newton et al., 2000b; New Zealand Dental Association, 2006). The proportion of women in the NZ dental workforce is continuing to increase as more females enter dental education (Rich, 2006); accordingly, the “manpower” hours of the dentist workforce may further decrease over the next few years. It is not clear (at present) whether mothers return to full-time practice later in their careers or persist in part-time practice.

Paradoxically, there were no significant differences in the mean number of hours worked per week in each of the three years overall. It may be that the dentists’ perception of “full-time work” has altered, but the actual hours worked have not. The large decrease in the mean hours per week worked by specialist practitioners may reflect a different mix of specialists over time (with some types of specialists working more hours per week than others), or specialists’ other demographic characteristics, such as age or gender. As “specialists” were defined as being “registered as a specialist in any year”, it might be that, as some individuals moved from general practice through their training and into specialist practice, they decreased their working hours.

5.6.7 Reasons for working part-time

The variation in the reasons given for working part-time was of interest. In the longitudinal cohort, the number of dentists who were “semi-retired” increased substantially between 1997 and 2005. This is consistent with the increasing age of the sample, and was not seen in the cross-sectional analyses. In the latter, the proportion of dentists citing “parental responsibilities” as their reason for part-time practice was relatively constant. For the longitudinal cohort, there was an increase in the number of dentists citing parental responsibilities as a reason for part-time practice, but this did not reach statistical
significance. Over the nine-year observation period, the mean age of female respondents increased from 35 to 45; meaning that some women would have moved into child-bearing age\(^4\), while those who had already had children might be starting to have less direct responsibility for them as they got older. As children reach adolescence or young adulthood, there may be a greater incentive to work in order to help to pay for their education. Dentists with children have been reported to work fewer hours per week (regardless of gender) than those without children (Kruger, 2004; Brennan \textit{et al.}, 1992). Interestingly, another study reported that the net income of male (but not female) dentists increased with the number of children under 21 years of age (Brown and Lazar, 1998), suggesting (not surprisingly) that productivity may increase in association with an increasing number of dependants.

The small numbers of dentists who were undertaking non-dental work, had insufficient dental work or were seeking dental work in both the cross-sectional and longitudinal cohorts are consistent with anecdotal reports of practice “busyness” in this country (New Zealand Dental Association, 2006b). It is reassuring from the dentists’ point of view that the vast majority have at least as much work as they want, but this also suggests that there may be a problem with access to care for some groups, as the demand for dental care is greater than the supply.

In both analyses, there was a large increase in the proportion of dentists who cited “other” reasons for working part-time in 2001 and 2005. By far the most dominant of these was personal choice. It might be that dentists are seeking to gain a better work-life balance, particularly following recent emphasis on the stress levels and mental health of dental practitioners, both in the press and the academic literature (Rada \textit{et al.}, 2004; Alexander, 2001; Gorter \textit{et al.}, 2000).

\(^{4}\) The median age at which New Zealand women have their first child is now 30 years, up from 25 years in 1968; \texttt{www.stats.govt.nz}, media release, 18 November 2008.
5.6.8 Continuing professional development

It was pleasing to note the increase in the number of dentists undertaking at least 20 hours annual CPD over the study period. With the introduction of the HPCA Act (2003; brought into force in September 2004), the DCNZ now requires dentists to undertake 20 hours “verifiable” and 20 hours “non-verifiable” CPD annually. The first four-year cycle of CPD finishes in May 2009. It is of some concern that a lower proportion of rural dentists (than city and provincial dentists) met the CPD targets during the observation period. Rural dentists may have more difficulty accessing continuing education courses due to the need to travel to main centres, and the difficulties and expenses involved in obtaining “cover” for their practice. It is also recognised that they are at greater risk of professional isolation (Kruger and Tennant, 2004). Such problems have also been identified for rural doctors in Australia, and have been associated with declining rural practice (Booth and Lawrance, 2001). The evolution of video-conferencing and web-based education, together with the popularity of small study groups, should go some way to addressing these problems, along with the availability of electronic education (such as CDs and DVDs, on-line access to dental journals and internet discussion groups). However, additional strategies may be required to assist rural practitioners in keeping up to date, and, in particular, to enable regular peer contact.

Similar concerns exist for female practitioners, as, over all three years, relatively fewer females than males met the CPD requirement. Family responsibilities and lower incomes may mean that women experience difficulty in accessing continuing education. These factors may also be responsible for the lower proportion of females among the specialists on the Register. The lower rates of self-employment among women dentists may have a role in the lower incomes reportedly earned by female practitioners (Brown and Lazar, 1998). It may be that many women prefer not to be involved in the “business side” of dentistry, but are more content to work as employees focusing on clinical aspects (and working fewer hours than their male counterparts).
5.6.9 Overseas-trained dentists

The practising characteristics of overseas-trained dentists showed considerable differences from NZ-trained dentists in 1997. However, this variation decreased over the observation period so that, by 2005, the practice settings, rates of self-employment and CPD activities of the two groups were not significantly different. This suggests that, with increasing years of practice in NZ, overseas graduates adapt to a more typical NZ working pattern.

Acculturation is a process in which members of one cultural group adopt the beliefs and behaviors of another group. This may involve changes in language preference, adoption of common attitudes and values, membership in common social groups and institutions, and loss of separate political or ethnic identification. Such a process appears to occur in dental practice as much as in wider general life. It may be that this process can be aided by encouraging immigrant dentists to become involved in the community in which they practise, and to be active within the dental profession (through, for example, attending New Zealand Dental Association branch meetings and study groups).

5.7 Job stressors of New Zealand dentists and their coping strategies - the Stress Study

5.7.1 Introduction

This cross-sectional study aimed to identify the principal job stressors and coping strategies of NZ dentists. It found that there was considerable variation in the number of stressors experienced by dentists, and that overseas-qualified practitioners reported experiencing more stressors more frequently than did those trained in NZ. There were differences in the strategies used by male and female dentists to manage stress.

5 www.rice.edu/projects/HispanicHealth/Acculturation.html
5.7.2 Strengths and weaknesses of the study

There were some limitations to this study, mainly due to its cross-sectional nature. The response rate of 65% was not ideal, but is typical of this type of study (Newton et al., 2002; Locker, 2000). It is not possible to determine precisely how the dentists who chose to respond to the study differed from those who did not. Comparison of the socio-demographic characteristics of the sample with all (non-specialist) dentists on the Dental Register confirmed that there were no statistically significant differences with respect to gender, age, or source of the primary dental qualification. Thus, it is possible cautiously to generalise and apply the study findings to all NZ dentists. There was a variable degree of item non-response (that is, failure to answer particular questions); it is assumed that this did not materially affect the findings. Cross-sectional studies are not able to demonstrate cause and effect, merely associations between variables. Although there are a number of updated stress measures used in the literature, a modified version of that used by Cooper and co-workers (1987) was chosen to allow comparison with previous work involving dentists.

5.7.3 Job-related stressors

There was considerable variation in the number of stressors experienced by dentists “frequently” or “all of the time”, with approximately half of respondents experiencing five or fewer, but five percent experiencing 20 or more. The most important stressors (treating difficult children, constant time pressure, maintaining high levels of concentration, coping with difficult patients, treating extremely nervous patients) were similar to those found in previously reported studies (Cooper et al., 1987; Myers and Myers, 2004; Wilson et al., 1998; Humphris and Peacock, 1992; Hastings, 1982). Newton and colleagues (2002) suggested that paediatric dentists might be more stressed than other specialists, and Humphris and Peacock (1992) proposed that treating children is the primary reason for the UK community dental service being so stressful. Time- and income-related stressors are reported to be particularly important for dentists working in the NHS (Wilson et al., 1998), where there is a perceived need to work quickly in order to generate sufficient income. In the current study, time pressure was one of the main sources of stress for dentists, but this may have related to scheduling and running on time, rather than treating large numbers of
patients. Dentists in NZ appear less concerned about the future than dentists in other studies (Humphris and Cooper, 1998). Patient relations has been reported to be a major factor relating to job satisfaction in dentistry (Jeong et al, 2006; Logan et al, 1997; Shugars et al, 1990), which suggests that it is important to ensure that dentists have optimal communication skills.

5.7.4 Variation in stressors among dentists

The most commonly reported stressors did not vary much among dentists. In comparison, the “ability to sell practice in future” varied by gender, graduating cohort, practice setting and weekly workload. It is possible that confounding factors are responsible for this, as male, older, and rural dentists may treat more patients per week and be more likely to own their own practice. Furthermore, practices located in highly desirable or fast-growing areas will retain their value better than those in less desirable locations. Anecdotal evidence suggests that, in NZ, rural practices are more difficult to sell than those in urban areas. Although it has been reported that in the USA, specialists find it easier to sell practices than general dentists (Beazoglou et al, 2000), it is not clear whether that is the case in this country.

Finding time for family and friends appeared to be more of an issue for dentists who had graduated between 1980 and 1999 (presumably those with preschool- or school-aged children). Similarly, Moller and Spangenberg (1996) reported that difficulty in finding time for family and friends was more of a problem for younger dentists. A recent study of South Korean dentists found that the majority were discontented with the amount of personal time they had, and that this adversely affected job satisfaction (Jeong et al, 2006). However these dentists worked (on average) 48 hours per week!

5.7.5 Medical emergencies

Although a medical emergency in the dental surgery has fairly consistently been found to be one of the most highly ranking stressors in the UK (Cooper et al, 1987; Wilson et al, 1998; Humphris and Peacock, 1992), only 15% of dentists in the current study reported that this was a stressor “very often” or “all of the time”. This may reflect the different
wording of the response options in the questionnaires; Cooper and co-workers (1987) used a scale ranging from 'no stress' to 'a great deal of stress', whereas we used a similar scale labelled 'never' to 'all the time'. Although a medical emergency would be a great potential source of stress, it does not occur commonly, and many dentists may not have experienced such an event. Broadbent and Thomson recently reported that 65% of dental practices had experienced a medical emergency within the previous 10 years; this would correspond to an average of 6.5% of practices experiencing a medical emergency each year, or 2 events per 10,000 patients treated under local anaesthesia, other forms of pain control, or sedation (Broadbent and Thomson, 2001).

5.7.6 Overseas-qualified dentists

A larger proportion of overseas-than NZ-qualified dentists reported experiencing many of the individual stressors frequently. It has been suggested that the NZ population can be hard on practitioners from overseas (Crum, 2007). Perhaps the NZ public (and the dental profession) need their awareness raised with respect to the valuable role that these dentists play in the community.

One of the least commonly reported stressors among general dental practitioners was "feeling isolated". However, a larger proportion of overseas- than NZ-trained dentists reported feeling isolated (P<0.001). This suggests that overseas-qualified dentists may not feel sufficiently accepted as part of the NZ dental community and may lack peer contact. These dentists may need greater professional support, as professional isolation may put dentists at greater risk.

Although overseas-trained dentists had a similar patient load to NZ dental graduates, a larger proportion of them reported that they were regularly stressed by factors such as long working hours, finding time for family and friends, earning enough money to meet lifestyle needs, and cancellations or failed appointments. It is of some concern that overseas-qualified dentists experience higher levels of job-related stress. It is not clear whether there are differences in the perceptions of stressors between the groups, or whether these dentists are subject to more sources of stress. New-immigrant dentists may have extra sources of stress beyond the workplace (such as family remaining overseas, the challenges of settling
into a new country and culture, and language difficulties). It is likely that a combination of factors is responsible, and these warrant further investigation (refer to the Immigrant Dentist Study).

5.7.7 Coping strategies

Consistent with reports from previous studies (Newton and Gibbons, 1996; Alexander, 2001), dentists tended not to apply active coping strategies for stress management. The gender differences were not unexpected; males were more likely to report using sports or alcohol as strategies to relieve stress, while female dentists preferred to interact with people and spend money (“retail therapy”). That over one-quarter of respondents admitted to using alcohol to relieve stress is a matter of some concern. Of course, it is likely that more consume alcohol, without identifying this as a means of managing stress. Other authors have reported on the use of alcohol by dentists [Gorter et al., 2000; Moller and Spangenberg, 1996; Winwood et al., 2003; Baldwin et al., 1999]. Conversely, Myers and Myers (2004) reported that, although over 90% of dentists in their sample consumed alcohol regularly, the average weekly consumption was low. The finding that smoking and drug use were not frequently reported as stress-reducing strategies is consistent with the findings of other studies (Moller and Spangenberg, 1996).

5.7.8 Implications of the findings

In summary, there is considerable variation in the number of stressors experienced by dentists. Overseas-qualified dentists appear to be under more stress than NZ trained dentists, but the reasons for this are not clear. These individuals may need greater professional support and peer contact. Dentists should be encouraged to make greater use of active coping strategies. The findings of this study suggested that further research was indicated to determine why overseas-trained dentists appear to have more job-related stress, and to identify interventions that could be used to decrease stress among dentists. This led directly to the Immigrant Dentist Study.
5.8 A qualitative investigation of the experiences of immigrant dentists working in New Zealand - the Immigrant Dentist Study

5.8.1 Introduction

This qualitative study investigated the experiences of overseas-qualified dentists working in NZ. The aim of the study was to determine the nature of problems experienced by overseas-trained dentists settling in New Zealand, and to ascertain what can be done to improve their experiences. It found that, while most participants were happy living in this country, some had experienced significant difficulties in the work setting. The majority of dentists who had sat the NZDREX examination had found the process to be difficult and stressful, predominantly due to uncertainty about the content of the examination. For some, the financial costs had also been difficult to meet. Those who had made contact with a dentist who had already undertaken the examination had found this contact to be very useful.

5.8.2 The qualitative method

Having identified an issue relating to greater experience of job-related stressors among overseas-trained dentists in the Stress Study, it seemed appropriate to explore in more detail the difficulties faced by this part of the workforce. The qualitative research method was utilised because of the need to understand the situation from the immigrant dentists’ point of view: a conventional survey would not have been useful because I would not have known what questions to ask. Accordingly, a semi-structured interview with open-ended questions was used, allowing respondents to use their own words; it enabled the interviewer to give feedback and ask for elaboration where required. Participants could discuss the issues they felt were most important rather than those being dictated by a printed questionnaire or closed questions. The in-depth interview approach was chosen over other qualitative data collection techniques (such as focus groups) to ensure confidentiality and promote the development of rapport between the interviewer and
interviewee. Dentists were interviewed in their own environment in order to minimise the disruption to their day and to maximise their comfort and responsiveness.

In qualitative research, the goal is to have rich, in-depth information, with the sample reflecting the diversity of the study population rather than being representative of it (Bower and Scambler, 2007; Meadows et al., 2003). A combination of convenience and maximum-variation sampling methods was used to enable selection of dentists from both genders and a range of countries, ages, dental practice settings and regions of NZ.

5.8.3 Experiences of the immigrant dentists

There was considerable variation in the experiences of the dentists interviewed. Some had arrived in NZ several years previously, before the pre-examination course was available. Some had attended a one-week pre-examination course and found it to be useful, while others had been unable to afford to attend the course.

Some dentists had worked as dental hygienists prior to sitting the NZDREX. This was seen as beneficial both in preparation for the examination and in helping to see how practices operate in this country. Some felt that it also aided their communication with patients, as they learned features of NZ culture. With the introduction of the Health Practitioners Competence Assurance Act, immigrant dentists are no longer able to work as dental hygienists because they will not meet the eligibility requirements for registration. This may limit immigrants' contact with the dental profession. Some other participants had applied for jobs as dental assistants. While some (all female) had been successful in their applications, others had not. Employing new immigrant dentists as dental assistants could be one way in which the dental profession could assist new immigrants in their examination preparation. Simply having an opportunity to observe in dental practice or a hospital dental department would help to gain insight into practising as a dentist in NZ.

A majority of immigrant dentists felt that there was a need for improved information and guidelines on the content of the NZDREX. Those who undertake the bridging course will
better understand the emphasis of the examination. It would also be beneficial if the Dental Council could provide a list of recommended texts and journals.

Some dentists experienced technical difficulties in the clinical examinations. These may relate to their country of qualification. For example, crown and bridgework is generally taught at postgraduate level in India, and handpieces used in the examination may differ from those which were used overseas (Komabayashi et al., 2005). Dentists from some countries may also need additional education and clinical training in the use of filling materials which are less commonly used in their own country (such as glass ionomer cement).

Although a few dentists reported that they had experienced employment problems, most had not. The main difficulties experienced in the dental practice environment were learning about the paperwork requirements, including general recordkeeping and third-party claims, concerns about the informed consent process, patient rights and complaints, charging for treatment, and equipment availability. Such topics could be addressed within a mentoring programme.

5.8.4 Bridging programme

Some recent changes have benefited dentists who have immigrated to NZ. A one-year, part-time bridging programme has been available for the last four years. The scientific component is taught from Auckland by correspondence, and the clinical component is undertaken in Dunedin. The programme has been associated with an improved pass rate in the NZDREX examinations. Unfortunately, only limited Government funding is available, so the private cost for most students is $30,000 (student loans are available for NZ residents). Similar programmes also exist in the USA (Komabayashi et al., 2005).

Although none of the dentists in this study had undertaken the bridging course, most interviewees thought it would have been of great benefit to them had it been available, although some said that the cost would have been prohibitive. By contrast, one dentist considered that it would be worth the cost if it could save the extra months out of work while waiting to resit the examination.

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6Personal communication; David Purton, NZDREX Director.
5.8.5 Changes to NZDREX

There have also been recent changes to the structure of the NZDREX itself. In order to improve accessibility to the examination, written papers are now run jointly by DCNZ and the Australian Dental Council. Preliminary examinations are conducted in Europe, Middle East, the Indian subcontinent, Africa, Asia, North and South America, the Pacific and Australia. However, those who choose to undertake the examinations in NZ have priority for entry to the clinical examinations. Two years ago, the standard of English was raised from a mean score of 7 to 7.5 (with a score of at least 7 in each band of the four individual components of listening, reading, writing and speaking) in the International English Language Testing exam (IELTS) in line with English language requirements for other health professionals in NZ. The Occupational English Test (OET) has also been approved by the DCNZ; dentists are required to pass with A or B grades in each of the four sections. Most of the dentists interviewed had not found the English examination to be overly difficult.

5.8.6 Recommendations resulting from this study

A number of recommendations emerged from this study:

1) That the Dental Council identifies a central point of contact for candidates to aid information gathering (such as a toll-free helpline).

2) That the NZDA supports a voluntary mentoring programme for prospective NZDREX candidates. This might include a facilitator in each of the main centres, supported by a network of mentoring dentists. The role of the mentors would be to; offer support, take candidates as a guest to suitable branch meetings, allow observation in their practices, and help them to identify other candidates who would like to meet for a study group. The NZDA website could contain a page for NZDREX dentists with contact details for facilitators, details of study groups.

7 For further information refer to www.dcnz.org.nz
available etc. Copies of prescribed textbooks and key journals could be available to loan via the network. Fundraising within the profession would be required to meet the costs of the programme.

3) That the NZDA investigates the possibility of running a mentorship programme for NZDREX dentists similar to the Graduate Professional Development Programme. Key topics might include; informed consent, record keeping, dealing with complaints, establishing a practice etc. Possible funding sources to investigate include NZDA, external sponsorship, or the NZDREX dentists themselves. Branches should be encouraged to offer a discounted branch membership for the first year to encourage attendance at local meetings and contact with the profession.

4) That the NZDA considers appointing a NZDREX representative on the Executive of NZDA to ensure that the voices of NZDREX dentists are heard at a national level.

5) That the NZDA arranges to have a NZDREX dinner to coincide with the ‘class dinners’ at NZDA conferences.

Providing assistance/support for NZDREX dentists will be beneficial for: the NZDREX dentists, potential employers, the profession, and the public.
5.9 The occupational health of dentists working in New Zealand - the Occupational Health Study

5.9.1 Introduction

This cross-sectional study aimed to assess the occupational health of general dental practitioners in NZ. The aim of the study was to determine the occupational health status of dentists in New Zealand and any work-related factors that may be related to dentists’ health concerns. The majority of dentists had good general health, but physical fitness levels were not ideal. The prevalence of hand dermatoses and musculoskeletal problems was high. Workplace bullying was reported by one-fifth of dentists, and over one-quarter had experienced a violent or abusive incident.

5.9.2 Strengths and weaknesses of the study

The study had some potential weaknesses. Unfortunately, it was not possible to survey non-practising dentists, some of whom may have retired for occupational health reasons. A small proportion of respondents chose not to answer all questions, introducing an element of item non-response, and it must be assumed that this did not significantly affect the findings of the study. Although measures were taken to ensure the confidentiality of responses (the researchers were unable to determine who each questionnaire belonged to as they were anonymised independently), respondents may not have had complete faith in the survey’s confidentiality and thus may not have answered sensitive questions truthfully. Finally, owing to the cross-sectional nature of the study, cause and effect could not be demonstrated, but associations between variables can be described.

Where the study’s strengths are concerned, a satisfactory response rate (Locker, 2000) was achieved after two mailings. It is not possible to accurately determine how respondent dentists differed from non-responders, but comparison of responders with the practising dentists in NZ (using the Dentist’s Register maintained by the Dental Council of New Zealand) showed that there were no significant differences between the two groups with respect to gender, age or country of qualification. Thus, the findings of this study can
cautiously be generalised to all NZ dentists, assuming that the two groups do not differ with respect to any other characteristics. Another strength of the study was the wide range of occupational health characteristics which were investigated. Many previous studies related to occupational health of dentists have concentrated on stress and/or burnout, and, more recently, on work engagement (Denton et al., 2008; Humphris, 1998; Moller and Spangenberg, 1996), while others have focused on other discrete areas such as percutaneous exposure incidents (Leggat and Smith, 2006a), ocular health (Chadwick et al., 2007; Al Wazzan et al., 2001), hand dermatoses (Leggat and Smith, 2006b; Sinclair and Thomson, 2004) or musculoskeletal problems (Lehto et al., 1991). A few recent studies have investigated broader issues such as habits (such as smoking and alcohol), areas of pain/discomfort, vision problems, allergies, and fitness and general wellbeing in combination (Kay and Lowe, 2008; Gijbels et al., 2006). Thus, the current study stands out for its breadth of scope.

5.9.3 General health

Overall, most dentists had very good general health. Only 1% reported using recreational drugs; this is considerably fewer than reported among dentists in the USA (Kenna and Wood, 2005) and vocational dental practitioners in the UK (Underwood et al., 2007) (which would be a younger sample). The 3% of respondents who were smokers is lower than estimates recently reported for dentists in the UK (Underwood et al., 2007), the USA (Kenna and Wood, 2005) and other countries (Smith and Leggat, 2006), but it is similar to that reported by Kay and Lowe in the UK in 2008. Although almost four-fifths of dentists reported drinking alcohol regularly; the mean weekly consumption of 7.3 standard drinks per week is within the recommended maximum of 14 for women and 21 for men and similar to that reported for dentists in the USA (Kenna and Wood, 2005). In a previous study, 25% of New Zealand dentists stated that they used alcohol as a means to relieve stress (Ayers et al., 2008c). Moderate drinkers (1-7 standard drinks per week) were more satisfied with their health than other dentists, consistent with the theory that one glass of wine per night has health benefits! Kay and Lowe (2008) reported that, of dentists in the UK, 6% had a “drink problem” and 9% had alcoholic tendencies. It appears that some NZ

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8 Alcohol Advisory Council www.alac.org.nz
dentists also consume too much alcohol, with reported consumption reaching up to 70 units per week for one dentist.

5.9.4 Sick days

Most dentists had taken very few days off work due to illness, although a minority had taken many days off. However, on average, respondents had worked almost one week (4.6 working days) when they had not felt physically well. Furthermore, dentists who had worked at least six days in the previous year when they felt unwell were more likely than their colleagues to have experienced an eye injury, needle-stick injury or other work injury. A larger proportion of those dentists reported having experienced bullying or a violent or abusive incident in the workplace than those who had less frequently gone to work when feeling unwell, although this was not statistically significant. This suggests that going to work when not feeling physically well may predispose dentists to workplace injuries or incidents.

A greater proportion of women than men had taken four or more days off work due to illness in the preceding year. In addition, more women than men reported working six or more days when they felt unwell (although this did not reach statistical significance). It is not clear whether female dentists are more prone to illness than male dentists or whether some of the ‘sick’ days taken were to mind dependents who were unwell.

5.9.5 Physical fitness

Although seven out of ten dentists rated their general health as very good or excellent, fewer than half rated their physical fitness as highly. It appears that many dentists do not find as much time to exercise as they would like. Low exercise rates have also been reported for Thai dentists (Leggat et al., 2001), who also had a high prevalence of musculoskeletal problems (Chowanadisai et al., 2000). A lack of physical fitness has been associated with musculoskeletal symptoms, and physical exercise is recommended for dentists (Lehto et al., 1991).
5.9.6 General wellbeing

While almost two-thirds of respondents were generally happy and interested in life, almost one-third were somewhat happy, and about 4% were unhappy, with little or no interest in life. In a recent study from the UK, 53% of dentists were happy and interested in life, 31% somewhat happy, and 2% unhappy (Kay and Lowe, 2008). This suggests that dentists in NZ are happier than those in the UK. It might be assumed that remuneration methods may be at least a factor in explaining this, but it would be of interest to further investigate other possible reasons for this. For example, are residents in New Zealand happier than those in the UK in general? None-the-less, it would be useful if unhappy dentists could be identified so that support could be provided. Many dentists reported that their lives were stressful, but it is not clear whether they perceived this in a positive or negative light. The way an individual views stress has a considerable affect on how it is managed.

5.9.7 Stress

Previous studies (Ayers et al., 2008; Newton et al., 2006; Cooper et al., 1987; Rada and Johnson-Leong, 2004) have suggested that dentists suffer high rates of stress, with stress being identified as a reason for premature retirement (Burke et al., 1997). Contributing factors include time pressure (and limited personal time), procedural intimacy, staff and patient relationships (including treating ‘difficult’ or nervous patients and/or children), job satisfaction and financial concerns (Ayers et al., 2008; Leggat et al., 2007). In the current study, women rated their lives as more stressful than men, while those aged over 50 rated their lives as being the least stressful, and those aged 40-49 the most stressful. It is possible that women and those aged 40-49 are more likely to be juggling work and family life, and they may perhaps have more financial pressures such as house mortgages and practice loans. High levels of stress can lead to ‘burnout’ and also contribute to musculoskeletal problems among dentists (Gijbels et al., 2006).
5.9.8 Pain, discomfort and medication use

Almost 60% of dentists experienced some pain or discomfort, with close to 40% requiring analgesics at least once in the previous four weeks. A recent New Zealand study reported that 33% of 32-year-olds had taken analgesics in the previous two weeks, and 16% had taken nutrient supplements (Thomson et al., 2007). Similarly, 39% of UK dentists in a recent study reported having taken analgesics in the previous 4 weeks (Kay and Lowe, 2008). More dentists had taken vitamin supplements (25%) and antihistamines (13%) in this study than in the UK (13% and 9% respectively; Kay and Lowe, 2008). The difference in vitamin use may reflect a difference in the popularity of vitamin supplements between the two countries, while the difference in antihistamines may relate to a higher prevalence of hayfever-type conditions in NZ, or perhaps a difference in seasons between the two studies. Differences between the two countries in the marketing and direct-to-consumer advertising of vitamin supplements and medications may also have contributed. It has been shown that more advertising leads to more prescriptions and greater use of medications, and that the laws pertaining to the advertising of medications vary by country (Mintzes et al., 2003). In the case of vitamin supplements, other factors (such as the fitness and fashion sectors) may influence consumer demand, along with recommendations for supplements such as (folic acid) during pregnancy (Thomson et al., 2007). Overall, three-quarters of dentists had taken some form of medication in the preceding four weeks, with overweight individuals having taken more. This would appear similar to the New Zealand population, with 65% of 32-year-olds in the study by Thomson and colleagues having taken medications in the preceding two weeks.

5.9.9 Ocular health

The age-associated gradient of greater use of spectacles, contact lenses and magnification with age is to be expected, as visual acuity, accommodation and yellow hue discrimination decrease with age, while glare and contrast sensitivity increase (Chadwick et al., 2007). Younger dentists were more likely to wear eye protection, most likely because they did not have prescription glasses or loupes (which would serve to protect the eyes as well as aiding vision). More of the dentists who saw fewer patients per day wore eye protection regularly than those who had larger patient numbers. This may be because some dentists choose to
see very few patients per day but provide large quantities of complex treatment at one appointment. Alternatively it could be because these dentists were older and more settled in their practice routines. The more than one-fifth of dentists in our sample had not undergone an eye examination in the previous two years (as is recommended for dentists) is higher than recently reported from the UK (Chadwick et al., 2007). In contrast to previous research (Al Wazzan et al., 2001), where the prevalence of ocular injury was higher in males and females, there were no gender differences in eye injury prevalence in this study. The overall prevalence was similar to that reported in the UK by Porter and colleagues (1990). The one in four dentists who did not use eye protection regularly were at greater risk of aerosol splatter (and the subsequent risk of bacterial and viral infection), direct mechanical trauma, or chemical injury involving the eyes.

5.9.10 Needlestick injuries

Fewer dentists in the current sample had received needlestick injuries than in other studies (Yengopal et al., 2001; Porter et al., 1990; Chowanadisai et al., 2000, Leggat, 2006), although some of these included all sharps injuries, while the wording in my questionnaire was ‘needlestick’. Women reported a higher prevalence of needlestick injuries than men, despite working fewer hours. The reasons for this are not clear. Given the potential for transfer of viruses (such as HIV and Hepatitis), measures to further prevent needlestick and other sharps injuries should be encouraged.

5.9.11 Workplace bullying and aggression

The incidence of violence and aggression towards healthcare personnel is reportedly increasing, although dental staff experience violent incidents less frequently than other healthcare workers. Eighty percent of a sample of dental practice personnel in the UK reported having experienced aggression at work, with some having experienced physical violence (Pemberton et al., 2000). In my study, over one-quarter of dentists had experienced a violent or abusive incident. The prevalence of workplace bullying is also of concern, with almost one-fifth of dentists having experienced it. Furthermore, those who did report it were more likely to have taken more days off work due to illness in the previous year. This appeared to be a particular concern for female and employee dentists,
and those aged between 40 and 49, although it is not known at what stage in their career the bullying had occurred. Further investigation of workplace bullying and aggression would be useful.

5.9.12 Dermatitis

Over half of the dentists in the current study had experienced at least one dermatitis-type symptom during their practising life. The prevalence was slightly higher than that previously reported for NZ dentists, where 42% had any symptom during their practising life and 33% had any symptom during the previous 12 months (Sinclair and Thomson, 2004). However, the variable ‘dry cracked hands’ was not included in the previous study. When this variable was removed from the current study data, the prevalence was 238 (42.0%; 95% CI 37.9 to 46.1%) during the previous 12 months and 280 (49.5%; 95% CI 45.4 to 53.6%) during their practising life. When the 95% CI for the earlier study’s estimates are taken into account, these are still somewhat higher than those reported four years ago. Consistent with previous studies (Sinclair and Thomson, 2004; Leggat and Smith, 2006b), the prevalence of dermatitis symptoms was higher in female than male dentists. The higher prevalence of red hands and fingers, dry cracked hands, and vesicles on hands or fingers, and itching of hands or finger in the previous 12 months (and of dry cracked hands or itching hands or fingers during their practising life) among younger dentists suggests that dermatitis may become more of an occupational health issue for dentists over the coming years. Dentists who treated fewer patients per day had a higher prevalence of dermatoses in the previous 12 months; perhaps they were working fewer clinical hours because of this problem. Hand dermatoses can often be managed by self-medication, use of non-powdered, non-latex gloves, and avoidance of other allergens (Sinclair and Thomson, 2004, Leggat et al., 2007).
5.9.13 Headaches

While the prevalence of headaches within the previous 12 months was high, they occurred during only a few days per year for most individuals. However, one-quarter of female dentists experienced headaches for at least 8 days during the last year. Female dentists have also reported more frequent headaches in other studies (Marshall et al., 1997). The reasons for this, (or its impact on the workforce) are not clear.

5.9.14 Musculoskeletal symptoms

As in previous studies of dentists (Leggat and Smith, 2006c; Marshall et al., 1997; Gijbels et al., 2006; Alexopoulos et al., 2004; Ratzon et al., 2000; Lehto et al., 1991) and even dental students (Rising et al., 2005), the prevalence of musculoskeletal symptoms was high, with the most commonly reported musculoskeletal problems relating to the neck, shoulder, back and wrists/hands. The impact of these symptoms on daily life was considerable, with many dentists reporting that their symptoms prevented normal tasks, and necessitated days off work and visits to health professionals. The 12 month prevalence of musculoskeletal symptoms among dentists in our study did not significantly differ from those recently reported for dental therapists in NZ (despite the gender differences between the two samples; Samotoi et al., 2008) for neck, shoulder, upper back, lower back or knee symptoms, although dentists had a lower prevalence of elbow and wrist/hand symptoms than dental therapists. The greater prevalence of hip/thigh symptoms reported for overweight dental therapists was not seen among dentists, although there was a higher prevalence of elbow, knee and ankle/feet pain among overweight dentists in the current study (Figure 5.1). As has previously been reported (Marshall et al., 1997; Finsen et al., 1998), female dentists more commonly had musculoskeletal pain than males, but the negative association between musculoskeletal pain and years since graduation reported by Chowanadisai and colleagues, (2000) and Leggat and Smith (2006) was not seen in this study (with the exception of neck pain).
Figure 5.1  Comparison of the prevalence of musculoskeletal symptoms among dentists and dental therapists\textsuperscript{1} in New Zealand

\begin{center}
\begin{tikzpicture}
\begin{axis}[
width=\textwidth,
height=0.5\textwidth,
ybar,nodes near coords,bar width=10pt,

\addplot[blue!70!black,fill=blue!50!white] coordinates {
(1,64) (2,58) (3,24) (4,42) (5,32) (6,64)
};
\addplot[purple!70!black,fill=purple!50!white] coordinates {
(1,60) (2,53) (3,20) (4,40) (5,28) (6,60)
};

\node at (axis cs:1.25,6) {Neck};
\node at (axis cs:2.25,58) {Shoulders};
\node at (axis cs:3.25,24) {Elbows};
\node at (axis cs:4.25,42) {Wrists/hands};
\node at (axis cs:5.25,32) {Upper back};
\node at (axis cs:6.25,64) {Lower back};

\end{axis}
\end{tikzpicture}
\end{center}

\textbf{Location of Musculoskeletal Symptoms}

\textsuperscript{1}Samotoi 	extit{et al.}, 2008

Part-time dentists have been found to have more musculoskeletal problems than their full-time counterparts in other studies, as well as in this study (Chowandisai \textit{et al.}, 2000). It appears that dentists with significant occupational health problems may reduce their clinical practice, as those reportedly treating fewer patients per day had a higher prevalence of shoulder, neck and hand/wrist pain and dermatoses over the previous 12 months. Alternatively, the dentists who treat fewer patients per day may perform more intricate and complex procedures, meaning that they wear gloves for a greater proportion of the day, and spend more time in a dental working position that predisposes to musculoskeletal problems.
5.9.15 Influence of gender

In general, women have been reported to suffer more occupation-related health complaints than men (Marshall et al., 1997). However, most studies involving the occupational health of dentists have not reported significant differences by gender, although female dentists are often reported to have more musculoskeletal problems than their male colleagues (Gijbels et al., 2006). It has been suggested that female gender roles require women to be responsible for a disproportionate amount of domestic labour and child care, increasing their susceptibility to role conflict between work and family demands, and that this may lead to a variety of negative health outcomes. For example, women involved in care-giving are more prone to back pain, insomnia, arthritis and depression. Lack of control in the workplace is also associated with poor self-rated health. Women with work, household and childcare responsibilities may not have sufficient time to engage in physical activity, relaxation or self-care (Spitzer, 2005). In comparison to males in the current study, women reported higher stress levels, and a greater prevalence of needlestick injuries, workplace bullying, dermatitis, headaches, TMJ pain and musculoskeletal pain. Despite this, women were more satisfied with their health overall than male dentists.

5.9.16 Influence of BMI

Overweight dentists appeared to have inferior health to those who were not, as they were more likely to report experiencing pain or discomfort, having more days off work due to sickness, poor general health and physical fitness, and lower satisfaction with their health. They were also more likely to have experienced a violent or abusive incident at work. Obesity is associated with a greater prevalence of many diseases, including non-insulin-dependent diabetes mellitus, coronary heart disease, hypertension, and several types of cancer. Studies of the general population have reported that overweight individuals are more likely to use medical services than those in the healthy weight range. In Australia, for example, a positive relationship has been reported between BMI and medical service use, including attendance at accident and emergency departments, doctors, outpatient clinics and other health professionals, as well as medication use (Reidpath et al., 2002).
Interventions to encourage overweight practitioners to lose weight may improve the health and wellbeing of the dentist workforce.

Concerns about overweight and obesity have been raised among health professionals in the USA, where it has been reported that 44% of US male physicians are overweight and 6% obese. It has been suggested that these doctors are poor role models for their patients. Just as health professionals have been encouraged to give up smoking, perhaps they should also be encouraged to ensure that their weight is within the healthy range (Cheng, 2006).

5.9.17 Future research

Further research is required to determine the impact of occupational health disorders on the productivity of the dentist workforce. The causes of occupational health problems affecting dentists (particularly musculoskeletal disorders) need to be determined with greater accuracy, along with the occupational safety measures that should be employed to help reduce the prevalence and impact of these disorders.
Chapter 6  Conclusions

A number of key overarching issues pertaining to the New Zealand dental workforce have been identified in the seven studies; these are now brought together to conclude the thesis.

The aim of this thesis was to understand the issues facing key groups of the oral health workforce and to identify priorities for workforce development.

6.1 Summary of findings

The dentist workforce continues to change with respect to gender, ethnicity, age, and working practices. Some groups are vulnerable to professional isolation and occupational health concerns (such as stress and physical health complaints). Creative strategies are required to assist these groups. By increasing career satisfaction and improving the health of the workforce, productivity is likely to improve.

The number of women in the dental workforce continues to increase. Despite substantial changes in societal trends and expectations, important differences remain between male and female dentists. Female dentists are less active in the workforce than men; they work fewer hours per week, take more career breaks, and plan to retire earlier. They are more likely to work as associates in practice or in salaried positions, and to have student loans. They are less active in CPD and are less likely to specialise. It appears that women dentists have more difficulty achieving an ideal work-life balance; they have lower career satisfaction than male dentists and rate their lives as more stressful. They tend to use stress management strategies which differ from those of their male colleagues. Women dentists are more likely to experience needle-stick injuries, workplace bullying, dermatitis, headaches, musculoskeletal problems and TMJ pain. Despite this, they are more satisfied with their overall health than male dentists.

The proportion of overseas-trained dentists in the NZ dental workforce has increased substantially in recent years. This has helped to offset the loss of recent graduate dentists to
other countries. Over time, the working practices of immigrant dentists approximate those of NZ-trained dentists with respect to practice settings, self-employment and participation in CPD. However, immigrant dentists experience more stressors than NZ-trained dentists. Many feel isolated and require greater professional support and peer contact, and a number have substantial financial difficulties. Most have found the NZDREX process difficult and stressful, and report that they required increased contact with the profession and better information about the examination process and dental practice in NZ. Improved support for immigrant dentists would aid their transition into general practice in this country.

Rural dentists constitute another group of practitioners at greater risk of professional isolation. There has been a decrease in the proportion of dentists working in small towns in recent years. Concerns expressed by rural practitioners include the greater demands of rural practice (such as a requirement to be on call and being less able to refer to dental specialists), difficulty recruiting associates and locum dentists, lower incomes, difficulty accessing sufficient CPD, and, for rural immigrant dentists, problems with being accepted by the local community. Additional concerns for female dentists are access to shopping, and the availability of employment for spouses and good education for their children.

Most dentists in New Zealand enjoy good general health and physical fitness. However, almost half have recent experience of dermatitis-type conditions. While few dentists require time off due to musculoskeletal symptoms, many do require care from a health professional such as a physiotherapist. Many dentists in New Zealand report having experienced work-place bullying and/or a violent or abusive incident at work.

Factors such as career satisfaction and remuneration are major contributors to the recruitment and retention of a workforce. These issues are critical in the SDS, where most dental therapists are dissatisfied with their income and feel that they are not a valued part of the dental community. Dental therapists tend to take long career breaks, and over half plan to retire within 10 years. While many hygienists take career breaks and work part-time, most have high levels of career and income satisfaction.
6.2 Implications of the research

This thesis has made a substantial contribution to our knowledge and understanding of the NZ dental workforce. It has also provided baseline information on several topics, including the working practices and career satisfaction of dentists, dental therapists and dental hygienists, difficulties experienced by immigrant dentists, and occupational health issues for general dental practitioners. Good levels of engagement with the oral-health professions were achieved in conducting this research, as reflected in the very good response rates achieved in each of the studies.

There appears to be an increasing emphasis on dental workforce issues in New Zealand, with the first oral health professions workforce meeting to be held in May 2009. This meeting will be supported by the Tertiary Education Commission, the Ministry of Health, the New Zealand Dental Association, and representatives of each of the key stakeholders within the dental profession. Such dialogue will be helpful in further developing priorities for action to ensure that we have an optimal workforce to meet the oral health needs of the New Zealand population into the future. Expertise developed by the author and her co-investigators during these studies—as well as the studies’ findings—will be utilised at this meeting and in the future.

6.3 Recommendations arising from this research

There is a need to continue to monitor the dental workforce with respect to its composition, and the working practices, job satisfaction and health of its members. In the meantime, though, several recommendations can be made from the current data.

Consideration should be given to the formation of a Dental Training Board in New Zealand (similar to the Medical Training Board formed in 2007). Such a body should have representation from the Ministry of Health, the Tertiary Education Commission and the professional associations representing the oral health workforce (NZDA, NZDTA, NZDHA, NZIDT). The Board could monitor the number of dental professionals in
training, together with their ethnic mix, geographic spread and related issues, and give recommendations about interventions required to ensure an optimal dental workforce.

Further initiatives need to be developed to address the ethnic imbalance of the dental workforce. In particular, the number of Maori and Pacific oral health professionals is well below acceptable levels, thus limiting the cultural appropriateness of the workforce and its ability to deliver acceptable services to New Zealand’s diverse communities. While the training institutions have places reserved for Maori and Pacific students, demand for these is not great, so strategies to promote careers in dentistry need to take place earlier in the life course (for example, by promoting these careers at school and in the community).

The New Zealand Government should extend the recently announced voluntary bonding scheme\(^1\) to include dental graduates. This could help address our poor retention of dental graduates and help to abate the trend for urbanisation of dentistry. Further investigation is required to determine the reasons for the declining numbers of dentists working in small towns, and whether the needs of the rural population are being met.

Greater support should be provided for overseas-qualified dentists. This could include: improved access to information about the registration process in New Zealand (such as an easy to access website and a toll-free helpline); a voluntary mentoring programme for prospective NZDREX candidates; a more formalised mentorship programme for NZDREX dentists, similar to the Graduate Professional Development Programme; and the appointment of a NZDREX representative on the Board of the NZDA to ensure that the voices of NZDREX dentists are heard at a national level. The development of such support mechanisms should involve the DCNZ and the NZDA, along with immigrant dentists themselves.

The role of women dentists in the profession needs to be regularly reviewed. Further research is required to determine the number of women who give up practice altogether when they have children, and whether they could be encouraged to return to dentistry.

\(^1\) This is an incentive payment scheme for medical, midwifery, nursing, teaching and veterinarian graduates working in hard-to-staff areas. Graduates who stay on the scheme for at least three years (and up to five years) receive incentive payments to help repay their student loans. See [www.moh.govt.nz/moh.nsf/indexmh/bonding](http://www.moh.govt.nz/moh.nsf/indexmh/bonding) for further details.
Where possible, women should be encouraged to remain active in the profession during their child-bearing years, and to increase their hours when they are able. This may require flexible working hours (particularly within salaried positions) and aids to support them on returning to work following career breaks. Such aids could include active mentorship, and perhaps reduced registration and NZDA fees in their first year back to work. Women dentists should be encouraged to participate in continuing education and in peer contact activities, and to consider specialty training. More flexible specialist training programmes could be developed in key disciplines such as special needs dentistry and paediatric dentistry. These are specialties which are currently short of ‘manpower’ but may appeal to women (particularly if they could then work on a salaried basis) if they were able to undertake flexible training. However, the costs of training would need to be balanced against the productivity of the specialist and the likely income of the individual.

Further research is required to monitor the occupational health of New Zealand dentists and other dental professionals. The existence of services such as the Doctors’ Health Advisory Service and the Medical Assurance counselling scheme should be promoted. Further information regarding strategies to increase physical fitness, improve general health and reduce stress should be available for dental health professionals. For example, educational sessions on optimal working posture and the management of dermatoses could be provided at NZDA branch level or by internet learning. The useful handbook ‘Self Care for Dentists’ could be updated, reprinted and be made available to a wider range of oral health professionals.

Ongoing research is required to determine how recent (and future) changes involving the dental therapy and dental hygiene professions will impact on these individuals and the communities they serve. Broader continuing education opportunities for dental therapists and hygienists are required to enable them to upskill to new scopes of practice, and to maintain professional competence. Such opportunities may be assisted by organisations such as the NZDA, but they also require input from the therapists and hygienists and their employers. As female-dominated professions, it is likely that the CPD issues relating to women dentists also apply to these groups. These need to be further investigated and solutions developed. Furthermore, issues such as recruitment, remuneration and career

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progression still need to be addressed in order to maintain adequate numbers of dental therapists and hygienists in the workforce, and improve their productivity. The Ministry of Health has been proactive in this respect, and such support needs to be continued.

Continued support should be given for the 2009 National Oral Health Survey and for this to be repeated at regular intervals, in order to monitor and assess the ongoing oral health needs of our communities and how effective the workforce has been in improving oral health and reducing health inequalities. Such a large undertaking requires support from many stakeholders (including the Ministry of Health, the NZDA, DCNZ, ACC, other professional organisations, and individual practitioners).

Routinely collected data by organisations such as the MOH and ACC should be utilised where possible to aid in the assessment of the oral health status of our population and the demand for oral health care. Oral health professionals need to support the collection of such information within their workplaces, and, in return, agencies holding the data should make this information available where possible, and enable ready access to such data by dental health services researchers.

Organisations such as the Ministry of Health and the Dental Council of New Zealand have a key role to play in promoting the health and wellbeing of the dental workforce, as well as in ensuring that the size and composition of the workforce are appropriate to meet the needs of New Zealand communities. However, professional associations (such as the NZDA, NZDHA, NZDTA, NZIDT and Te Ao Marama) also have a critical role to play. Optimal communication between such organisations is crucial in ensuring maximal collaboration for optimal benefit. In addition, measures to promote collegiality among dental professionals and among professional groups (such as dental therapists and dental hygienists) would be advantageous. Among other benefits, such peer support limits professional isolation and assists with CPD activities. However, individual practitioners need to take some responsibility for their own health and wellbeing, and to support their colleagues. A healthy and satisfied dental workforce is likely to be more productive on a day-to-day basis, and in the longer term by having improved retention of these highly-skilled workers.
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214


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Appendix 1. Publications resulting from the thesis research


Self-reported occupational health of general dental practitioners

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Background
Limited information is available regarding the occupational health status of dentists (particularly in New Zealand), although previous research suggests that stress, hand dermatoses and musculoskeletal symptoms are common.

Aims
To determine the occupational health status of New Zealand dentists.

Methods
A nationwide postal survey of a representative sample of 750 dentists.

Results
There was a response rate of 77%. Most dentists (71%) reported their general health as very good or excellent; 43% rated their physical fitness as excellent or very good and 64% were happy and interested in life. Workplace bullying had been experienced by 19% and was higher for female and employee dentists and 29% had experienced a violent or abusive incident at work. Almost half of the sample (47%) had experienced at least one dermatitis-type condition in the previous 12 months. The most commonly reported sites for musculoskeletal problems experienced in the previous year were the neck (59%), lower back (57%) and shoulders (45%). Women had a higher prevalence of several occupational health problems, but were more satisfied with their overall health than male dentists.

Conclusions
The majority of dentists had good general health, but physical fitness levels were not ideal. The prevalence of hand dermatoses and musculoskeletal problems are high and impact significantly on dentists' daily lives. Interventions such as reducing weight and training in optimal working methods to reduce musculoskeletal problems and injuries (such as eye or needlestick incidents) might improve the health of this workforce but further research is required.

Key words
Dentist; dermatoses; gender; musculoskeletal; obesity; occupational health.

Introduction
Dentistry is a stimulating and rewarding occupation but is physically and mentally demanding. The physical attributes required include good visual acuity, hearing, depth perception, psychomotor skills and manual dexterity and the ability to maintain occupational postures over long periods. Dentists also require mental alertness, sound judgement and good communication and managerial skills. Diminution of any of these may affect a practitioner's performance [1].

Failure to adapt to or contend with the working environment can predispose to illness or injury [2]. Dentists may be at risk of occupational diseases such as systemic infection (e.g. HIV, hepatitis B or C and tuberculosis), allergies (including dermatitis and respiratory disorders), toxicity, hearing loss, musculoskeletal disorders (particularly of the neck, back and shoulders), injuries (e.g. percutaneous or ocular) and psychological problems [1,3]. Musculoskeletal disorders, cardiovascular disease and neurotic symptoms contribute to premature retirement among dentists [4]. Although dentistry has seen significant technical advancements in recent years, occupational health problems remain [3].

There has been little discussion of the practising characteristics of dentists that may be associated with occupational disease. The aim of the present study was to determine the occupational health status of New Zealand (NZ) general dental practitioners (GDPs) and to identify associations with practising characteristics.

Methods
A nationwide postal survey of GDPs was undertaken in February to March 2008. Approval was gained from the University of Otago Ethics Committee. A sample
of 750 GDPs was randomly selected from the 2007 Dental Register of the Dental Council of New Zealand. The questionnaire was developed following a literature review and was piloted with a sample of dental specialists. It was posted with a covering letter explaining the study’s purpose and a reply paid envelope. Three weeks later, a second wave of forms was sent to dentists who had not responded. Participation incentives were offered in the form of a prize draw for each round.

The questionnaire sought data on respondents’ socio-demographic and practising characteristics and information about their health behaviours and general health. For reporting purposes, respondents were grouped by gender, number of years working as a dentist (<10, 10–19, 20–29, 30–39 and 40+), country of dental training (NZ or other) and number of patients treated per day (up to 12, ≥13). The body mass index (BMI) was calculated for each dentist by using the formula: BMI = (weight in kg)/(height in m)².

Responses were analysed using the Statistical Package for the Social Sciences (SPSS; Version 16 for Mac OS X; www.spss.com). Associations between categorical variables were tested for statistical significance using the chi-square test, with the alpha level set at 0.05. Means were compared using the independent samples t-test.

**Results**

Thirteen questionnaires were returned because of incorrect address details and six because the dentists were not currently practising. Of the 567 questionnaires returned, one was excluded because fewer than half of the questions had been answered, giving a response rate of 77%. Approximately one-third (32%) of respondents were female and 68% were male. Comparison of characteristics of the responders with practising dentists in NZ (using the Dentist’s Register) showed that there were no significant differences.

Almost three-quarters of respondents worked in group practices (73%), with 26% working solo. Most were self-employed (65%), while 21% were employees on commission and 14% worked on salary. Respondents had been practising for a mean of 22 years (SD 12) and had patient contact for a mean of 31 h/week (SD 9, range 0–60). Gender differences existed, with men treating patients for a mean 33 h/week (SD 9), while women treated patients for 28 h/week (SD 10, P < 0.001). The mean number of patients seen per day was 13 (SD 6). Self-employed dentists worked more contact hours than employees dentists (32, SD 8 and 30, SD 10, respectively; P < 0.05) and treated more patients per day (14, SD 7 and 12, SD 4, respectively; P < 0.001).

Only 3% of dentists were regular smokers and 5% smoked occasionally. Most reported using alcohol (79%), with usual consumption ranging from 0 to 70 units/week (mean 7; SD 8). The mean BMI was 25 (SD 4, range 15–55).

On average, dentists had taken 2.9 days off work due to illness in the previous year (SD 12, range 0–200), but had worked a mean 5 days (SD 12, range 0–200) when they had felt unwell. A higher proportion of dentists with a high BMI (≥26) had taken ≥4 days off due to illness than those with a lower BMI (≤25; 41, 21% and 37, 13%, respectively; P < 0.05). A greater proportion of women than men had taken ≥4 days off due to sickness in the previous year (39, 22% and 50, 13%, respectively; P < 0.01) or reported working ≥6 days when they felt unwell (P > 0.05).

Characteristics of respondents’ self-reported general health are presented in Table 1.

Dentists who drank moderately (1–7 units/week) reported being more satisfied with their health; 33% of non-drinkers, 51% of moderate drinkers and 41% of heavier drinkers reported being very satisfied with their health (P < 0.05). Three-quarters of dentists had taken at least one form of medication in the preceding 4 weeks; the mean number taken was 1 (SD 1, range 0–7). The most commonly taken drugs were analgesics (39%), cardiac or anti-hypertensive medications (14%) and allergy medications such as antihistamines (14%). One-quarter (25%) had taken vitamin supplements and 4% had taken homeopathic medicines. Eight (1%) had taken recreational drugs. There were no differences by gender, age or smoking status.

A larger proportion of dentists with a high BMI had taken medications in the last year than those with a lower BMI (72 and 61%, respectively; P < 0.05).

Data relating to the ocular health of the respondents and their experience of work-related adverse health events are presented in Tables 2 and 3, respectively. Individuals who had taken ≥4 days off work due to illness in the last year were more likely to have reported experiencing workplace bullying (29 and 18%, respectively; P < 0.05). Respondents who drank more heavily were least likely to report that they had; 14% of dentists who reported consuming >7 units of alcohol per week had experienced workplace bullying (29 and 18%, respectively; P < 0.05). There were no significant differences between the two groups with respect to workplace bullying experience. A greater proportion of dentists working in solo practice had experienced a violent or abusive incident than in group practice (37 and 26%, respectively; P < 0.05). Conversely, more of those in group practice had experienced an eye injury (15 and 8%, respectively; P < 0.05).

Data on dermatitis-type conditions are presented in Table 4. Females and younger dentists reported a higher experience of most symptoms (data not shown). Dentists who treated fewer patients per day had a higher prevalence of dermatitis-type symptoms than those who treated more (47 and 37%, respectively; P < 0.05).
### Table 1. Self-reported general health (percentages in brackets)*

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age group</th>
<th>All combined, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male, n (%)</td>
<td>Female, n (%)</td>
<td>0–39 years, n (%)</td>
</tr>
<tr>
<td>268 (70)</td>
<td>131 (72)</td>
<td>137 (72)</td>
</tr>
<tr>
<td>117 (30)</td>
<td>50 (28)</td>
<td>53 (28)</td>
</tr>
<tr>
<td>How do you rate your general health?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent/very good</td>
<td>174 (45)</td>
<td>69 (38)</td>
</tr>
<tr>
<td>Good/fair/poor</td>
<td>211 (55)</td>
<td>112 (70)</td>
</tr>
<tr>
<td>How do you rate your physical fitness?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent/very good</td>
<td>174 (45)</td>
<td>69 (38)</td>
</tr>
<tr>
<td>Good/fair/poor</td>
<td>211 (55)</td>
<td>112 (70)</td>
</tr>
<tr>
<td>What is your usual feeling?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Happy and interested in life</td>
<td>238 (62)</td>
<td>119 (67)</td>
</tr>
<tr>
<td>Somewhat happy</td>
<td>130 (34)</td>
<td>52 (39)</td>
</tr>
<tr>
<td>Unhappy</td>
<td>15 (4)</td>
<td>7 (4)</td>
</tr>
<tr>
<td>How would you describe your life?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very fairly stressful</td>
<td>254 (67)</td>
<td>138 (78)**</td>
</tr>
<tr>
<td>Not very/not at all stressful</td>
<td>128 (34)</td>
<td>40 (23)</td>
</tr>
<tr>
<td>To what degree do you experience pain and discomfort?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free from pain/discomfort</td>
<td>154 (40)</td>
<td>71 (40)</td>
</tr>
<tr>
<td>Not free from pain/discomfort</td>
<td>229 (60)</td>
<td>106 (60)</td>
</tr>
<tr>
<td>Overall, how satisfied are you with your health?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very satisfied</td>
<td>161 (42)</td>
<td>91 (51)*</td>
</tr>
<tr>
<td>Somewhat or not satisfied</td>
<td>223 (58)</td>
<td>87 (49)</td>
</tr>
</tbody>
</table>

*Some respondents did not answer all questions.

*P < 0.05, **P < 0.01.

### Table 2. Factors relating to dentists’ ocular health

<table>
<thead>
<tr>
<th>Uses magnification regularly, n (%)</th>
<th>Wears prescription glasses or lenses regularly, n (%)</th>
<th>Uses eye protection regularly, n (%)</th>
<th>Had eye examination in previous 2 years, n (%)</th>
<th>Ever had eye injury at work, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>173 (45)***</td>
<td>229 (60)</td>
<td>212 (56)***</td>
<td>300 (78)</td>
</tr>
<tr>
<td>Female</td>
<td>40 (22)</td>
<td>102 (57)</td>
<td>131 (73)</td>
<td>140 (78)</td>
</tr>
<tr>
<td>Age group (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;40</td>
<td>33 (17)***</td>
<td>93 (49)***</td>
<td>138 (73)***</td>
<td>121 (64)***</td>
</tr>
<tr>
<td>40–49</td>
<td>63 (40)</td>
<td>72 (46)</td>
<td>111 (70)</td>
<td>124 (79)</td>
</tr>
<tr>
<td>≥50</td>
<td>116 (54)</td>
<td>166 (78)</td>
<td>93 (45)</td>
<td>194 (91)</td>
</tr>
<tr>
<td>Number of patients per day</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 12</td>
<td>115 (38)</td>
<td>166 (55)*</td>
<td>200 (67)***</td>
<td>228 (76)</td>
</tr>
<tr>
<td>≥13</td>
<td>93 (38)</td>
<td>155 (64)</td>
<td>128 (54)</td>
<td>198 (82)</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee</td>
<td>51 (26)***</td>
<td>108 (56)</td>
<td>122 (64)</td>
<td>141 (73)*</td>
</tr>
<tr>
<td>Self-employed</td>
<td>158 (44)</td>
<td>220 (60)</td>
<td>218 (61)</td>
<td>296 (81)</td>
</tr>
<tr>
<td>Days worked when not well</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥5</td>
<td>175 (40)</td>
<td>250 (58)</td>
<td>266 (62)</td>
<td>346 (80)*</td>
</tr>
<tr>
<td>≥6</td>
<td>32 (31)</td>
<td>61 (59)</td>
<td>61 (60)</td>
<td>72 (70)</td>
</tr>
<tr>
<td>All combined</td>
<td>213 (38)</td>
<td>331 (59)</td>
<td>343 (62)</td>
<td>440 (78)</td>
</tr>
</tbody>
</table>

*P < 0.05, **P < 0.01, ***P < 0.001.
Table 3. Dentists' experience of work-related adverse health events

<table>
<thead>
<tr>
<th></th>
<th>Needlesick injury in previous year, n (%)</th>
<th>Work injury excluding eyes, n (%)</th>
<th>Violent or abusive incident, n (%)</th>
<th>Workplace bullying, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>53 (14)**</td>
<td>83 (22)</td>
<td>113 (30)</td>
<td>57 (15)*****</td>
</tr>
<tr>
<td>Female</td>
<td>42 (23)</td>
<td>48 (27)</td>
<td>48 (27)</td>
<td>51 (28)</td>
</tr>
<tr>
<td><strong>Age group (years)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤40</td>
<td>39 (21)</td>
<td>37 (20)</td>
<td>48 (25)</td>
<td>37 (20)**</td>
</tr>
<tr>
<td>40–49</td>
<td>21 (13)</td>
<td>38 (25)</td>
<td>50 (32)</td>
<td>41 (26)</td>
</tr>
<tr>
<td>≥50</td>
<td>34 (16)</td>
<td>55 (26)</td>
<td>62 (29)</td>
<td>29 (14)</td>
</tr>
<tr>
<td><strong>BMI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 25</td>
<td>60 (20)**</td>
<td>71 (25)</td>
<td>77 (26)</td>
<td>60 (20)</td>
</tr>
<tr>
<td>≥26</td>
<td>23 (12)</td>
<td>46 (24)</td>
<td>70 (36)</td>
<td>39 (20)</td>
</tr>
<tr>
<td><strong>Employment status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee</td>
<td>48 (25)*****</td>
<td>40 (21)</td>
<td>53 (27)</td>
<td>48 (25)*</td>
</tr>
<tr>
<td>Self-employed</td>
<td>47 (13)</td>
<td>90 (25)</td>
<td>105 (29)</td>
<td>59 (16)</td>
</tr>
<tr>
<td><strong>Days worked when not well</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤5</td>
<td>67 (15)**</td>
<td>94 (22)*</td>
<td>114 (26)</td>
<td>78 (18)</td>
</tr>
<tr>
<td>≥6</td>
<td>25 (24)</td>
<td>33 (32)</td>
<td>37 (36)</td>
<td>26 (25)</td>
</tr>
<tr>
<td>All combined</td>
<td>95 (24)</td>
<td>131 (24)</td>
<td>161 (29)</td>
<td>108 (19)</td>
</tr>
</tbody>
</table>

*P < 0.05, **P < 0.01, ***P < 0.001.

Table 4. Prevalence of dentists' dermatitis-type conditions

<table>
<thead>
<tr>
<th></th>
<th>During the previous 12 months, n (%)</th>
<th>During practising life, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red swollen hands</td>
<td>25 (4)</td>
<td>30 (5)</td>
</tr>
<tr>
<td>Red hands or fingers</td>
<td>33 (6)</td>
<td>53 (9)</td>
</tr>
<tr>
<td>Dry cracked hands</td>
<td>118 (21)</td>
<td>156 (28)</td>
</tr>
<tr>
<td>Vesicles on hands or fingers</td>
<td>29 (5)</td>
<td>47 (8)</td>
</tr>
<tr>
<td>Scaling hands or fingers</td>
<td>43 (8)</td>
<td>55 (10)</td>
</tr>
<tr>
<td>Itching hands or fingers</td>
<td>116 (21)</td>
<td>158 (28)</td>
</tr>
<tr>
<td>Irritation of eyes, airway or nose</td>
<td>160 (28)</td>
<td>180 (32)</td>
</tr>
<tr>
<td>Any symptom</td>
<td>267 (47)</td>
<td>317 (56)</td>
</tr>
</tbody>
</table>

Discussion

In this survey of NZ general dentists, most reported good health, but hand dermatoses and musculoskeletal problems were common. Workplace bullying was reported by one-fifth, and over one-quarter had experienced a violent or abusive incident.

Turning to the study’s weaknesses and strengths, we were unable to survey non-practising dentists, who may have retired for occupational health reasons. Some respondents chose not to answer all questions, introducing some item non-response. Finally, the cross-sectional design meant that causation could not be demonstrated.

A satisfactory response rate [5] resulted from two mailings. Comparison of responders with practising dentists in NZ showed that the two groups did not differ by gender, age or country of qualification, suggesting that the findings are generalizable.

Overweight dentists were more likely than those with a lower BMI to have experienced elbow (13 and 8%, respectively, P < 0.05), knee (27 and 19%, respectively, P < 0.05) or ankle or foot pain (20 and 11%, respectively, P < 0.01) in the previous 12 months. Females had a higher prevalence of pain than males for shoulder (58 and 42%, respectively, P < 0.05) or ankle or foot pain (20 and 11%, respectively, P < 0.01) in the previous 12 months. Females had a higher prevalence of pain than males for shoulder (58 and 42%, respectively, P < 0.05) or elbow (13 and 8%, respectively, P < 0.05) or ankle or foot pain (20 and 11%, respectively, P < 0.01) in the previous 12 months. Females had a higher prevalence of pain than males for shoulder (58 and 42%, respectively, P < 0.05) or elbow (13 and 8%, respectively, P < 0.05) or ankle or foot pain (20 and 11%, respectively, P < 0.01) in the previous 12 months.

Most dentists had taken very few days off due to illness, but, on average, respondents had worked 5 days when they were well.

Data on respondents’ experience of headaches and temporomandibular joint (TMJ) pain are presented in Table 5 and experience of musculoskeletal problems in Table 6.
Table 5. Dentists' experience of headaches and TMJ pain

<table>
<thead>
<tr>
<th></th>
<th>Headaches in last 12 months, n (%)</th>
<th>Length of time with headaches in last 12 months, n (%)</th>
<th>TMJ pain in last 12 months, n (%)</th>
<th>Length of time with TMJ pain in last 12 months, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Up to 1 week</td>
<td>8 days</td>
<td>Up to 1 week</td>
<td>8 days</td>
</tr>
<tr>
<td>Male</td>
<td>208 (95)***</td>
<td>340 (88)</td>
<td>51 (13)***</td>
<td>337 (98)</td>
</tr>
<tr>
<td>Female</td>
<td>145 (81)</td>
<td>135 (75)</td>
<td>50 (28)</td>
<td>171 (95)</td>
</tr>
<tr>
<td>Trained in NZ</td>
<td>257 (60)**</td>
<td>369 (85)</td>
<td>78 (18)</td>
<td>420 (97)</td>
</tr>
<tr>
<td>Trained overseas</td>
<td>96 (73)</td>
<td>106 (79)</td>
<td>23 (17)</td>
<td>128 (96)</td>
</tr>
<tr>
<td>Employee</td>
<td>135 (70)*</td>
<td>162 (83)</td>
<td>45 (23)*</td>
<td>187 (96)</td>
</tr>
<tr>
<td>Self-employed</td>
<td>216 (60)</td>
<td>308 (84)</td>
<td>56 (15)</td>
<td>356 (97)</td>
</tr>
<tr>
<td>0-39 years</td>
<td>145 (76)***</td>
<td>148 (78)</td>
<td>42 (22)**</td>
<td>179 (94)</td>
</tr>
<tr>
<td>40-49 years</td>
<td>106 (67)</td>
<td>130 (82)</td>
<td>29 (18)</td>
<td>154 (97)</td>
</tr>
<tr>
<td>50+ years</td>
<td>101 (47)</td>
<td>179 (91)</td>
<td>19 (9)</td>
<td>214 (99)</td>
</tr>
<tr>
<td>Up to 12 patients per day</td>
<td>200 (66)</td>
<td>247 (81)</td>
<td>36 (23)</td>
<td>291 (99)</td>
</tr>
<tr>
<td>≥13 pts per day</td>
<td>140 (38)</td>
<td>212 (87)</td>
<td>16 (8)*</td>
<td>291 (99)</td>
</tr>
<tr>
<td>All combined</td>
<td>393 (63)</td>
<td>475 (84)</td>
<td>91 (16)</td>
<td>548 (97)</td>
</tr>
</tbody>
</table>

*p < 0.05, **P < 0.01, ***P < 0.001.

Table 6. Musculoskeletal symptoms experienced by dentists

<table>
<thead>
<tr>
<th></th>
<th>Symptoms in last 12 months, n (%)</th>
<th>Symptoms preventing normal tasks, n (%)</th>
<th>Symptoms last 7 days, n (%)</th>
<th>Days off work due to symptoms last year, n (range of days)</th>
<th>Seen health professional due to these symptoms in last 12 months, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neck</td>
<td>332 (59)</td>
<td>65 (12)</td>
<td>112 (20)</td>
<td>17 (1-7)</td>
<td>129 (23)</td>
</tr>
<tr>
<td>Shoulders</td>
<td>257 (45)</td>
<td>52 (9)</td>
<td>95 (17)</td>
<td>12 (1-7)</td>
<td>115 (20)</td>
</tr>
<tr>
<td>Elbows</td>
<td>57 (10)</td>
<td>15 (3)</td>
<td>23 (6)</td>
<td>2 (1-7)</td>
<td>22 (4)</td>
</tr>
<tr>
<td>Wrist/hands</td>
<td>141 (25)</td>
<td>49 (9)</td>
<td>56 (10)</td>
<td>4 (1-88)</td>
<td>43 (8)</td>
</tr>
<tr>
<td>Upper back</td>
<td>169 (30)</td>
<td>41 (7)</td>
<td>70 (12)</td>
<td>7 (1-3)</td>
<td>79 (14)</td>
</tr>
<tr>
<td>Lower back</td>
<td>325 (57)</td>
<td>86 (15)</td>
<td>120 (21)</td>
<td>16 (1-48)</td>
<td>138 (23)</td>
</tr>
<tr>
<td>Hip/thighs</td>
<td>84 (15)</td>
<td>19 (3)</td>
<td>30 (5)</td>
<td>2 (1-8)</td>
<td>40 (7)</td>
</tr>
<tr>
<td>Knees</td>
<td>118 (21)</td>
<td>26 (5)</td>
<td>54 (10)</td>
<td>5 (1-32)</td>
<td>47 (8)</td>
</tr>
<tr>
<td>Ankles/feet</td>
<td>74 (13)</td>
<td>21 (4)</td>
<td>34 (6)</td>
<td>3 (1-4)</td>
<td>34 (6)</td>
</tr>
</tbody>
</table>

had felt unwell. Furthermore, work-related injuries were more common among dentists who had worked at least 6 days in the previous year when they felt unwell (which, in turn, was more common among those reporting workplace bullying, violence or abuse), suggesting that working when unwell predisposes to such events. More women than men had taken ≥4 days off work due to illness in the preceding year and reported working ≥6 days when they felt unwell. It is not clear whether female dentists are more prone to illness than males or whether some of the 'sick' days taken were to mind unwell dependants.

Fewer than half rated their physical fitness highly, suggesting that many dentists do not find as much time as they would like for exercise, a key strategy for reducing dentists' musculoskeletal symptoms [9]. While only a few dentists were generally unhappy with little interest in life, many dentists reported stressful lives; it is unclear whether they perceived this positively or negatively. Dentists suffer high rates of stress [10-13]; this can lead to premature retirement [4]. Contributing factors include time pressure (and limited personal time), procedural intimacy, staff and patient relationships, job satisfaction and financial concerns [3,10]. In this study, women and those aged 40-49 rated their lives as more stressful, with the least among those aged >50. The former are more likely to be juggling work, family life and financial concerns [3,10]. Contributing factors include time pressure (and limited personal time), procedural intimacy, staff and patient relationships, job satisfaction and financial concerns [3,10]. In this study, women and those aged 40-49 rated their lives as more stressful, with the least among those aged >50. The former are more likely to be juggling work, family life and financial pressures. High levels of stress can lead to 'burnout' and contribute to musculoskeletal problems [14].

Almost 60% experienced pain or discomfort, with close to 40% requiring analgesics at least once in the previous 4 weeks. Overweight dentists appeared to have inferior health, as they were more likely to report experiencing pain or discomfort, having more days off work due to sickness, poor general health and physical fitness and lower satisfaction with their health. Enabling overweight practitioners to lose weight should be a key occupational health goal.
dentists wore more eye protection, probably because they did not have prescription glasses or loupes (which serve to protect the eyes as well as aiding vision). The more than one-fifth of dentists who had not undergone a recent eye examination is higher than reported from the UK [15]. In contrast to previous findings [16], there were no sex differences in eye injury prevalence in this study. Overall prevalence was similar to a UK estimate [17].

Fewer dentists had received needlestick injuries than in other studies [17–20], although some of these included all sharps injuries. Women reported a higher prevalence than men, despite working fewer hours. The reasons for this are unclear. Given the potential for transfer of viruses, measures to further prevent needlestick and other sharps injuries should be encouraged.

Violence and aggression towards dental personnel are increasing, but are less than for other health care workers. Eighty per cent of a sample of UK dental personnel [21] had experienced aggression at work (some having experienced physical violence). In our study, over one-quarter of dentists had done so. The prevalence of workplace bullying is also concerning, especially as it was associated with sick days taken and it appeared to be a particular concern for female and employee dentists and those aged between 40 and 49. Further investigation of workplace bullying and aggression would be useful.

Over half of the dentists in the current study had experienced at least one dermatitis-type symptom during their practising life. The prevalence was higher than previously reported for NZ dentists, where 33% had symptoms during the previous year and 42% during their practising life [22]. However, ‘dry cracked hands’ were not counted in that study; removing those from our data gave 12-month and lifetime prevalences of 42% [95% confidence interval (CI) 38–46%] and 50% [95% CI 45–54%], respectively, still higher than the earlier estimates. Consistent with previous studies [22,23], dermatitis symptoms were more common among females. Dentists treating fewer patients had a higher 12-month prevalence of dermatoses; perhaps they were working fewer clinical hours because of this problem. Hand dermatoses can be managed by self-medication, use of non-powdered, non-latex gloves and avoidance of other allergens (such as methacrylates) [3,22].

While the 12-month prevalence of headaches was high, they occurred during only a few days per year for most. However, one-quarter of females experienced headaches for at least 8 days, consistent with previous reports [24]. The reasons for this (and its workforce impact) are unclear. As in previous studies [9,14,24–27, 28], musculoskeletal symptom prevalence was high, most commonly in the neck, shoulder, back and wrists/hands. Their daily impact was considerable, with many reporting that symptoms prevented normal tasks and necessitated days off work and visits to health professionals. Symptom prevalence in our study did not significantly differ from that among NZ dental therapists [29] (despite the two samples’ gender differences) for neck, shoulder, upper back, lower back or knee symptoms, although fewer dentists than dental therapists had elbow or wrist/hand symptoms. As has previously been reported [24,30], female dentists had more musculoskeletal pain than males, but the previously reported negative association between musculoskeletal pain and years since graduation [19,25] was not seen (except for neck pain). Part-time dentists reported more musculoskeletal problems than their full-time counterparts in this and other studies [19].

Dentists with significant occupational health problems may reduce their clinical practice; those treating fewer patients per day had a higher prevalence of shoulder, neck and hand/wrist pain and dermatoses over the previous 12 months. Alternatively, those treating fewer patients may perform more intricate and complex procedures, meaning that they wear gloves for a greater proportion of the day and spend more time in a working position that predisposes to problems. Women have been reported to suffer more occupation-related health complaints than men [24]; women in the current study reported higher stress levels and more needlestick injuries, workplace bullying, dermatitis, headaches, TMJ pain and musculoskeletal pain. Despite this, women were more satisfied with their health overall than male dentists.

Further research is required to determine the impact of occupational health disorders on the productivity of the dentist workforce. The causes of occupational health problems affecting dentists (particularly musculoskeletal disorders) need to be determined with greater accuracy, along with occupational safety measures to help reduce their prevalence and impact.

**Key points**

- The majority of dentists had good general health overall, but physical fitness was not ideal for most.
- The prevalence of musculoskeletal problems and dermatoses was high and impacted significantly on the daily lives of dentists.
- Women had a higher prevalence of several occupational health problems than their male counterparts.

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Conflicts of interest
None declared.

References
A qualitative investigation of the experiences of immigrant dentists working in New Zealand

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ABSTRACT

Objectives: To determine the nature of problems experienced by overseas-trained dentists settling in New Zealand (NZ), and to ascertain what can be done to improve their experiences.

Design: Qualitative study using semi-structured interviews.

Subjects and methods: A convenience sample of fourteen overseas-qualified dentists was selected and individuals invited to participate in a semi-structured interview. Each interview was audiorecorded, transcribed and analysed in order to identify key patterns and themes.

Results: Those who were required to sit the New Zealand Dental Registration Examination (NZDREX) found it very challenging, with the majority requiring more than one attempt. Most interviewees had moved to NZ for an improved quality of life and had settled well into dental practice. However, some reported that they had experienced significant difficulties. These primarily related to financial issues, employment issues, being accepted into the profession, and establishing suitable peer contact. The dentists considered that the Dental Council and the NZDA were very helpful, but that there was a need for clearer information about the content of the NZDREX examinations, and a peer support network for immigrant dentists.

Conclusions: Improved support for immigrant dentists would aid their transition into general practice in this country.

INTRODUCTION

There has been much attention to dental workforce issues in New Zealand (NZ) recently, including annual workforce reports produced by the Dental Council of New Zealand (Dental Council of New Zealand, 2007), the New Zealand Dental Association Workforce Project (Bain et al, 2006), and recent publications (Ayers et al, 2008a; Ayers et al, 2008b and Ayers et al, 2008c). A key feature of workforce trends in recent years has been the increase in the number of overseas-trained dentists, who now comprise over 20 percent of the NZ dentist workforce. These dentists originate from 38 different countries (mainly United Kingdom, South Africa, Iraq, India and Australia) and approximately half are required to sit the New Zealand Dental Registration examination (NZDREX) prior to commencing work as a dentist in this country. The international mobility of health professionals is a reality of the global economy, and strongly influences service planning and policy (Buchan and O'May, 1999). Immigration of dentists to New Zealand helps to offset the significant loss of New Zealand graduates, enabling maintenance of a satisfactory dentist-to-population ratio (Bain et al, 2006). Recent research (Ayers et al, 2008b) has revealed that overseas-trained dentists working in New Zealand experience more job-related stressors 'frequently' or 'all the time' than New Zealand dental graduates. Furthermore, anecdotal evidence suggests that a number of immigrant dentists experience difficulties settling into the dental community in New Zealand. The reasons for this are unclear, but the issue has been identified as a cause of concern by some individuals and representatives of the New Zealand Dental Association (NZDA).

The current project aims to enquire further into the nature of difficulties experienced by overseas-trained dentists settling in New Zealand, and to ascertain the measures which can be taken to improve their experiences.

METHODS

Ethical approval for the study was obtained from the University of Otago. A series of questions was developed to seek information on participants’ experiences of working as dentists in New Zealand. The questions were designed in consultation with several individuals, including New Zealand-trained dentists, immigrant dentists, a practice manager from a large practice employing predominantly overseas-qualified dentists, and an NZDA representative. An initial interview took place with one participant. After transcription, this interview was analysed by three of the investigators and necessary modifications were made to the interview schedule.

The principal investigator contacted 13 further dentists and invited them to participate in the study. All agreed to participate in an interview and completed a consent form. Interviews were undertaken at the workplace of each participant, in a quiet room. One dentist chose to have the practice manager present, and another chose to undertake the interview at home, with her spouse (also an immigrant dentist) present as a passive observer. Aside from the collection of basic demographic information, each semi-structured interview included questions relating to: reasons for coming to New Zealand, gaining dental registration, experiences of working in this country, membership of NZDA and other support systems, life in New Zealand, and advice for other dentists moving to New Zealand.

Interviews were recorded on digital audiotape and transcribed by an independent typist. Analysis involved reading through the transcripts several times and identifying patterns and themes expressed by the participants. The interview transcripts were scrutinised by two further researchers (WMT and HA) to maximise the accuracy of interpretation. After 14 interviews, 'saturation' had taken place, with no new themes arising. This confirmed that no further interviews were required.

RESULTS

Of the fourteen dentists interviewed, eight were from the Hamilton region, four from the Bay of Plenty, and two from...
The dentists who took part in the study had undertaken their training in a variety of countries, including India (three), Iraq (three), the United Kingdom (two), Brazil, Egypt, Germany, France, the Netherlands, and the Philippines. They had worked in a range of further countries, including Ireland, Saudi Arabia, Jordan, Malaysia and Mauritius. Seven were male and seven female. Nine interviewees were aged between 35 and 50 years, while the remaining five were younger. Eleven participants had sat the NZDREX (one was exempted from the written component) while three had not been required to go through the NZDREX process (two from the United Kingdom and one from the Netherlands). There was a range in the time during which dentists had worked in their home country from none to several years. Similarly, there was a range (from 3 months to 13 years) in the time during which the dentists had been working in NZ. Some dentists had commenced work directly on moving to NZ, while others had been living in the country for up to six years prior to practising as a dentist here. Although five had had specialty training, (one in each of oral surgery, orthodontics and paediatric dentistry, while two had specialised in periodontics) prior to coming to NZ, only one had gained specialist registration in this country. One individual was currently going through the specialist registration process here (based on overseas training and experience), and another had completed specialist training in NZ.

Reasons for moving to New Zealand

The predominant reasons for moving to NZ were lifestyle and quality of life:

“Better quality of life, better finances, better education for the children. Everything.” (Participant 9)

The dentists perceived that NZ was a good country to bring up children, with some saying that their own country was not a safe place to live. Four dentists had decided to live in NZ to be with their loved ones; two had come to NZ for a short period and then met their spouse-to-be, while two others moved here because a partner was resident in this country. Another dentist had come to NZ because there was a good income potential and an ability to practise top-quality dentistry. Other reasons for choosing NZ over other countries included: being able to register by examination rather than having to retrain: NZ being a cosmopolitan country accepting of people from all over the world: or for a change of life. One participant had suggested that it was easier to gain registration in NZ than Australia, and was planning to move to Australia in the near future.

NZDREX

The three dentists who had gained registration without sitting the NZDREX had found the process to be relatively straightforward. One of these was a periodontist who gained registration by a specialist assessment. However, the experiences of NZDREX dentists were more varied. Most dentists found the examination process very stressful and difficult:

“It was terrible. Awful...the most stressful time of my life.” (Participant 10)

“Very, very, very tough, because there’s no syllabus as such you do not know what is given more importance here and what is not given much importance”. (Participant 9)

Some dentists appeared a little more philosophical:

“I am not saying that it’s a bad or good system but this is the system you have to respect.” (Participant 5)

“[My husband] wrote the exam first. He didn’t make it through on his first attempt. But then he kind of got an idea of what the examiners were looking for, and that we felt was the key to the exam.” (Participant 7)

Some dentists felt that the English examination was a “waste of time” while others said that there was too much emphasis on the basic sciences. Several dentists commented on the lack of study guidelines and difficulty in accessing study material:

“It’s like starting over. Yes, there is no real guidelines. Like there is no supervisor that can tell you what to study, what sort of things are important or what they are looking for in the exams.” (Participant 3)

“At the beginning, there were no books, no guide, nothing, and I struggled to get some books from the School of Medicine in Auckland and Auckland libraries and through the internet. The difficulties was how to get the information, the books really, and left alone I sorted it out.” (Participant 4)

Some dentists mentioned that it was difficult to find out about particular methods and materials used in NZ which they were less familiar with in their own country. Examples included pinned amalgam restorations, Fuji IX, and tooth mousse. Two dentists commented that they struggled with the essay format of the examination, as they were more used to multiple-choice examinations and found it difficult to work out what was being asked.

Although most candidates were living in NZ, three dentists continued to live and work in India, travelling to NZ for each component of the exam:

“I think the process took us almost three years. We were quite happy to go back and forth and keep our life there, but visit here to keep this part going as well. Just do the bits”. (Participant 7)

This allowed them to keep earning a dentist’s income (albeit in a lower currency) during the examination process, but was seen by one dentist as being a more difficult option as far as the examination was concerned:

“Everybody says it’s much easier if you are in New Zealand, because you know what’s happening, you know, dentistry point of view, what people use here. You come across different people. You get used to the accent and, you know, all that, but finances are tight. You’ve got to work. You don’t have the peace of mind. You don’t have your family’s support.” (Participant 9)

Candidates living in NZ worked in a range of jobs while preparing for the NZDREX. Some were completely unrelated to dentistry, such as working in a factory, a supermarket or as a caregiver. Four had been fortunate enough to gain employment within the dental industry as a dental assistant or a hygienist. Others had applied for jobs as dental assistants, but felt that they had been considered ‘overqualified’ or that nobody was interested:
Although most dentists appeared to have really struggled with the examination, some managed to remain positive about the process:

"What we both liked was, learning for this exam was a bonding experience for both of us... I believed I improved professionally by going through the exam." (Participant 7)

Working as a dentist in NZ

Dentists gained their first job as a dentist in NZ in a number of ways. The UK dentists organised their employment before they moved to New Zealand. Although some NZDREX dentists found their jobs via the Internet, mostly on commission. Some dentists talked about the difficulties of purchasing a dental practice:

"Finding a job for an overseas dentist is not easy [because] according to the immigration requirements, it should be a salaried job for a minimum of 30 hours. So it was mandatory to take up a salaried job and not many people are ready to offer that [because] we are new to the country." (Participant 9)

A lack of local referees was another obstacle identified by two dentists:

"Most of the private dentists, they were a little bit hesitant of having you because you are overseas and they don’t know what’s your background." (Participant 3)

Only one dentist was working in his own sole-practitioner practice. The remainder were working in group practices, mostly on commission. Some dentists talked about the difficulties of purchasing a dental practice:

"I’m thinking, but actually I can’t do it now. It’d cost too much." (Participant 4)
However, six dentists had bought their own practice. Some (even those who had very little when they arrived in NZ) had managed to purchase a practice within a year or two of sitting the examination. This suggests that the investment in undergoing the NZDREX paid off in the longer term.

Dentists were asked about what they considered to be difficulties working as immigrant dentists in NZ. Some, (particularly those who were not required to undergo NZDREX) thought there were no problems at all; once they were registered, they had the same experiences as any other NZ dentist. Others identified a number of difficulties ranging from communication issues, complaints, and patient rights through to difficulties obtaining equipment and materials.

Communication was identified as a problem by only a few dentists:

"The job is stressful because you never know what the patient thinks of what you’ve said. And that gives a little bit of stress and you go home and think, did I say the right thing, did I do the right thing?" (Participant 9)

Most of the other dentists did not consider that communication was a problem, despite English being a second language for most.

"Actually there’s no communication issues, I find that very easy. It is easy to communicate with patients. They seem to understand me, that’s the important thing." (Participant 7)

Although one dentist commented that patients do hesitate to see an overseas-qualified dentist most had not experienced any such problems. In fact, one dentist commented:

"I feel it’s more of the dentists not accepting than the patients…" (Participant 9)

There was a perception among many of the dentists—including those from the UK—that patients have more rights in this country, and that complaints were more likely and that this influenced their day-to-day practice:

"The complaints are bad in New Zealand because they allow the people – Oh thank god it didn’t happen to me – but the complaints here are too much…they give people too much rights." (Participant 4)

"Here the people have, you know, more knowledge generally speaking…here I think 10 times before I do any simple form of treatment." (Participant 5)

One dentist said that the patients don’t complain as much as one might expect:

"I find the patients very, very forgiving." (Participant 10)

Some dentists commented on the high cost of dentistry in NZ and the lack of third-party payments:

"The cost of dentistry here is quite high so it’s often stressful dealing with the issue of charging patients… And from that of course, if the cost is high then the expectations are high, so there’s always both a high cost and a high expectation." (Participant 1)

Some dentists also commented on the difficulties of working with ACC and State-funded dentistry, although others didn’t perceive this to be much of a problem.

Most interviewees thought that the dentistry performed in New Zealand was the same as in their home country. The only exceptions were two dentists from India and one from Brazil who had more limited equipment and materials than are available here. In contrast, the dentist from Germany commented on how little amalgam was used there in comparison with NZ. The dentist from the Netherlands had experienced some difficulties with delays after ordering equipment in this country; materials were more readily available within Europe.

Overall, the immigrant dentists had found the local dentists to be quite welcoming, although some reported having some bad experiences:

"Yes, most of them have been extremely nice, extremely supportive. I guess you do get a few rotten apples everywhere. We did have a couple of bad experiences with some local dentists... a couple of bad experiences with a couple of employers here. So that really puts me off. Given a chance I don’t want to work for anyone." (Participant 7)

One dentist commented on the competitive nature of dentistry in NZ ("They keep to themselves a bit… it’s very competitive" (Participant 11)) and another on the difficulty of determining appropriate fees when these issues cannot be discussed.

Some overseas-qualified dentists spoke about the excellent employers for whom they had worked:

"...a multi-associate practice, and we set aside at least two hours at lunchtime [a week], and I had peer contact with my senior partner on an evening basis almost twice a week, say, and he would review your clinical notes for the week and discuss any perhaps different treatment plans or issues. And similarly, if there was ever a patient dispute or anything like that then the senior partner would be involved and they would all be dealt with very openly. It was very good." (Participant 1)

Sadly, this was not the case for all participants. Several spoke about the bad experiences of themselves and some of their peers as overseas-qualified dentists in NZ:

"I believe, I think it maybe just my opinion, maybe they are being taken advantage of. Unfair employment practices… Hours of work, pay, professional conduct... basically unprofessional conduct from an employer… all the people I know have had some kind of bad experience, so that’s not very good, is it?" (Participant 7)

"Most of them have changed, two jobs, or had employment issues. Like I told you I haven’t come across anyone who’s been kind of happy." (Participant 9)

There were concerns in that, if the first job didn’t work out, this would affect the ability of a dentist to gain a NZ reference with which to move into another job. In contrast, one interviewee felt that the overseas dentists whom he had employed since purchasing his own practice had let him down.

NZDA and DCNZ

All but one of the dentists belonged to the NZDA, although two had not yet joined their local branch. The reasons given for joining were similar for all dentists and included: collegiality; to meet and communicate with colleagues (and potential referrers); to keep informed about current issues; improved access to continuing education; the discounted indemnity insurance; and back-up ("so you can ask for help").
Most dentists agreed that branch meetings were useful, and attended them sporadically. Some dentists thought that the NZDA was more beneficial at the national level and expressed concerns that it was difficult to access branch meetings because of the distance to the venue, having to work late nights, or because of difficulty arranging childcare. A few also felt that they were a little reluctant to attend as an ‘outsider’:

“Nice to go with somebody that you know... sometimes you feel a bit of an outsider... Because there’s the one dental school, everyone else seems to know each other... whereas when you’re the outsider, it’s like, ohh, who are you?” (Participant 8)

Other dentists felt that it was the branch level that NZDA membership was most useful:

“...the national level... never really seems to do very much at all for you. And I still think it’s important to support professional bodies but it is quite interesting. There seems to be very little gain from them”. (Participant 1

However, dentists who had needed to contact NZDA Headquarters due to difficulties arising in practice had nothing but praise for the organization:

“I had an issue once and they were very, very helpful. They helped me to whatever extent they could.” (Participant 9)

“Yeah, I think it’s very, very useful. And they’re really helpful, very, very helpful... You can just pick up the phone and ask and they’re really helpful.” (Participant 3)

Another dentist who had experienced employment difficulties had decided not to contact the NZDA:

“We did think a couple of times whether we should take it up with them, when we have something bad done to us. In a country like this there is a chance for – to address grievances and see but I don’t know why, we just decided to let it lie... If you made it more aware that there was support available, I think people might, maybe if they were stressed enough, they might take up on that”. (Participant 7)

The Dental Council was also perceived to be very helpful:

“Yes the Council is very helpful. They reply to every question that you ask, and if they don’t feel like replying they just write ‘you can look up the website’. So the Council is quite nice. They answer every query of yours any they kind of get to know you personally as you go getting the exams”. (Participant 9)

Mentors
Almost all of the dentists spoke about the importance of good mentors in aiding them not only through the NZDREX process, but also into dental practice:

“Not like a guide would hold your hand, but someone who knew what the system was”. (Participant 7)

Most felt that it would be best to have a NZDREX dentist as a mentor:

“Someone who went through the process, so they can identify with what you went through.” (Participant 7)

One dentist thought it would be useful to have mentorship through the specialist assessment process as well. All dentists thought that it was important to have someone they could contact to discuss issues. It was suggested that mentors should be linked to NZDA, prominent in the profession, active in continuing education, and willing to spend the time to help immigrant dentists. Some individuals wanted someone who would be able to discuss specific problems/ cases, employment issues, ACC issues, and to help handle any disputes, complaints or misunderstandings that may arise.

Mentors need to be carefully selected to ensure that they are giving constructive advice. One dentist reported that she was told:

“Look, don’t bother to take the exam because number 1, it’s very, very hard and number 2, it’s expensive...So it’s like that put me off... so it took like five years for me to just think about it.” (Participant 12)

This dentist passed each examination on her first attempt! Several dentists mentioned the problems related to lack of family and social support in New Zealand:

“I miss my family and it is difficult to bring them here...... the Dental Association or the Council... they must help the overseas dentists to bring their families... we are highly educated and we are working, we are hard workers, we pay tax and GST, we serve this country honestly, so we deserve this kind of support. And this may reduce the stress on the overseas (dentists)” (Participant 4)

Advice to dentists immigrating to NZ and suggestions for improvements to the NZDREX process
Most of the participants would advise any new immigrants to undertake the bridging course before attempting the NZDREX examinations. They felt that the new bridging course would be worthwhile, as it would save time in the long run by avoiding retests. However, they felt that meeting the cost of the course would be difficult for some.

Some dentists suggested that it would be useful to have a “Helpline” available where dentists could obtain advice. This could perhaps be run by the DCNZ. It could attend local branches or in a hospital base... It’s just sometimes the approach is different... New Zealand patients have a different culture, they have different ideas about treatment... we have to learn things of people.” (Participant 3)
Some dentists thought mentorship should continue after achieving NZDREX:

"They could model it exactly the same [as the Graduate Professional Development Programme]. If it’s good enough for new graduates then it should be fine for overseas dentists." (Participant 1)

One dentist suggested the idea of an internship for overseas-qualified dentists for up to one year. Some thought it would be useful to work in a hospital department:

"... look at the patients... know how things work, and the rules... It would give them a good reference at least..." (Participant 3)

Other advice included:

"Respect the system and don’t take it for granted.... Whoever worked hard passed." (Participant 5)

"Be strong. Be very strong. And be prepared for all kinds of obstacles." (Participant 9)

Only two dentists suggested that they were not entirely happy in New Zealand, although a third stated that he would soon be moving to Australia. The majority felt they had settled into New Zealand well and planned to stay here:

"I tell them it’s great here and I love it. I won’t go back." (Participant 2)

DISCUSSION

This qualitative study investigated the experiences of overseas-qualified dentists working in New Zealand. It found that, while most participants were happy living in this country, some had experienced significant difficulties in the work setting. The majority of dentists who had sat the NZDREX examination had found the process to be difficult and stressful, predominantly due to uncertainty about the content of the examination. For some, the financial costs had also been difficult to meet. Those who had made contact with a dentist who had already undertaken the examination had found this contact to be very useful.

Having identified an issue relating to greater experience of job-related stressors among overseas-trained dentists in a previous study, we wanted to explore in more detail the difficulties faced by this part of the workforce. The qualitative research method was utilised because of the need to understand the situation from the immigrant dentists’ point of view: a conventional survey would not have been useful because we would not have known what questions to ask. Accordingly, a semi-structured interview with open-ended questions was used, allowing respondents to use their own words; it enabled the interviewer to give feedback and ask for elaboration where required. Participants could discuss the issues they felt were most important rather than those being dictated by a printed questionnaire or closed questions. The in-depth interview approach was chosen over other qualitative data collection techniques (such as focus groups) to ensure confidentiality and the development of rapport between the interviewer and interviewee. Dentists were interviewed in their own environment in order to minimise the disruption to their day and to maximise their comfort and responsiveness.

In qualitative research, the goal is to have rich, in-depth information, with the sample reflecting the diversity of the study population rather than being representative of it (Bower and Scambler, 2007; Meadows et al, 2003). A combination of convenience and maximum-variation sampling methods was used to enable selection of dentists from both genders and a range of countries, ages, dental practice settings and regions of New Zealand.

There was considerable variation in the experiences of the dentists interviewed. Some had arrived in New Zealand several years previously, before the pre-examination course was available. Some had attended a one-week pre-examination course and found it to be useful, while others had been unable to afford to attend the course.

Some dentists had worked as dental hygienists prior to sitting the NZDREX. This was seen as beneficial both in preparation for the examination and helping to see how practices operate in this country. Some felt that it also aided their communication with patients as they learned features of New Zealand culture. With the introduction of the Health Practitioners Competence Assurance Act, immigrant dentists are no longer able to work as dental hygienists because they will not meet the eligibility requirements for registration. This may limit immigrants’ contact with the dental profession. Some further participants had applied for jobs as dental assistants. While some (all female) had been successful in their applications, others had not. Employing new immigrant dentists as dental assistants could be one way in which the dental profession could assist new immigrants in their examination preparation. Simply having an opportunity to observe in dental practice or a hospital dental department would be of benefit.

Other recent changes have been more beneficial to dentists immigrating to New Zealand. A one-year, part-time bridging programme has been available for the last three years. The scientific component is taught from Auckland by correspondence, and the clinical component is undertaken in Dunedin. The programme has been associated with an improved pass rate in the NZDREX examinations (David Purton, personal communication). Unfortunately, only limited Government funding is available, so the private cost for most students is $30,000 (student loans are available for New Zealand residents). Similar programmes also exist in the USA (Kornabashii et al, 2005). Although none of the dentists in this study had undertaken the bridging course, most interviewees thought it would have been of great benefit to them had it been available, although some said that the cost would have been prohibitive. By contrast, one dentist considered that it would be worth the cost if it could save the extra months out of work while waiting to resit the examination.

There have also been recent changes to the structure of the NZDREX itself. In order to improve accessibility to the examination, written papers are now run through the Australian Dental Council. Preliminary examinations are conducted in Europe, Middle East, the Indian subcontinent, Africa, Asia, North and South America, the Pacific and Australia. However, those who chose to undertake the examinations in New Zealand have priority for the clinical examinations. Two years ago, the standard of English was raised from a score of 7 to 7.5, in line with English language requirements for health professionals in NZ. Most of the dentists interviewed had not found the English examination to be overly difficult.

A majority of immigrant dentists felt that there was a need for improved information and guidelines on the content of the NZDREX. Those who undertake the bridging course will better understand the emphasis of the examination. It would also be beneficial if the Dental Council could provide a list of recommended texts and journals.
Some dentists experienced technical difficulties in the clinical examinations. These may relate to their country of qualification. For example, crown and bridgework is generally taught at postgraduate level in India, and handpieces used in the examination may differ from those which have been used overseas (compressed air or electricity with cable wire; Komabayashi et al, 2005). Dentists from some countries may also need additional education and clinical training in the use of filling materials that are less commonly used in their own country.

Although a few dentists reported that they had experienced employment problems, most had not. The main difficulties experienced in the dental practice environment were learning about the paperwork requirements, including general record-keeping and third-party claims, concerns about the informed consent process, patient rights and complaints, charging for treatment, and equipment availability. Such topics could be addressed within a mentoring programme.

Recommendations
1) That the Dental Council identifies a central point of contact for candidates to aid information gathering (such as a toll-free helpline).
2) That the NZDA supports a voluntary mentoring programme for prospective NZDREX candidates. This might include a facilitator in each of the main centres, supported by a network of mentoring dentists. The role of the mentors would be to offer support, take candidates as a guest to suitable branch meetings, allow observation in their practices, and help them to identify other candidates who would like to meet for a study group. The NZDA website could contain a page for NZDREX dentists with contact details for facilitators, details of study groups available, etc. Copies of prescribed textbooks and key journals could be available to loan via the network. Fundraising within the profession would be required to meet the costs of the programme.
3) Investigate the possibility of running a mentorship programme for NZDREX dentists similar to the Graduate Professional Development Programme. Key topics might include; informed consent, record keeping, dealing with complaints, establishing a practice etc. Possible funding sources to investigate include NZDA, external sponsorship, or the NZDREX dentists themselves. Branches should be encouraged to offer a discounted membership for the first year to encourage attendance at local meetings and contact with the profession.
4) Consider appointing a NZDREX representative on the NZDA Board to ensure that the voices of NZDREX dentists are heard at a national level.
5) Have a NZDREX dinner to coincide with the ‘class dinners’ at NZDA conferences.

Providing assistance and support for NZDREX dentists will be beneficial for the NZDREX dentists, potential employers, the profession, and the public.

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REFERENCES
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Job stressors of New Zealand dentists and their coping strategies

K. M. S. Ayers¹, W. M. Thomson¹, J. T. Newton² and A. M. Rich¹

Background Dentistry is understood to be a stressful profession. Although there has been recent research about stress and dentistry in the UK and the Netherlands, little is known about the job stressors and coping strategies of New Zealand dentists.

Aim To investigate job stressors and coping strategies among New Zealand dentists.

Methods A nationwide postal survey of a representative sample of 700 dentists.

Results The response rate was 65%. The most commonly reported stressors were treating difficult children (52%), constant time pressure (48%) and maintaining high levels of concentration (43%). The strategies most utilized for managing work-related stress included interactions with people (78%), sports (64%) and forgetting about work (59%). Dentists who had graduated overseas reported more sources of stress than New Zealand graduates. There were differences in the strategies used by male and female practitioners to manage stress.

Conclusions There is considerable variation in the number of stressors experienced by dentists. Overseas-qualified dentists appear to be under more stress than New Zealand-trained dentists and may need greater professional support. Dentists should be encouraged to make greater use of active coping strategies.

Key words dentists; burnout; occupational health; stress; stressors; stress management.

Introduction

Dentistry is perceived as a stressful profession [1–3]. Several models of stress exist, such as the classic model by Cox, which suggests that stress is an imbalance between an individual’s demands and ability [3]. High levels of stress can lead to physical or mental health problems [1,2], and high levels of work-related stress have been linked to poor working relationships and low job satisfaction [4]. Furthermore, the quality of care provided may also be affected [5].

Cross-sectional studies indicate that >10% of dentists experience high levels of ‘burnout’, a possible long-term consequence of occupational stress [6–8]. Dentists with a high burnout risk have poorer health and more unhealthy behaviours than their less-stressed peers [9]. Furthermore, stress-related disorders are a common cause of early retirement among dentists [10].

Research findings on the health and well-being of dentists are conflicting [11]. There is a general belief that dentistry generates more stress than any other profession and that job-related factors explain almost half of the overall stress in a dentist's life [5]. However, the personality traits common to those who choose to practise dentistry may also play a role [2]. Little comparison has been made of the stress experienced by dentists and that encountered by other professionals [12].

It has been suggested that dentists lack awareness and knowledge about managing their stress [13,14]. However, before developing interventions to manage and prevent stress among dentists, the job-related stressors and existing coping strategies need to be determined [12]. The most common stressors reported include time-related pressures, heavy workloads, financial concerns, anxious/difficult patients, the causing of pain, staff problems, equipment breakdowns, defective materials, poor working conditions, medical emergencies in the surgery and the routine nature of the job [4,5,13,15]. Some stressors appear to be linked to the type of health system
in which dentists work and the way in which they are remunerated.

There is a lack of information on stress levels among dentists in New Zealand. Therefore, the aim of this study was to investigate job stressors, coping strategies and their associations among New Zealand dentists. This will assist in determining the need for interventions to manage and prevent stress among dentists.

Methods
A nationwide postal survey of 700 general dental practitioners was undertaken between April and July 2006. The sample was randomly selected from the 2005 New Zealand Dental Register [with permission from the Dental Council of New Zealand (DCNZ)]. The study was approved by the University of Otago Ethics Committee. Participation incentives were offered in the form of prize draws sponsored by dental supply companies. The questionnaire was posted with a covering letter explaining the study's purpose, and a prepaid envelope was included for returning completed forms. A second wave of forms was sent to the 354 non-responder dentists after 1 month.

Data collected included respondents' socio-demographic and practice characteristics, together with information on factors causing stress in dentistry and coping strategies. A modified form of the inventory devised by Cooper et al. [4] was used to obtain information about job stressors. It consisted of 33 items within the following seven scales: time pressures, financial stressors, patient-related stressors, staff and technical problems, the nature of work and concerns about the future. Respondents were asked to rate those stressors in terms of the frequency with which they usually experienced them. The response options were as follows: 'never', 'seldom', 'sometimes', 'often', 'frequently' and 'all the time'. Similar versions of this questionnaire have been used widely in dental research [4,5,15,16]. For reporting purposes, respondents were grouped by gender, year of graduation (pre-1970, 1970–79, 1980–89, 1990–99 and 2000+) and site of practice (major city, provincial city and other).

The survey responses were entered into an electronic database, and then analysed using the Statistical Package for the Social Sciences (SPSS; Version 11 for Mac OS X; http://www.spss.com). Associations between categorical variables were tested for statistical significance using the Chi-square test, with the alpha level set at 0.05.

Results
Of the original random sample of 700 general dental practitioners, 23 were outside the sampling frame, either because they were retired, deceased, or because their questionnaires had been returned due to incorrect address details. The 437 questionnaires returned from the remaining 677 dentists gave a response rate of 65%. Comparison of the characteristics of the responders with the practising dentists in New Zealand (using the DCNZ Dentist's Register) showed that there were no significant differences, with the Register data falling within the 95% confidence intervals for all the survey estimates (Table 1).

There were 329 male (75%) and 108 female respondents (25%). The mean age of male respondents was 48.2 (SD 12.1) and of females was 38.8 (SD 8.4). In all, 146 (44%) males had graduated prior to 1980, 36 (33%) had graduated in the 1980s and over half (58, 54%) graduated in 1990 or later. More male (281, 85%) than female (77, 71%) dentists were New Zealand graduates (P < 0.001). There were no significant differences in the sociodemographic characteristics of the responders with the Register data falling within the 95% confidence intervals for all the survey estimates (Table 1).

There was considerable variation in the number of stressors that dentists experienced frequently or all the time, with the number per dentist ranging from 0 to 31 (mean = 7.0, SD = 6.2). Of all participants, 215 (49%) experienced 5 or fewer sources of stress frequently or all the time, while 22 individuals reported experiencing 20 or more stressors frequently or all the time. The mean number of such stressors was 6.4 (SD 5.6) among New Zealand graduates and 9.7 (SD 7.8) among overseas-qualified dentists (P < 0.05). A higher proportion of the latter reported experiencing eight or more stressors frequently or all the time (39, 49%) than New Zealand graduates (126, 38%, P < 0.05).

Table 1. Comparison of respondents' socio-demographic and degree characteristics with those of the actively practising New Zealand dental profession as a whole (data are percentages)

<table>
<thead>
<tr>
<th>Sex</th>
<th>Respondents (95% CI)</th>
<th>The New Zealand dental profession*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>75 (71, 79)</td>
<td>73</td>
</tr>
<tr>
<td>Female</td>
<td>23 (21, 29)</td>
<td>27</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowest to 29</td>
<td>10 (7, 13)</td>
<td>10</td>
</tr>
<tr>
<td>30–39</td>
<td>21 (17, 25)</td>
<td>23</td>
</tr>
<tr>
<td>40–49</td>
<td>32 (27, 36)</td>
<td>30</td>
</tr>
<tr>
<td>50–59</td>
<td>23 (19, 27)</td>
<td>22</td>
</tr>
<tr>
<td>≥60</td>
<td>15 (11, 18)</td>
<td>15</td>
</tr>
<tr>
<td>Country of qualification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Zealand</td>
<td>82 (78, 86)</td>
<td>79</td>
</tr>
<tr>
<td>Other</td>
<td>18 (15, 22)</td>
<td>21</td>
</tr>
</tbody>
</table>

*Data source: DCNZ.
The frequency with which the various stressors were reported as occurring 'very often' or all the time is presented in Table 2. The most commonly reported stressors were treating difficult children, constant time pressure and maintaining high levels of concentration. The least frequent stressors were feeling isolated, perceived problems with colleagues and the possibility of contracting a viral infection.

For a number of stressors, there were no significant differences by gender, graduating cohort, practice setting, country of graduation or weekly workload in the number of respondents reporting them very often or all the time. These included the following: seeing more patients for income reasons, rising costs, perceived problems with colleagues, actually making mistakes, working with children and treating difficult children.

There were no significant differences between male and female respondents in the frequency of reporting any of the job stressors, except for maintaining high levels of concentration (46 and 35%, respectively; \( P = 0.05 \)) and causing pain (35 and 24%, respectively; \( P < 0.05 \)). A higher proportion of male respondents reported working with children as a stressor very often or all the time, but this failed to reach statistical significance (34 and 27%, respectively).

The only stressors which reached statistical significance with respect to the weekly workload of dentists (<58 versus ≥58 patients) were as follows: concerns about the supply of dentists (22, 11% and 36, 18%, respectively), continuing professional development requirements (22, 11% and 37, 18%, respectively) and the ability to sell the practice in the future (37, 18% and 53, 27%, respectively).

There were only five stressors that differed significantly in reported frequency by graduating cohort. These are presented in Table 3. Fewer dentists who had graduated prior to 1970 reported feeling stressed by constant time pressure than those who had graduated later (\( P < 0.05 \)), while those who had graduated between 1980 and 1999 reported having difficulty finding time for family and friends more often than their colleagues (\( P < 0.05 \)). Those in the oldest and youngest groups reported being stressed by coping with difficult patients more often.

### Table 2. Frequency of stressors reported very often or all the time among general dental practitioners

<table>
<thead>
<tr>
<th>Stressor</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treating difficult children</td>
<td>223 (52)</td>
</tr>
<tr>
<td>Constant time pressure</td>
<td>207 (48)</td>
</tr>
<tr>
<td>Maintaining high levels of concentration</td>
<td>185 (45)</td>
</tr>
<tr>
<td>Coping with difficult patients</td>
<td>171 (40)</td>
</tr>
<tr>
<td>Treating extremely nervous patients</td>
<td>159 (37)</td>
</tr>
<tr>
<td>Working with children</td>
<td>139 (32)</td>
</tr>
<tr>
<td>Causing pain</td>
<td>139 (32)</td>
</tr>
<tr>
<td>Rising costs</td>
<td>122 (29)</td>
</tr>
<tr>
<td>Finding time for family and friends</td>
<td>115 (27)</td>
</tr>
<tr>
<td>Long working hours</td>
<td>103 (24)</td>
</tr>
<tr>
<td>Quoting fees/colllecting payments</td>
<td>99 (23)</td>
</tr>
<tr>
<td>Possibility of making mistakes</td>
<td>97 (23)</td>
</tr>
<tr>
<td>Ability to sell practice in future</td>
<td>94 (22)</td>
</tr>
<tr>
<td>Earning enough money to meet lifestyle needs</td>
<td>94 (22)</td>
</tr>
<tr>
<td>Cancellations/no show</td>
<td>89 (21)</td>
</tr>
<tr>
<td>Decisions about future career directions</td>
<td>76 (18)</td>
</tr>
<tr>
<td>Seeing more patients for income reasons</td>
<td>75 (18)</td>
</tr>
<tr>
<td>Equipment breakdown/defective materials</td>
<td>74 (17)</td>
</tr>
<tr>
<td>Staff-related problems</td>
<td>73 (17)</td>
</tr>
<tr>
<td>Inability to meet own expectations/standards</td>
<td>71 (16)</td>
</tr>
<tr>
<td>Medical emergencies in surgery</td>
<td>64 (15)</td>
</tr>
<tr>
<td>New requirements for continuing professional development</td>
<td>61 (15)</td>
</tr>
<tr>
<td>Supply of dentists</td>
<td>59 (14)</td>
</tr>
<tr>
<td>Unsatisfactory auxiliary help</td>
<td>59 (14)</td>
</tr>
<tr>
<td>Actually making mistakes</td>
<td>56 (13)</td>
</tr>
<tr>
<td>Feeling underrated by patients</td>
<td>54 (13)</td>
</tr>
<tr>
<td>Repetitive nature of work</td>
<td>54 (13)</td>
</tr>
<tr>
<td>Unsatisfactory laboratory service from technicians</td>
<td>52 (12)</td>
</tr>
<tr>
<td>Conflict between profit and professional ethics</td>
<td>52 (12)</td>
</tr>
<tr>
<td>Lack of patient appreciation</td>
<td>50 (12)</td>
</tr>
<tr>
<td>Feeling isolated</td>
<td>40 (9)</td>
</tr>
<tr>
<td>Perceived problems with colleagues</td>
<td>31 (7)</td>
</tr>
<tr>
<td>Possible viral infection contraction</td>
<td>24 (6)</td>
</tr>
</tbody>
</table>

### Table 3. Number reporting job stressors very often or all the time by graduating cohort

<table>
<thead>
<tr>
<th>Stressor</th>
<th>Pre-1970 (Number/%)</th>
<th>1970-79 (Number/%)</th>
<th>1980-89 (Number/%)</th>
<th>1990-99 (Number/%)</th>
<th>2000+ (Number/%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant time pressure*</td>
<td>19 (31)</td>
<td>48 (21)</td>
<td>76 (54)</td>
<td>48 (49)</td>
<td>16 (43)</td>
</tr>
<tr>
<td>Finding time for family and friends*</td>
<td>10 (17)</td>
<td>21 (22)</td>
<td>43 (31)</td>
<td>34 (34)</td>
<td>7 (19)</td>
</tr>
<tr>
<td>Cancellations/no show*</td>
<td>12 (20)</td>
<td>24 (56)</td>
<td>20 (14)</td>
<td>28 (29)</td>
<td>5 (14)</td>
</tr>
<tr>
<td>Coping with difficult patients*</td>
<td>19 (31)</td>
<td>46 (48)</td>
<td>51 (36)</td>
<td>46 (47)</td>
<td>9 (24)</td>
</tr>
<tr>
<td>Lack of patient appreciation</td>
<td>8 (13)</td>
<td>12 (13)</td>
<td>11 (8)</td>
<td>14 (14)</td>
<td>5 (14)</td>
</tr>
<tr>
<td>Possibility of making mistakes</td>
<td>13 (21)</td>
<td>18 (19)</td>
<td>28 (20)</td>
<td>26 (26)</td>
<td>12 (32)</td>
</tr>
<tr>
<td>Unsatisfactory auxiliary help</td>
<td>4 (7)</td>
<td>11 (12)</td>
<td>26 (19)</td>
<td>13 (15)</td>
<td>5 (14)</td>
</tr>
<tr>
<td>Supply of dentists</td>
<td>7 (13)</td>
<td>17 (19)</td>
<td>22 (17)</td>
<td>12 (13)</td>
<td>1 (3)</td>
</tr>
<tr>
<td>Ability to sell practice in future***</td>
<td>19 (32)</td>
<td>31 (25)</td>
<td>30 (22)</td>
<td>11 (11)</td>
<td>3 (9)</td>
</tr>
</tbody>
</table>

*\( P < 0.05 \), **\( P < 0.01 \), ***\( P < 0.001 \).
than those in the other age groups \( (P < 0.05) \). The elder dentists were also the most concerned about their ability to sell their practice in the future \( (P < 0.001) \).

In Table 4, the number of respondents reporting job stressors very often or all the time is presented by practice setting. More dentists from provincial cities than those in major cities or small towns were concerned about lack of patient appreciation and the possibility of making mistakes \( (P < 0.05) \). Dentists in major cities reported being more frequently stressed by unsatisfactory auxiliary help than other dentists \( (P < 0.05) \), while those in the small towns were more frequently concerned about the supply of dentists \( (P < 0.001) \) and their ability to sell their practice in the future \( (P < 0.001) \) than their colleagues in the towns and cities.

Further comparison between New Zealand- versus overseas-trained dentists demonstrated that, for most potential stressors, more overseas- than New Zealand-trained dentists reported experiencing them frequently or all the time. The only exceptions were treating difficult children, concerns about the supply of dentists and the ability to sell the practice in future. These data are presented in Table 5.

The most commonly used strategies for coping with stress are presented in Table 6. The most frequently used three were interactions with people, sports and forgetting about work. The least commonly used strategies were smoking (4%), recreational drugs (3%) and prescribed drugs (4%). Fifteen males (5%) but no females reported that they smoked to deal with stress \( (P < 0.05) \). A higher proportion of males than females reported using both recreational drugs and prescribed drugs to deal with stress, but this did not reach statistical significance. More male than female respondents reported using alcohol or sports to manage stress, while a higher proportion of female dentists reported that they spent money or interacted with people. Changing the work environment was a strategy used by more males (83, 26%) than females (17, 16%). Dentists who had graduated within the previous 16 years were less likely than other age groups to report using alcohol. There was a gradient towards increasing proportions of dentists that reported spending money was used as a stress-coping strategy by higher proportions of more recent graduates. A similar gradient was observed with respect to ‘interactions with people’, but this failed to reach statistical significance. Fewer dentists practising in provincial cities (than in major cities or other: areas) reported interactions with people as a strategy for dealing with job-related stress. The strategies used by overseas- and New Zealand-trained dentists were similar, except that a higher proportion of New Zealand graduates consumed alcohol, played sport or engaged in hobbies. Fewer busier dentists (those who treated, on average, at least 58 patients per week) identified interactions with people or ‘changing relationship with patient/staff’ as strategies for dealing with job-related stress.

### Table 4. Number reporting job stressors very often or all the time by practice setting

<table>
<thead>
<tr>
<th>Stressor</th>
<th>Major</th>
<th>Provincial</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant time pressure</td>
<td>127 (48)</td>
<td>47 (53)</td>
<td>33 (45)</td>
</tr>
<tr>
<td>Finding time for family and friends</td>
<td>75 (27)</td>
<td>20 (25)</td>
<td>20 (27)</td>
</tr>
<tr>
<td>Cancellations/no show</td>
<td>53 (20)</td>
<td>22 (26)</td>
<td>14 (19)</td>
</tr>
<tr>
<td>Coping with difficult patients</td>
<td>103 (38)</td>
<td>39 (44)</td>
<td>29 (40)</td>
</tr>
<tr>
<td>Lack of patient appreciation*</td>
<td>23 (9)</td>
<td>16 (18)</td>
<td>11 (15)</td>
</tr>
<tr>
<td>Possibility of making mistakes*</td>
<td>53 (20)</td>
<td>29 (33)</td>
<td>15 (21)</td>
</tr>
<tr>
<td>Unsatisfactory auxiliary help*</td>
<td>45 (17)</td>
<td>6 (7)</td>
<td>8 (11)</td>
</tr>
<tr>
<td>Supply of dentists***</td>
<td>25 (10)</td>
<td>11 (13)</td>
<td>23 (33)</td>
</tr>
<tr>
<td>Ability to sell practice in future**</td>
<td>50 (19)</td>
<td>17 (20)</td>
<td>27 (39)</td>
</tr>
</tbody>
</table>

* \( P < 0.05 \), ** \( P < 0.01 \), *** \( P < 0.001 \).
Table 6. Strategies most commonly used for coping with stress by demographic and practising characteristics (brackets contain percentages)

<table>
<thead>
<tr>
<th></th>
<th>Alcohol</th>
<th>Eating</th>
<th>Sports</th>
<th>Resting</th>
<th>Hobby</th>
<th>Spending money</th>
<th>Forgetting about work</th>
<th>Interactions with people</th>
<th>Active coping strategies*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>101 (31)*</td>
<td>70 (21)</td>
<td>222 (68)**</td>
<td>191 (59)</td>
<td>157 (48)</td>
<td>57 (18)*</td>
<td>195 (60)</td>
<td>241 (74)***</td>
<td>102 (31)</td>
</tr>
<tr>
<td>Female</td>
<td>19 (18)</td>
<td>26 (24)</td>
<td>55 (51)</td>
<td>64 (39)</td>
<td>45 (42)</td>
<td>30 (28)</td>
<td>61 (57)</td>
<td>97 (90)</td>
<td>27 (25)</td>
</tr>
<tr>
<td><strong>Graduating cohort</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-1970</td>
<td>24 (39)*</td>
<td>14 (23)</td>
<td>39 (64)</td>
<td>29 (48)*</td>
<td>34 (56)</td>
<td>7 (12)**</td>
<td>43 (71)</td>
<td>43 (71)</td>
<td>13 (21)</td>
</tr>
<tr>
<td>1970-79</td>
<td>30 (31)</td>
<td>13 (14)</td>
<td>68 (71)</td>
<td>50 (52)</td>
<td>47 (49)</td>
<td>10 (10)</td>
<td>50 (52)</td>
<td>73 (76)</td>
<td>24 (25)</td>
</tr>
<tr>
<td>1980-89</td>
<td>93 (59)</td>
<td>39 (21)</td>
<td>93 (60)</td>
<td>83 (59)</td>
<td>62 (44)</td>
<td>33 (24)</td>
<td>82 (59)</td>
<td>109 (78)</td>
<td>50 (38)</td>
</tr>
<tr>
<td>1990-99</td>
<td>27 (27)</td>
<td>25 (25)</td>
<td>54 (55)</td>
<td>66 (67)</td>
<td>45 (46)</td>
<td>25 (25)</td>
<td>56 (57)</td>
<td>80 (81)</td>
<td>30 (31)</td>
</tr>
<tr>
<td>2000+</td>
<td>4 (11)</td>
<td>15 (41)</td>
<td>23 (62)</td>
<td>27 (73)</td>
<td>14 (38)</td>
<td>12 (32)</td>
<td>23 (68)</td>
<td>33 (89)</td>
<td>12 (32)</td>
</tr>
<tr>
<td><strong>Practice setting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major city</td>
<td>71 (26)</td>
<td>65 (24)</td>
<td>171 (63)</td>
<td>165 (60)</td>
<td>117 (43)</td>
<td>60 (22)</td>
<td>164 (60)</td>
<td>227 (83)**</td>
<td>78 (29)</td>
</tr>
<tr>
<td>Provincial city</td>
<td>32 (36)</td>
<td>15 (17)</td>
<td>60 (68)</td>
<td>50 (57)</td>
<td>45 (51)</td>
<td>14 (16)</td>
<td>52 (59)</td>
<td>58 (66)</td>
<td>30 (34)</td>
</tr>
<tr>
<td>Other</td>
<td>17 (24)</td>
<td>16 (22)</td>
<td>46 (64)</td>
<td>40 (56)</td>
<td>40 (56)</td>
<td>13 (18)</td>
<td>40 (26)</td>
<td>25 (74)</td>
<td>21 (30)</td>
</tr>
<tr>
<td><strong>Country of qualification</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Zealand</td>
<td>110 (31)***</td>
<td>80 (23)</td>
<td>238 (67)**</td>
<td>205 (58)</td>
<td>174 (49)*</td>
<td>72 (20)</td>
<td>211 (60)</td>
<td>280 (79)</td>
<td>106 (30)</td>
</tr>
<tr>
<td>Other</td>
<td>10 (13)</td>
<td>16 (20)</td>
<td>39 (49)</td>
<td>50 (63)</td>
<td>28 (35)</td>
<td>15 (19)</td>
<td>45 (57)</td>
<td>58 (73)</td>
<td>23 (29)</td>
</tr>
<tr>
<td><strong>Weekly workload</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;58 patients</td>
<td>56 (26)</td>
<td>54 (25)</td>
<td>129 (60)</td>
<td>132 (62)</td>
<td>102 (48)</td>
<td>49 (23)</td>
<td>129 (60)</td>
<td>179 (84)**</td>
<td>68 (32)</td>
</tr>
<tr>
<td>≥58 patients</td>
<td>63 (30)</td>
<td>42 (20)</td>
<td>144 (68)</td>
<td>122 (58)</td>
<td>96 (45)</td>
<td>38 (18)</td>
<td>124 (59)</td>
<td>154 (73)</td>
<td>58 (27)</td>
</tr>
<tr>
<td>All combined</td>
<td>120 (28)</td>
<td>96 (22)</td>
<td>277 (64)</td>
<td>255 (59)</td>
<td>202 (47)</td>
<td>87 (20)</td>
<td>256 (59)</td>
<td>338 (78)</td>
<td>129 (30)</td>
</tr>
</tbody>
</table>

*Active coping strategies included consultations, changing work environment and changing relationships with patients/staff.

**P < 0.05, ***P < 0.01, ****P < 0.001.

Discussion

This study found that there was considerable variation in the number of stressors experienced by dentists and that overseas-qualified practitioners reported experiencing more stressors frequently or all the time than those trained in New Zealand. There were differences in the strategies that male and female dentists use to manage stress.

There were some limitations to our study, mainly due to its cross-sectional nature. The response rate of 65% was not ideal, but is typical of this type of study [16,17]. It is not possible to determine precisely how the respondents differed from the non-responders. However, comparison of the socio-demographic characteristics of our sample with all (non-specialist) dentists on the Dental Register confirmed that there were no statistically significant differences with respect to gender, age or source of the primary dental qualification (Table 1). Thus, it is possible to generalize the findings of our study to all New Zealand dentists (assuming that the two groups do not differ with respect to any other characteristics).

There was a variable degree of item non-response (i.e. failure to answer particular questions). It is assumed that this did not materially affect the findings. Cross-sectional studies are not able to demonstrate cause and effect, merely associations between variables. Although there are a number of more recent stress measures used in the literature, we chose a modified version of that used by Cooper et al. [4] to allow comparison with previous work involving dentists.

There was considerable variation in the number of stressors experienced by dentists 'frequently' or 'all the time', with approximately half of respondents experiencing ≤5, but 5% experiencing ≥20. The most important stressors (treating difficult children, constant time pressure, maintaining high levels of concentration, coping with difficult patients and treating extremely nervous patients) were similar to those found in previously reported studies [4,5,15,18,19]. Newton et al. [16] suggested that paediatric dentists might be more stressed than other specialists, and Humphris and Peacock [18] proposed that treating children is the primary reason for the UK community dental service being so stressful. Time- and income-related stressors are reported to be high for dentists working in the National Health Service [15], where there is a perceived need to work quickly in order to generate sufficient income. In the current study, time pressure was a principal source of stress for dentists, but this may have related to scheduling and running on time, rather than treating as many patients as possible. Dentists in this study appear less concerned about the future than has been reported previously [20].

The most commonly reported stressors did not vary much between dentists, with no significant differences by demographic or practising characteristics in the reported...
frequency of being stressed by treating difficult children. Constant time pressure varied only by graduating cohort and maintaining high levels of concentration only by gender. In comparison, the 'ability to sell practice in future' varied by gender, graduating cohort, practice setting and weekly workload. It is possible that confounding factors may be responsible for this, as male, older and rural dentists may treat more patients per week and be more likely to own their own practice. Finding time for family and friends appeared to be more of an issue for dentists who had graduated between 1980 and 1999 (presumably those with pre-school- or school-aged children). Similarly, Moller and Spangenberg [12] reported that difficulty in finding time for family and friends was more of a problem for younger dentists.

Although a medical emergency in the dental surgery has been found to be one of the most highly ranking stressors in the UK [4,15,18], only 15% of dentists in our study reported that this was a stressor very often or all the time. This may reflect a difference in the wording of the questionnaires used; Cooper et al. [4] used a five-point Likert-type scale ranging from 'no stress' to 'a great deal of stress', whereas we used a similar scale labelled 'never' to 'all the time'. Although a medical emergency would be one of the greatest potential sources of stress, it does not occur commonly, and many dentists may not have experienced such an event.

A larger proportion of overseas-qualified dentists reported frequently experiencing many of the individual stressors. For example, although 'feeling isolated' was one of the least commonly reported stressors overall, a larger proportion of overseas- than New Zealand-trained dentists reported feeling isolated ($P < 0.001$). These dentists may need greater professional support, as professional isolation may put dentists at greater risk. It has also been suggested that the New Zealand population can be hard on practitioners from overseas [21]. Perhaps the public (and the dental profession) need their awareness raised with respect to the valuable role that these dentists play in the community.

Although overseas-trained dentists had a similar patient load to New Zealand dental graduates, a larger proportion of them reported that they were regularly stressed by factors such as long working hours, finding time for family and friends, earning enough money to meet lifestyle needs and cancellations or failed appointments. It is of some concern that overseas-qualified dentists experience higher levels of job-related stress. It is not clear whether there are differences in the perceptions of stressors between the groups or whether these dentists are subject to more sources of stress. New immigrant dentists may have extra sources of stress beyond the workplace (such as family remaining overseas, the challenges of settling into a new country and culture and language difficulties). It is likely that a combination of factors is responsible and these warrant further investigation.

Consistent with reports from previous studies [22,23], dentists tended not to apply active coping strategies for stress management. The gender differences were not unexpected with males more likely to report using sports and alcohol as strategies to relieve stress and female dentists preferring to interact with people and spend money. That >25% of respondents reported using alcohol to relieve stress is a matter of concern. It is likely that more consume alcohol, without identifying this as a means of managing stress. Other authors have reported worrying use of alcohol by dentists [9,12,24,25]. Conversely, Myers and Myers [5] reported that, although >90% of dentists in their sample consumed alcohol regularly, the mean weekly consumption was low. The finding that smoking and drug use were not frequently reported as stress-reducing strategies is consistent with the findings of other studies [12].

There is considerable variation in the number of stressors experienced by dentists. Overseas-qualified dentists appear to be under more stress than New Zealand-trained dentists. These individuals may need increased professional support. Dentists should be encouraged to make greater use of active coping strategies. Further research is indicated to determine why overseas-trained dentists appear to have more job-related stress and to identify interventions that could be used to decrease stress among dentists.

### Key points

- The most commonly reported stressors in New Zealand dentists were treating difficult children, constant time pressure and maintaining high levels of concentration.
- Overseas-trained dentists reported more sources of stress than local graduates.
- There are differences in the strategies used by male and female practitioners to manage stress.

### Acknowledgements

The authors would like to thank Oral-B and Henry Schein Regional for sponsoring prizes as an incentive for participation in the study. We also thank the dentists for taking the time to accurately and honestly complete the questionnaire. Debbie Chi and Rumi Lee are thanked for their assistance with the survey.

### Conflicts of interest

None declared.
References


Changes in the New Zealand dentist workforce over a nine-year period

KATHRYN MS AYERS, W MURRAY THOMSON, ROBIN A WHYMAN, ALISON M RICH AND J TIM NEWTON

New Zealand Dental Journal 104, No. 1: 19-26; March 2008.

ABSTRACT

Objective: To identify and describe trends in the NZ dentist workforce over a nine-year period.

Methods: Data from the 1997, 2001 and 2005 DCNZ workforce questionnaires were collated and analysed using both cross-sectional and longitudinal methods.

Results: 2088 dentists completed the workforce questionnaire in at least one of these years, and 1026 (49.1%) did so in all three of them. Substantial changes occurred in the NZ dentist workforce over the observation period. The proportion of women and overseas-trained dentists in the workforce continued to increase, along with the mean age of dentists. There was a large decrease in the number of hours worked per week by specialist dentists (who still worked more hours than dentists), but there was no clear trend for general practitioners. Increasing numbers of dentists appear to be opting for part-time work; the main reasons for doing so included personal choice, parental responsibilities, and semi-retirement. There was a trend for fewer dentists to be working in small towns, mainly through dentists leaving (or retiring) and not being replaced, rather than dentists moving from towns to the cities. Rural dentists and female practitioners were less likely to achieve the continuing professional development (CPD) target than their colleagues. In 1997, fewer overseas-qualified dentists (than NZ graduates) were self-employed and had undertaken 20 hours CPD, and a larger proportion worked in small towns. However, these differences were not evident in the later years.

Conclusion: The New Zealand dental workforce continues to change, particularly with respect to gender mix, age, work circumstances and CPD activities.

INTRODUCTION

In recent years, there has been concern among the New Zealand dental profession regarding several workforce issues. These stem largely from anecdotal reports about dentists being unable to attract associates or sell their practices, patients being unable to access timely dental care (particularly in rural areas), and overworked dentists (New Zealand Dental Association, 2006a). In addition, there have been concerns about the impact of the increasing number of women and overseas-trained dentists in the profession, in addition to the high number of recent graduates leaving to work overseas. Quantitative research is required to evaluate the significance of these issues.

The New Zealand Dental Association (NZDA) periodically undertakes a survey of its membership. This gives limited information about workforce issues, and has limited external validity due to the variable response rate and relatively small sample size. In 2003, the Association commissioned a major report to evaluate the evidence for suspected workforce problems (New Zealand Dental Association, 2006a and b). This report drew on available information (mainly the New Zealand Dental Council annual reports), and identified several areas in need of further investigation.

The Dental Council of New Zealand (DCNZ) has been monitoring dental workforce issues for a number of years. All dentists practising in New Zealand (NZ) must be registered with DCNZ and possess an Annual Practising Certificate (APC) issued by the same body. Each year, upon application for an APC, dentists complete a workforce questionnaire. Annual reports derived from the questionnaire data provide valuable information regarding sociodemographic characteristics, employment rates, postgraduate education and continuing professional development (CPD), practice characteristics, cohort remainder rates, and distribution of specialists. Although comparison is made between individual yearly reports, a longitudinal review of the workforce data has not taken place.

The purpose of the current study was to review the DCNZ workforce data for the years 1997, 2001 and 2005, and to undertake a longitudinal analysis of these data to evaluate trends in the New Zealand dentist workforce.

METHOD

Permission was sought from DCNZ to access data from the APC questionnaires in the years 1997, 2001 and 2005. Spreadsheets were obtained from the two consultants who had analysed data and prepared reports in these years (RAW and WMT). The data were then amalgamated into a single database and analysed using the Statistical Package for the Social Sciences (SPSS; Version 11 for Mac OS X; www.spss.com). Associations between categorical variables were tested for significance using the Chi-square test, with the alpha level set at 0.05. For comparison of means, 95% confidence intervals were used.

In order to be consistent with other DCNZ publications, the respondents' "first ethnicity" was used when determining ethnic group. Dentists were also categorised according to the location of their practice. "Major cities" included Auckland, North Shore, Waitakere, Manukau, Papakura, Hamilton, Porirua, Upper Hutt, Lower Hutt, Wellington, Christchurch and Dunedin. Locations classified as "provincial cities" included Whangarei, Tauranga, Rotorua, Gisborne, Hastings, Napier, New Plymouth, Wanganui, Palmerston North, Masterton, Nelson, Blenheim, Kaikoura, Timaru and Invercargill. All other locations were classified as "other".

RESULTS

The complete database included all 3065 dentists who were on the DCNZ register in 1997, 2001 or 2005. The majority (2088 dentists, 68.1%) possessed an APC and completed the APC questionnaire in at least one of these years; 1026 (49.1%) of those individuals (comprising 33.5% of the total number) possessed an APC and completed the workforce questionnaire in each of the three years.
The sociodemographic characteristics of those dentists who were practising in New Zealand in any of the three years are presented in Table 1. Over the nine-year observation period, there was a significant increase in the number of women in the workforce. The mean age of practising dentists increased by twenty-five months, and the proportion aged at least 65 years also increased significantly. The proportion of the workforce who were NZ European decreased, while the number of dentists of Chinese, Indian and 'other' ethnic groups increased. The percentage of dentists who were NZ trained decreased during the study period, and the proportion of specialists is in the dentist workforce was relatively stable.

The practising characteristics of the dentist workforce are presented in Table 2. The majority of dentists worked in private practice, although there was an increase in the proportion of dentists working in other settings during the observation period. Approximately two-thirds of dentists worked in major cities, and one-fifth in provincial cities. The proportion of dentists working in small towns decreased with time. Most dentists worked full-time (defined as being at least 4.5 days per week), but the proportion working part-time increased. There was a decrease in the number of individuals who held an APC but were not working in dentistry. For all dentists, the mean number of hours worked in 2001 was higher than in the other two years. The same was true for general practitioners. For specialists, the mean number of hours worked in 2005 was substantially lower than in 1997 and 2001. The proportion of dentists achieving the DCNZ target of 20 hours CPD per year increased between 1997 and 2005. Of those dentists who worked part-time, the proportion having insufficient dental work or seeking dental work decreased significantly. The proportion who cited parental responsibilities or semi-retirement as the reason for part-time practice did not change significantly. The proportion of dentists who cited 'other' reasons (mostly 'personal choice') for part-time practice more than doubled over the study period.

Comparison of the characteristics of those for whom data were available for all of the three time points and the remainder showed that there was a higher proportion of female dentists in the smaller sample; 202 women (19.7%) compared with 339 women (16.2%) in the larger sample (P<0.05). Within the group of dentists who were working in all three years, there was a higher proportion of specialists (158, 15.4%) than in the full sample (265, 12.7%; P<0.05). Within the longitudinal cohort, there was a higher proportion of New Zealand graduates (934, 91.0%) than in the larger group (1664, 79.7%; P<0.001).

All subsequent data pertain to the 1026 active dentists for whom complete longitudinal data were available. Approximately four-fifths were male (824; 80.3%). The mean age of the sample increased from 42.4 in 1997 to 50.4 in 2005. There was some minor variation in the reported ethnicity of respondents over the period. In 2005, approximately three-quarters (791; 77.1%) were New Zealand European, and fewer than one percent (3; 0.3%) self-identified as Maori. The majority (934, 91.0%) of dentists had qualified in New Zealand. The number who were registered as specialists increased from 115 (11.2%) to 152 (14.8%) over the nine-year period.

Data relating to the practising characteristics of the longitudinal cohort are presented in Table 3. In each year, the majority of dentists were working in private practice and were self-employed. Approximately two-thirds worked in major cities and one-fifth in provincial cities. The remaining dentists worked in small towns; the proportion doing so decreased over the nine-year period, although this decrease did not reach statistical significance. Most dentists worked full-time, but the proportion doing so dropped in the number of those dentists who worked part-time, the proportion having insufficient dental work or seeking dental work decreased significantly. The proportion who cited parental responsibilities or semi-retirement as the reason for part-time practice did not change significantly. The proportion of dentists who cited 'other' reasons (mostly 'personal choice') for part-time practice more than doubled over the study period.

Comparison of the characteristics of those for whom data were available for all of the three time points and the remainder showed that there was a higher proportion of

<table>
<thead>
<tr>
<th>Table 1 – Sociodemographic characteristics of the active New Zealand dentist workforce over the study period (percentages in brackets unless otherwise indicated; some respondents did not answer all questions).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnic Group</td>
</tr>
<tr>
<td>-----------------------------</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Mean age (SD)</td>
</tr>
<tr>
<td>Age 65 or more</td>
</tr>
<tr>
<td>Ethnic Group</td>
</tr>
<tr>
<td>NZ European</td>
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<tr>
<td>NZ Maori</td>
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<tr>
<td>Chinese</td>
</tr>
<tr>
<td>Indian</td>
</tr>
<tr>
<td>Other/Not stated</td>
</tr>
<tr>
<td>Registrable qualification</td>
</tr>
<tr>
<td>NZ BDS</td>
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<tr>
<td>NZDREX</td>
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<tr>
<td>Other/Not stated</td>
</tr>
<tr>
<td>Practitioner status</td>
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<tr>
<td>Specialist trainee</td>
</tr>
<tr>
<td>Dental Specialist</td>
</tr>
<tr>
<td>General practitioner</td>
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### Table 2 – Practising characteristics of the active New Zealand dentist workforce over the study period (percentage in brackets; some respondents did not answer all questions)

<table>
<thead>
<tr>
<th></th>
<th>1997 N = 1418</th>
<th>2001 N = 1518</th>
<th>2005 N = 1682</th>
<th>Significance level</th>
</tr>
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<tr>
<td><strong>Type of practice</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private practice</td>
<td>1209 (90.3)</td>
<td>1291 (87.5)</td>
<td>1414 (87.9)</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Other</td>
<td>130 (9.7)</td>
<td>184 (12.5)</td>
<td>194 (12.1)</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td><strong>Town type</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major city</td>
<td>855 (60.3)</td>
<td>980 (64.6)</td>
<td>1102 (65.5)</td>
<td>NS</td>
</tr>
<tr>
<td>Provincial city</td>
<td>268 (18.9)</td>
<td>290 (19.1)</td>
<td>336 (20.0)</td>
<td>NS</td>
</tr>
<tr>
<td>Other</td>
<td>295 (20.8)</td>
<td>248 (16.3)</td>
<td>244 (14.5)</td>
<td></td>
</tr>
<tr>
<td><strong>Full time equivalent (FTE)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>179 (12.7)</td>
<td>91 (6.0)</td>
<td>121 (7.2)</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>0.1-0.8</td>
<td>278 (19.8)</td>
<td>375 (24.7)</td>
<td>493 (29.3)</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>0.9 or more</td>
<td>948 (67.5)</td>
<td>1052 (69.3)</td>
<td>1068 (63.5)</td>
<td>P&lt;0.01</td>
</tr>
<tr>
<td><strong>Mean hours/week (SD)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>31.8 (15.7)</td>
<td>33.6 (13.1)</td>
<td>32.2 (13.5)</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>GDPs</td>
<td>31.4 (15.3)</td>
<td>33.0 (13.1)</td>
<td>32.1 (12.7)</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Specialists</td>
<td>38.5 (12.9)</td>
<td>37.8 (12.3)</td>
<td>32.5 (17.7)</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>20+ hours of CPD</td>
<td>1047 (73.8)</td>
<td>1071 (73.6)</td>
<td>1327 (78.9)</td>
<td>P&lt;0.001</td>
</tr>
</tbody>
</table>

**Reason for part-time practice**
- Doing non-dental work
- Insufficient dental work
- Seeking dental work
- Semi-retired from dentistry
- Parental responsibilities
- Other

### Table 3 – Practice characteristics of dentists who were working in NZ in all three years (N=1026; percentages in brackets)

<table>
<thead>
<tr>
<th></th>
<th>1997</th>
<th>2001</th>
<th>2005</th>
<th>Statistical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of practice</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private practice (self-employed)</td>
<td>817 (83.2)</td>
<td>849 (84.1)</td>
<td>837 (83.8)</td>
<td>NS</td>
</tr>
<tr>
<td>Private practice (employee)</td>
<td>89 (9.1)</td>
<td>80 (7.9)</td>
<td>81 (8.1)</td>
<td>NS</td>
</tr>
<tr>
<td>MOH/DHB</td>
<td>30 (3.1)</td>
<td>34 (3.4)</td>
<td>38 (3.8)</td>
<td>NS</td>
</tr>
<tr>
<td>Dental School</td>
<td>28 (2.9)</td>
<td>29 (2.9)</td>
<td>25 (2.5)</td>
<td>NS</td>
</tr>
<tr>
<td>Other</td>
<td>18 (1.8)</td>
<td>18 (1.8)</td>
<td>18 (1.8)</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Town type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major city</td>
<td>635 (61.9)</td>
<td>646 (63.0)</td>
<td>647 (63.1)</td>
<td>NS</td>
</tr>
<tr>
<td>Provincial city</td>
<td>200 (19.5)</td>
<td>208 (20.3)</td>
<td>213 (20.8)</td>
<td>NS</td>
</tr>
<tr>
<td>Other</td>
<td>191 (18.6)</td>
<td>172 (16.8)</td>
<td>166 (16.2)</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Full time equivalent (FTE)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>126 (12.4)</td>
<td>41 (4.0)</td>
<td>51 (5.0)</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>0.1-0.8</td>
<td>171 (16.8)</td>
<td>226 (22.0)</td>
<td>235 (32.7)</td>
<td>P&lt;0.01</td>
</tr>
<tr>
<td>0.9-1.0</td>
<td>720 (70.8)</td>
<td>759 (74.0)</td>
<td>640 (62.4)</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td><strong>Mean hours/week (SD)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>32.6 (15.6)</td>
<td>35.0 (11.6)</td>
<td>32.5 (12.6)</td>
<td>NS</td>
</tr>
<tr>
<td>General dentists</td>
<td>32.1 (15.2)</td>
<td>34.6 (11.2)</td>
<td>31.9 (12.3)</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Specialists</td>
<td>40.2 (11.0)</td>
<td>39.0 (11.6)</td>
<td>34.0 (16.4)</td>
<td>P&lt;0.05</td>
</tr>
</tbody>
</table>

**Reason for PT practice**
- Doing non-dental work
- Insufficient dental work
- Seeking dental work
- Semi-retired from dentistry
- Parental responsibilities
- Other

*More than one response was permitted to this question.*
respondents giving this reason increased in 2001 and 2005, the proportion of part-time dentists citing this reason did not change significantly. There was a three-fold increase in the proportion of part-time workers citing "other" reasons (mostly "personal choice"). Other notable patterns included a three-fold increase in the proportion who were semi-retired from dentistry, and a decrease in the proportion who were seeking dental work.

The workforce questionnaires also sought information on the number of hours of CPD undertaken in each year. Overall, there was a significant increase in the number of dentists who reported having undertaken at least 20 hours annual CPD over the period from 784 (76.4%) in 1997 to 827 (82.1%) in 2005. Over half of the sample (583; 56.8%) completed at least 20 hours CPD in all 3 years.

Throughout the observation period, the CPD activities of dentists differed according to their practice setting. In 1997, a minimum of 20 hours CPD was undertaken by 513 (80.8%) dentists from major cities, 156 (78.0%) from provincial cities, and 115 (60.2%) from other areas (P<0.001). In 2001, 506 (78.3%) city dentists, 155 (74.5%) provincial dentists, and 114 (66.3%) other dentists met this target (P<0.01). In 2005, 537 (83.0%) dentists in major cities, 170 (79.8%) in provincial cities and 120 (72.3%) in other regions achieved the DCNZ requirement of 20 hours of verifiable CPD (P<0.01).

Specialist status

Comparison of the sociodemographic and practising characteristics of general dentists and specialists was undertaken (Table 4). A higher proportion of specialists than general practitioners were male. Specialists were, on average, more than two years older than those who had not specialised, and a higher proportion of specialists than general practitioners self-identified as New Zealand European. Moreover, more general dentists than specialists identified as Chinese. There were no differences between generalists and specialists in the proportion of NZ graduates. A higher proportion of specialists than general dentists were practising in the major cities than in provincial cities and towns. A lower proportion of specialists than generalists were in group practice. More generalists than specialists were self-employed. A larger percentage of specialists than dentists were employed in "other" settings (such as district health boards or community clinics).

There were statistically significant differences between general dentists and specialists with respect to completing at least 20 hours of CPD in each of the three years, with consistently high proportions of specialists meeting the target (94.9%, 89.2% and 91.8% in 1997, 2001 and 2005), although the general dentists did improve over time (73.0%, 73.0% and 78.6% respectively). An overwhelming majority of specialists had undertaken at least 20 hours of CPD in any (and each) of the three years. Although only half the general dentists had undertaken at least 20 hours of CPD in each year, most had done so in at least one of those years.

Table 4 – Sociodemographic and practising characteristics of dentists who were working in NZ in all three years by practitioner status (percentages in brackets; some respondents did not answer all questions; for simplicity, only 2005 data are reported here)

<table>
<thead>
<tr>
<th></th>
<th>All respondents N=1026</th>
<th>Specialist in any year N=158</th>
<th>Others N=868</th>
<th>Statistical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>824 (80.3)</td>
<td>138 (87.3)</td>
<td>686 (79.0)</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Female</td>
<td>202 (19.7)</td>
<td>20 (12.7)</td>
<td>182 (21.0)</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Mean Age (SD)</td>
<td>50.4 (10.2)</td>
<td>52.4 (9.3)</td>
<td>50.0 (10.3)</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ European</td>
<td>791 (79.5)</td>
<td>137 (87.8)</td>
<td>654 (77.9)</td>
<td>P&lt;0.01</td>
</tr>
<tr>
<td>Chinese</td>
<td>84 (8.4)</td>
<td>2 (1.3)</td>
<td>82 (9.8)</td>
<td>P&lt;0.01</td>
</tr>
<tr>
<td>Town type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major city</td>
<td>647 (63.1)</td>
<td>122 (77.2)</td>
<td>525 (60.5)</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Provincial City</td>
<td>213 (20.8)</td>
<td>31 (19.6)</td>
<td>182 (21.0)</td>
<td>NS</td>
</tr>
<tr>
<td>Other</td>
<td>166 (16.2)</td>
<td>5 (3.2)</td>
<td>161 (18.5)</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Practice type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solo (SE)</td>
<td>330 (32.2)</td>
<td>61 (38.6)</td>
<td>269 (31.0)</td>
<td>NS</td>
</tr>
<tr>
<td>Group (SE)</td>
<td>507 (49.4)</td>
<td>50 (31.6)</td>
<td>457 (52.6)</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Employee</td>
<td>81 (7.9)</td>
<td>9 (5.7)</td>
<td>72 (8.3)</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Other</td>
<td>108 (10.5)</td>
<td>38 (24.1)</td>
<td>70 (8.1)</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Continuing education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20+ hrs in any year</td>
<td>964 (94.0)</td>
<td>157 (99.4)</td>
<td>807 (93.0)</td>
<td>P&lt;0.01</td>
</tr>
<tr>
<td>20+ hrs in each year</td>
<td>583 (56.8)</td>
<td>129 (81.6)</td>
<td>454 (52.3)</td>
<td>P&lt;0.001</td>
</tr>
</tbody>
</table>
Table 5 – Key sociodemographic and practising characteristics of dentists who were working in NZ in all three years by gender (percentages in brackets; some respondents did not answer all questions)

<table>
<thead>
<tr>
<th></th>
<th>All respondents N=1026</th>
<th>Male N=824</th>
<th>Female N=202</th>
<th>Statistical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialist in any year</td>
<td>158 (15.4)</td>
<td>138 (16.7)</td>
<td>20 (9.9)</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Mean Age in 2005 (SD)</td>
<td>50.4 (10.2)</td>
<td>52.3 (10.1)</td>
<td>42.6 (6.5)</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Registriable qualification</td>
<td>934 (91.0)</td>
<td>750 (92.2)</td>
<td>174 (86.1)</td>
<td>P&lt;0.01</td>
</tr>
<tr>
<td>NZ BDS</td>
<td>26 (2.5)</td>
<td>21 (2.5)</td>
<td>5 (2.5)</td>
<td>NS</td>
</tr>
<tr>
<td>NZDREX</td>
<td>66 (6.4)</td>
<td>43 (5.2)</td>
<td>23 (11.4)</td>
<td>P&lt;0.01</td>
</tr>
<tr>
<td>Self-employed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>817 (83.2)</td>
<td>679 (86.1)</td>
<td>138 (71.5)</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>2001</td>
<td>849 (84.1)</td>
<td>705 (86.5)</td>
<td>144 (73.8)</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>2005</td>
<td>837 (84.0)</td>
<td>655 (86.3)</td>
<td>142 (73.2)</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Mean hours per week</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997 (SD)</td>
<td>32.6 (15.6)</td>
<td>33.9 (15.5)</td>
<td>27.3 (14.7)</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>2001 (SD)</td>
<td>35.0 (11.6)</td>
<td>36.8 (10.7)</td>
<td>27.6 (12.4)</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>2005 (SD)</td>
<td>32.5 (12.6)</td>
<td>34.2 (12.1)</td>
<td>25.7 (12.2)</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Town type*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major city</td>
<td>647 (63.1)</td>
<td>502 (60.9)</td>
<td>145 (71.8)</td>
<td>P&lt;0.01</td>
</tr>
<tr>
<td>Provincial city</td>
<td>213 (20.8)</td>
<td>183 (22.2)</td>
<td>30 (14.9)</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Other</td>
<td>166 (16.2)</td>
<td>139 (16.9)</td>
<td>27 (13.4)</td>
<td>NS</td>
</tr>
</tbody>
</table>

*As there was minimal variation in the proportion of male and female dentists working in each town type over the period, the 2005 data are presented here.

dentists to work in rural areas, this did not reach statistical significance. The proportion of male and female dentists working in each of the practice settings did not change much over time.

In 1997, a higher proportion of male (78.4%) than female dentists (68.3%) achieved the CPD target of 20 hours. Although the gender differences were not significant in 2001 or 2005, relatively more male (58.7%) than female (49.0%) dentists undertook at least 20 hours of CPD in all three years (P<0.05).

Country of graduation

While approximately four-fifths (760, 81.4%) of New Zealand-trained dentists were male, fewer than three-quarters (64, 69.6%) of overseas-trained dentists were male (P<0.01). There were no differences between the two groups by age. Among the overseas-trained dentists, there were relatively fewer respondents who self-identified as NZ European (43, 46.7%) or Chinese (2, 2.2%), and more who identified as Indian (9, 9.8%) or of other ethnicity (34, 37.0%) compared to the New Zealand-trained group (748, 80.1%; 82, 8.8%; 28, 3.0%; 46, 4.9% respectively). In 1997, a lower proportion of overseas-trained dentists than NZ graduates were self-employed in private practice (75.6% and 83.9% respectively, P<0.05). Correspondingly, a larger proportion of overseas than NZ-trained dentists were employees. This difference was not evident in either 2001 or 2005. In 1997, a larger proportion of overseas-qualified than NZ-qualified dentists were employed in small towns (34.8% and 17% respectively, P<0.001). The proportion of overseas dentists working in small towns decreased to 26.1% in 2001 and by 2005 was more closely approximating the proportion of NZ graduates working in the small towns (21.7% and 15.6% respectively). There were no significant differences in the mean number of hours worked between the two groups in any of three years.

In 1997, there was a large difference between the two groups with respect to the proportion of respondents who had undertaken at least 20 hours of CPD. In the NZ-trained group, 730 (78.2%) had met the target, but only 54 (58.7%) of the overseas-trained group had (P<0.001). The difference was less marked in 2001, when 716 (76.7%) New Zealand and 59 (64.1%) overseas dentists had undertaken 20 hours of CPD (P<0.01). In 2005, there was no significant difference between the two groups, with 754 (80.7%) NZ-trained and 73 (79.3%) overseas-trained dentists meeting the requirement.

DISCUSSION

This paper has described trends in the New Zealand dentist workforce over a nine-year period from 1997 to 2005, using data from the annual DCNZ workforce questionnaires. Cross-sectional analysis identified characteristics of the complete workforce in each year. Subsequent longitudinal analysis outlined changes in the practising characteristics of those practitioners who were working in each of the three years.

Using the DCNZ questionnaire data enabled us to maximise our sample size; the response rates were 96.5%, 95.1% and 99.3% in 1997, 2001 and 2005 respectively. However, there was a degree of item non-response (that is, failure to answer particular questions) which varied throughout the questionnaire. Limiting the sample to those dentists who were practising in all three years reduced the number of individuals in the longitudinal cohort, but did allow us to undertake this analysis for the first time.

Although the use of ‘first ethnicity’ ensured that our results were consistent with other DCNZ publications, this may have resulted in an under-estimate of the number of different ethnic groups represented. We described individuals based on the ethnicity with which they primarily identified. The observed minor variation in the proportions of different
ethnic groups over the period (in the longitudinal analysis) is to be expected, as individuals may change over time in the way they view their own ethnic identity. It is of concern that the proportion of Maori in the dentist workforce remained relatively stable at less than 1%, while the percentage of Maori in the general population is approximately 14% (www.stats.govt.nz). Although there is an affirmative entry policy at the School of Dentistry, other barriers must exist which are limiting the numbers of Maori choosing to study dentistry.

The number of dentists practising in New Zealand increased by 18.6% over the nine-year period, while the population increased by 11.3% from 1996 to 2006 (www.stats.govt.nz). Thus, the dentist-to-population ratio increased from 390 per 100,000 to 420 per 100,000 over that period.

The observed increase in the proportion of non-NZ-European dentists working in NZ over the observation period is likely to reflect both an increase in the number of dentists registering from overseas, and an increase in the number of students from other ethnic groups who were training in New Zealand through the late 1990s and early 2000s. Recent changes to the University of Otago Dental School selection process appear to have decreased the number of students with a first language other than English (Rich, 2006). The number of graduate dentists leaving New Zealand to work overseas may be an additional factor, although it has been observed that graduates with parents living in this country were more likely to remain or return to NZ (New Zealand Dental Association, 2006a and b).

As would be expected, most dentists worked in private practice and were self-employed. It was not possible to determine whether dentists were in solo or group practice in each year, or whether they owned the establishment in which they were working.

Not surprisingly, the majority of dentists worked in major cities. Over the observation period, there was a decrease in the number of dentists working in small towns. This reached statistical significance for the complete workforce, but not the longitudinal cohort, probably because of the smaller numbers involved. This finding is consistent with anecdotal evidence which suggests that there is an ageing dental workforce in small towns, and that many rural health professionals are unable to sell their practices (Rural Expert Advisory Group to the Ministry of Health, 2002), thus being forced to close down their practices when retiring (New Zealand Dental Association, 2006a and b).

A “purge” of the DCNZ register was undertaken in March 2003. Dentists who were not intending to practise in NZ for the following year had to choose between being removed from the register or paying a fee to remain on the register with non-practising status. This resulted in 268 dentists (11.1% of registered dentists) being removed from the register, and 299 (12.3%) remaining on the register as non-practising dentists (Dental Council of New Zealand, 2004). This “purge” explains the observed decrease in the number of dentists who had an APC but were not practising dentistry.

There was a sizeable increase in the proportion of the dentist workforce who were working part-time, although the pattern in the mean number of hours worked per week was unclear. It might have been expected that there would be an increase in the mean number of hours worked per week following the “purge” of the register, but this was not observed. The mean number of hours worked overall (and by generalists) was higher in 2001 than in the other two years.

In the longitudinal sample (the dentists who were working in each of the three years), there was a substantial decrease in the proportion working full-time over the observation period. This may reflect the changing age distribution of the sample over time; some practitioners may progressively reduce their working hours as they approach retirement. At the other end of the age range, dentists entering the child-bearing years may choose to work part-time, at least for a period. This might be particularly so for female practitioners, who, in each of the three years, worked fewer hours per week (on average) than male dentists. This is consistent with other findings, both here and overseas (Russell, 2002; Newton et al, 2000; New Zealand Dental Association, 2006). The proportion of women in the NZ dental workforce is continuing to increase as more females enter dental training (Rich, 2006); the ‘manpower’ hours of the dentist workforce may further decrease over the next few years. It is not clear (at present) whether mothers return to full-time practice or persist in part-time practice later in their careers.

Paradoxically, there were no significant differences in the mean number of hours worked per week in each of the three years overall. It may be that the dentists’ perception of ‘full-time work’ has altered but the actual hours worked have not. The large decrease in the mean hours per week worked by specialist practitioners may reflect a different mix of specialists over time (with some types of specialists working more hours per week than others), or specialists’ other demographic characteristics, such as age or gender. As “specialists” were defined as being “registered as a specialist in any year”, it might be that, as some individuals moved from general practice, through their training and into specialist practice, they decreased their working hours.

The variation in the reasons given for working part-time was of interest. In the longitudinal cohort, the number of dentists who were “semi-retired” increased substantially between 1997 and 2005. This is consistent with the increasing age of the sample, and was not seen in the cross-sectional analyses. In the latter, the proportion of dentists citing “parental responsibilities” as their reason for part-time practice was relatively constant. For the longitudinal cohort, there was an increase in the number of dentists citing parental responsibilities as a reason for part-time practice, but this did not reach statistical significance. Over the nine-year observation period, the mean age of female respondents increased from 34.6 to 42.6; meaning that some women would have moved into child-bearing age, while those who had already had children might be starting to have less direct responsibility for them as they got older. As children reach adolescence or young adulthood, there may be a greater incentive to work to pay for their education. Dentists with children have been reported to work fewer hours per week (regardless of gender) than those without children (Kruger, 2004; Brennan et al, 1992). Interestingly, another study reported that the net income of male (but not female) dentists increased with the number of children under 21 years of age (Brown and Lazar, 1998), suggesting (not surprisingly) that productivity may increase in association with an increasing number of dependants.

The small numbers of dentists who were undertaking non-dental work, had insufficient dental work or were seeking dental work — in both the cross-sectional and longitudinal cohorts — are consistent with anecdotal reports of practice “busyness” in this country (New Zealand Dental Association, 2006b). It is reassuring from the dentists’ point of view that the vast majority have at least as much work as they want, but this also suggests that there may be a problem with access to care for some groups, as the demand for dental care is greater than the supply.
In both analyses, there was a large increase in the proportion of dentists who cited ‘other’ reasons for working part-time in 2001 and 2005. By far the most dominant of these was personal choice. It might be that dentists are seeking to gain a better work-life balance, particularly following recent emphasis on the stress levels and mental health of dental practitioners, both in the press and the academic literature (Rada et al, 2004; Alexander, 2001; Gorton et al, 2000).

It was pleasing to note the increase in the number of dentists undertaking at least 20 hours annual CPD over the study period. With the introduction of the Health Practitioners Competence Assurance Act (2003; brought into force in September 2004), the DCNZ now requires dentists to undertake 20 hours “verifiable” and 20 hours “non-verifiable” CPD annually. The first four-year cycle of CPD finishes in May 2009. It is of some concern that a lower proportion of rural dentists (than city and provincial dentists) met the CPD targets during the observation period. Rural dentists may have more difficulty accessing continuing education courses due to the need to travel to main centres, and the difficulties and expenses involved in obtaining “cover” for their practice. It is also recognised that they are at greater risk of professional isolation (Kruger and Tennant, 2004). Such problems have also been identified for rural doctors in Australia, and have been associated with declining rural practice (Booth and Lawrence, 2001). The evolution of video-conferencing and web-based education, together with the popularity of small study groups, should go some way to addressing these problems, along with the availability of electronic education (such as CDs and DVDs, on-line access to dental journals and internet discussion groups). However, additional strategies may be required to assist rural practitioners in keeping up to date, and, in particular, to enable regular peer contact.

Similar concerns exist for female practitioners, as, overall, all three years, relatively fewer females than males met the CPD requirement. Family responsibilities and lower incomes may mean that women experience difficulty in accessing continuing education. These factors may also be responsible for the lower proportion of females among the specialists on the register. The lower rates of self-employment among women dentists may have a role in the lower incomes reportedly earned by female practitioners (Brown and Lazar, 1998). It may be that many women prefer not to be involved in the “business side” of dentistry, but are more content to work as employees focusing on clinical aspects (and working fewer hours than their male counterparts).

The higher proportion of female than male dentists working in the major cities may reflect a greater potential for employment (e.g. DHBs and community clinics), greater earning potential, or concerns about managing the demands of a rural practice. A recent Western Australian study also found fewer female dentists working in rural and remote areas (Kruger and Tennant, 2004).

As would be expected, the majority of specialists worked in the major cities (where, presumably, the larger populations ensure a broad and consistent referral base and associated practice viability). However, it may also mean that it is harder for people living in rural areas to access these services, and that rural dentists have less specialist support (New Zealand Dental Association, 2006b).

The practising characteristics of overseas-trained dentists showed considerable variation from NZ-trained dentists in 1997. However, the differences decreased over the observation period so that, by 2005, the practice settings, rates of self-employment, and CPD activities of the two groups were not significantly different. This suggests that, with increasing years of practice in NZ, overseas graduates adapt to a more typical NZ working pattern.

CONCLUSION

Significant changes occurred in the NZ dentist workforce over the nine years from 1997 to 2005. The sociodemographic composition of the workforce has altered; the proportion of women and non-European dentists has increased, as has the mean age of dentists. Further investigation is needed to determine why many dentists now choose to work part-time (particularly specialists). It also remains to be seen whether women who work part-time during child-rearing will return to full-time practice later in their career. There is an urgent need to address the reasons for declining numbers of dentists working in small towns, and whether the needs of the rural population are being met. Another area requiring further investigation is the reason why fewer women and non-European dentists undergo specialist training. The introduction of the HPCA appears to have increased the CPD activities of dentists, although women and rural practitioners appear less likely to meet the target. There is a need for creative strategies to assist these groups.

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Gender differences in dentists' working practices and job satisfaction

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ABSTRACT
Objectives: To describe the working practices and level of job satisfaction of male and female dentists.

Methods: A nationwide postal survey of all dentists holding an annual practising certificate in New Zealand (response rate 78.1%).

Results: The mean number of hours worked per week was 29.1 for female and 36.0 for male dentists. The main reason for part-time practice given by women was caring for children (cited by 67.2%) and for men was personal choice (cited by 63.6%). A greater proportion of females than males were employed on a salary or as an associate in practice rather than owning their own practice. Male dentists were more active in continuing education than females. The mean career satisfaction score for male respondents was 7.6 and for females 7.1 ($P < 0.001$). Relatively more women than men had taken a career break, usually for child rearing. Two-thirds of women and one-third of men planned to retire from dentistry before 60 years of age.

Conclusions: Male and female dentists differ in their working patterns and career satisfaction. There is a need for ongoing monitoring of the workforce, particularly as the gender distribution (and societal trends and expectations) continues to change.

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1. Introduction

In most industrialised countries, there has been a steady increase in the proportion of women in the dentist workforce over the last 25 years. This is likely to have impacted on the profession’s productivity, as female dentists tend to work fewer hours per week than male dentists. Furthermore, a larger proportion of females than males take career breaks, with women taking longer breaks (up to several years). Such breaks tend to be followed by lower working hours upon returning to practice, and some women experience difficulties upon their return. Female dentists have also been found to retire earlier than male dentists, on average. However, much has changed in recent years with regard to women in the general workforce. Childcare is more readily available and increasing numbers of mothers are returning to work while their children are young. Concomitantly, men are playing an increasingly large role in family life, and many are involved in childcare on a day-to-day basis. The extent to which such social changes are impacting on the dental profession is not known.
As the proportion of women in the profession continues to increase, there is a need to monitor the differences in working patterns between male and female dentists, and to be aware of their dental workforce implications. Although child rearing is an important factor, there are other areas to consider, such as breadwinner status and job satisfaction. While there has been an interest in gender issues in the dental workforce, there have been limitations to previous studies, in that some considered women only, without comparison to their male colleagues, and others had low response rates (which somewhat compromise their usefulness). The aim of this study was to describe and compare the working practices and job satisfaction of a representative sample of male and female dentists.

2. Methods

A nationwide postal survey of all New Zealand dentists holding an annual practising certificate was undertaken in 2005. Ethical approval was granted by the University of Otago Ethics Committee prior to commencing the study. Contact details of all dentists with an Annual Practising Certificate (APC) were obtained from the New Zealand Dental Register (with permission from the Dental Council of New Zealand). All women and one-third of male dentists (randomly selected) were invited to participate, in order to maximise the statistical power of the gender comparisons. Participation incentives were offered in the form of prize draws. A self-completion questionnaire, covering letter and reply-paid return envelope were sent to 659 male and 482 female dentists. Questions sought information on respondents' socio-demographic characteristics, current working practice, career breaks, continuing education and career satisfaction. A follow-up letter and duplicate questionnaire were sent to those who had not responded after 3 weeks. Using a previously developed and tested career satisfaction scale, respondents were asked to rate their satisfaction with their work life on a 10-point scale. The scale consisted of the numbers 1–10 with written anchors at each end, where 1 is the minimum satisfaction and 10 is the maximum satisfaction. This provided a career satisfaction score for each dentist.

The responses received were entered into an Excel spreadsheet and analyzed using the Statistical Package for the Social Sciences (SPSS; Version 11.0 for Mac OS X, SPSS Inc., Chicago, IL). Chi-square tests were used for comparing proportions, while differences between means were examined using the independent samples t-test. The level of significance was set at P < 0.05.

3. Results

Of the 659 questionnaires sent to male dentists, 16 were returned without reaching the addressee because of data-base address errors, and 15 were returned because the practitioner had died or retired. Completed questionnaires were received from 468 men, giving an effective response rate of 74.5%. Of the 482 questionnaires sent to female dentists, 22 were returned because of address errors. Completed questionnaires were received from 382 women (response rate 83.0%). An overall response rate of 78.1% was achieved.

The socio-demographic characteristics of the respondents are summarised by gender in Table 1. Most responding dentists were of New Zealand (NZ) European ethnic origin, although a smaller proportion of female than male dentists were NZ Europeans. A greater proportion of female than male dentists reported that they self-identified with 'other' ethnic groups (such as South African). Most women dentists were younger than 40, while most males were aged between 40 and 59 years. Almost one in five male respondents were aged 60 or more, but only 1 female was in this age band. Most dentists were married or cohabiting and had at least one child. Around half had qualified between 1970 and 1980, with only three women having qualified before 1970. Most respondents had trained in NZ, with a larger proportion of women than men qualifying overseas. Approximately, one-third of respondents held a postgraduate qualification of some kind. While similar proportions of males and females held postgraduate dental diplomas or masters' degrees, larger proportions of male than female dentists held College Fellowships and other qualifications. A higher proportion of men than women were registered as dental specialists. The mean number of years registered as a specialist was 11.1 (S.D. 8.0) overall, with 12.5 (8.2) and 8.0 (6.8) for males and females, respectively (P < 0.05). Thirty-five men (7.5%) and 292 female (78.1%) respondents had a student loan (P < 0.001).

Of the 849 respondents, 36 were not working as dental practitioners at the time of the study, 30 were female (7.8% of female respondents) and 6 were male (1.3% of male respondents; P < 0.001). The most common reasons for currently being on a career break were parental leave or caring for children (17, 47.2%), personal choice (11, 30.5%), personal illness (7, 19.4%) and working outside dentistry (7, 19.4%). Some respondents gave more than one reason for their career break. Fourteen (38.9%) had been away from work for less than 6 months, 10 (27.8%) between 6 and 12 months, and 10 (27.8%) for more than 1 year. Two-thirds (20, 66.7%) of those who were taking a career break planned to return to dental practice (most within 6 months), while five (13.9%) were unsure and five (13.9%) stated that they did not intend to return to dentistry. Two-thirds stated that they would be interested in taking a refresher course prior to returning to dental practice, while the remainder were either not interested or were unsure.

Participants were asked about any career breaks they had taken in the past (Table 2). A career break was defined as any period of 6 weeks or longer away from practice, and almost half indicated that they had taken a break at some stage of their career. Although a greater proportion of females than males had taken a career break, there were no significant gender differences in the duration of career breaks. While most women had taken breaks to care for children, men mainly took breaks because of personal choice or because they were seeking a job in dentistry. More men than women had taken breaks for the purpose of further study. Over one-fifth of women but only one-seventh of men reported that they had experienced difficulty returning to work following their career break.

Data regarding the current working practices of those currently working as dental practitioners are summarised in
Table 1 - Demographic characteristics of respondents shown by gender (brackets contain percentages; some respondents did not answer all questions)

<table>
<thead>
<tr>
<th>Ethnicitya</th>
<th>Male (N = 456)</th>
<th>Female (N = 382)</th>
<th>All combined (N = 850)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NZ European</td>
<td>333 (73.2)</td>
<td>247 (64.7)</td>
<td>580 (68.3)</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>NZ Māori</td>
<td>11 (2.4)</td>
<td>7 (1.8)</td>
<td>18 (2.1)</td>
<td>NS</td>
</tr>
<tr>
<td>Pacific Island</td>
<td>1 (&lt;0.1)</td>
<td>3 (&lt;0.1)</td>
<td>4 (&lt;0.1)</td>
<td>NS</td>
</tr>
<tr>
<td>Chinese</td>
<td>62 (13.2)</td>
<td>40 (10.5)</td>
<td>102 (12.0)</td>
<td>NS</td>
</tr>
<tr>
<td>Indian</td>
<td>22 (4.7)</td>
<td>26 (6.8)</td>
<td>48 (5.6)</td>
<td>NS</td>
</tr>
<tr>
<td>Other</td>
<td>54 (11.5)</td>
<td>65 (17.0)</td>
<td>119 (14.0)</td>
<td>P &lt; 0.05</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Male</th>
<th>Female</th>
<th>All combined</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-30</td>
<td>105 (22.6)</td>
<td>235 (61.7)</td>
<td>340 (40.1)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>40-59</td>
<td>269 (57.8)</td>
<td>145 (38.0)</td>
<td>414 (48.9)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>60 or more</td>
<td>91 (19.6)</td>
<td>1 (0.7)</td>
<td>92 (10.9)</td>
<td>P &lt; 0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marital status</th>
<th>Male</th>
<th>Female</th>
<th>All combined</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married/cohabiting</td>
<td>396 (85.9)</td>
<td>267 (73.3)</td>
<td>663 (80.5)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Single, never married, widowed</td>
<td>70 (15.0)</td>
<td>55 (14.5)</td>
<td>165 (19.5)</td>
<td>P &lt; 0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of children</th>
<th>Male</th>
<th>Female</th>
<th>All combined</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>72 (15.8)</td>
<td>40 (10.6)</td>
<td>112 (13.1)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>1-2</td>
<td>190 (41.7)</td>
<td>168 (44.6)</td>
<td>358 (42.0)</td>
<td>NS</td>
</tr>
<tr>
<td>3 or more</td>
<td>194 (42.5)</td>
<td>69 (18.4)</td>
<td>263 (30.9)</td>
<td>P &lt; 0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year of qualification</th>
<th>Male</th>
<th>Female</th>
<th>All combined</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior to 1970</td>
<td>108 (23.1)</td>
<td>30 (8.3)</td>
<td>138 (16.3)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>1970-1989</td>
<td>262 (56.1)</td>
<td>179 (46.9)</td>
<td>441 (51.9)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>1990 or later</td>
<td>97 (20.7)</td>
<td>200 (52.2)</td>
<td>297 (35.0)</td>
<td>P &lt; 0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country of graduation</th>
<th>Male</th>
<th>Female</th>
<th>All combined</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Zealand</td>
<td>399 (85.3)</td>
<td>292 (76.4)</td>
<td>691 (81.3)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Australia</td>
<td>6 (1.3)</td>
<td>5 (1.3)</td>
<td>11 (1.3)</td>
<td>NS</td>
</tr>
<tr>
<td>UK</td>
<td>20 (4.2)</td>
<td>28 (7.3)</td>
<td>48 (5.6)</td>
<td>NS</td>
</tr>
<tr>
<td>Other</td>
<td>43 (9.2)</td>
<td>27 (7.1)</td>
<td>70 (8.3)</td>
<td>P &lt; 0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Postgraduate qualificationsa</th>
<th>Male</th>
<th>Female</th>
<th>All combined</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>312 (67.8)</td>
<td>300 (78.5)</td>
<td>612 (73.7)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>PGDipClinDent</td>
<td>31 (6.7)</td>
<td>25 (6.6)</td>
<td>56 (6.6)</td>
<td>NS</td>
</tr>
<tr>
<td>MD/DComDent</td>
<td>47 (10.2)</td>
<td>29 (7.6)</td>
<td>76 (9.0)</td>
<td>NS</td>
</tr>
<tr>
<td>FRACS</td>
<td>30 (6.5)</td>
<td>11 (2.9)</td>
<td>41 (4.9)</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>Other</td>
<td>80 (17.4)</td>
<td>31 (8.1)</td>
<td>111 (13.2)</td>
<td>P &lt; 0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Registered as a specialist</th>
<th>Yes</th>
<th>No</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>67 (14.6)</td>
<td>331 (75.4)</td>
<td>398 (46.8)</td>
</tr>
</tbody>
</table>

a Participants were permitted to identify with more than one ethnic group.
b Some respondents held more than one postgraduate qualification.

Table 3. Whereas the majority of male dentists owned their own practice, a greater proportion of women worked as an associate in dental practice. More women than men worked in hospital departments. The mean number of hours worked per week ranged from 0 to 80 (with a mean of 32.9), with men working 6.9 h per week more (on average) than women. Men’s most frequent reason for working part-time was personal choice, and that for women was caring for children, followed by personal choice. Most men (but only one-third of women) were the main family income earners. Two-thirds of men planned to work until at least 60 years of age, while a similar proportion of women planned to retire before 60 years.

The continuing education practices of respondents are presented in Table 4. Most dentists belonged to the New Zealand Dental Association. A greater proportion of men than women had a Dental College Fellowship or belonged to two or more societies. Greater proportions of male respondents than female dentists had read two or more dental journals regularly; undertaken at least 20 h of continuing professional development in the previous year; and attended three or more Dental Association branch meetings in the previous year. A greater proportion of males than female dentists reported that they found branch meetings useful, and that they felt welcome at those. Most women who were specialists had undertaken their postgraduate training before having children (17, 60.7%) or did not have any children (5, 17.9%). In contrast, 59 of the 60 male specialists (98.3%) had children, with 26 (43.3%) having undertaken specialist training around the time of the birth of their children, and 13 (21.7%) after having children (P < 0.001).

Information regarding the career satisfaction of respondents is presented in Table 5. Most respondents stated that...
### Table 2 - Information about previous career breaks by gender (percentages in brackets; some respondents did not answer all questions)

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>All combined</th>
<th>Statistical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever had a career break</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>133 (23.6)</td>
<td>229 (34.9)</td>
<td>372 (44.6)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>No</td>
<td>332 (71.4)</td>
<td>143 (19.7)</td>
<td>475 (55.6)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Duration of break</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;12 months</td>
<td>622 (47.7)</td>
<td>110 (46.9)</td>
<td>172 (46.6)</td>
<td>NS</td>
</tr>
<tr>
<td>12-24 months</td>
<td>20 (15.4)</td>
<td>50 (20.9)</td>
<td>70 (19.0)</td>
<td>NS</td>
</tr>
<tr>
<td>&gt;24 months</td>
<td>48 (36.9)</td>
<td>73 (33.1)</td>
<td>121 (44.4)</td>
<td>NS</td>
</tr>
<tr>
<td>Reason for career break*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caring for children</td>
<td>6 (2.3)</td>
<td>17 (6.9)</td>
<td>23 (4.7)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Personal illness</td>
<td>5 (1.3)</td>
<td>14 (5.9)</td>
<td>19 (4.7)</td>
<td>NS</td>
</tr>
<tr>
<td>Personal choice</td>
<td>45 (33.8)</td>
<td>28 (12.7)</td>
<td>73 (19.6)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Seeking job in dentistry</td>
<td>45 (33.8)</td>
<td>28 (11.7)</td>
<td>73 (19.6)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Working outside dentistry</td>
<td>5 (1.3)</td>
<td>21 (8.8)</td>
<td>26 (5.4)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Study</td>
<td>11 (23.3)</td>
<td>21 (8.8)</td>
<td>32 (6.4)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Other (mainly travel)</td>
<td>32 (24.1)</td>
<td>38 (15.9)</td>
<td>70 (18.8)</td>
<td>NS</td>
</tr>
<tr>
<td>Experienced difficulty after returning from career break</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>18 (13.0)</td>
<td>53 (22.6)</td>
<td>71 (19.3)</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>No</td>
<td>114 (86.4)</td>
<td>182 (77.4)</td>
<td>296 (80.7)</td>
<td>P &lt; 0.05</td>
</tr>
</tbody>
</table>

* Respondents were able to identify more than one reason.

### Table 3 - Current working practices of dental practitioners (percentages in brackets; some respondents did not answer all questions)

<table>
<thead>
<tr>
<th></th>
<th>Male N = 452</th>
<th>Female N = 352</th>
<th>All combined N = 814</th>
<th>Statistical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current position*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own practice</td>
<td>324 (70.1)</td>
<td>137 (39.9)</td>
<td>461 (56.6)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Associate</td>
<td>103 (22.3)</td>
<td>158 (44.7)</td>
<td>261 (32.3)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Hospital</td>
<td>35 (7.6)</td>
<td>46 (13.1)</td>
<td>81 (10.0)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Teaching</td>
<td>16 (3.5)</td>
<td>21 (6.0)</td>
<td>37 (4.5)</td>
<td>NS</td>
</tr>
<tr>
<td>Other dental setting</td>
<td>20 (4.3)</td>
<td>15 (4.3)</td>
<td>35 (4.3)</td>
<td>NS</td>
</tr>
<tr>
<td>Hours worked per week</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (S.D.)</td>
<td>36.0 (10.0)</td>
<td>29.1 (12.6)</td>
<td>32.9 (11.8)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Median</td>
<td>37</td>
<td>32</td>
<td>35</td>
<td></td>
</tr>
</tbody>
</table>

** Male N = 77 Female N = 180 All combined N = 257

| Reasons for working part-time*    |              |                |                      |                           |
| Caring for children               | 6 (7.8)      | 21 (6.3)       | 27 (8.2)             | NS                        |
| Caring for other relatives        | 2 (2.3)      | 6 (1.7)        | 8 (2.4)              | NS                        |
| Personal illness                  | 5 (5.8)      | 5 (1.7)        | 10 (3.0)             | NS                        |
| Personal choice                   | 55 (63.6)    | 96 (33.3)      | 151 (56.9)           | P < 0.001                 |
| Job outside dentistry             | 12 (15.6)    | 7 (3.9)        | 19 (6.8)             | NS                        |
| Study                             | 5 (5.2)      | 14 (7.8)       | 19 (7.4)             | NS                        |
| Other                             | 6 (7.8)      | 7 (3.9)        | 13 (5.1)             | NS                        |

| Principal earner in family        |              |                |                      |                           |
| Yes                               | 19 (35.3)    | 123 (34.9)     | 142 (36.5)           | P < 0.001                 |
| No                                | 50 (64.7)    | 226 (65.1)     | 276 (63.5)           | P < 0.001                 |

| Planned age of retirement         |              |                |                      |                           |
| <50 years                         | 11 (2.7)     | 45 (12.8)      | 56 (18.2)            | P < 0.001                 |
| 50-59 years                       | 94 (26.3)    | 151 (44.8)     | 245 (33.7)           | P < 0.001                 |
| 60+ years                         | 310 (67.1)   | 113 (51.8)     | 423 (56.2)           | P < 0.001                 |

* Some dentists held more than one position.

** More than one reason was permitted.
dentistry had fulfilled their career expectations and that they would study dentistry again, although more positive responses were received from males than females. Almost all respondents stated that there were adequate career opportunities for dentists, with no significant differences by gender. Approximately, half of male dentists and one-quarter of female dentists felt that their partner had made career adjustments to suit their dental career.

Career satisfaction scores by socioeconomic characteristics are presented in Table 6. Career satisfaction scores were higher for male dentists, those aged 40 or more, dental specialists, and those with children. Linear regression confirmed that only female gender was associated with career satisfaction; being overseas-trained was not associated with the dependent variable once age group and gender were controlled for.

### 4. Discussion

This cross-sectional study investigated the working practices and job satisfaction of a random sample of 468 male and 382 female dentists. A greater proportion of female dentists had taken a career break of 6 weeks or more, with the main reason being to care for children. Larger proportions of women worked as associates in practice (rather than owning their own

<table>
<thead>
<tr>
<th>Table 4 – Continuing professional education practices of dental practitioners by gender (percentages in brackets; some respondents did not answer all questions)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Male</strong></td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Member of NZDA</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Number of dental society memberships</td>
</tr>
<tr>
<td>2 or more</td>
</tr>
<tr>
<td>Number of dental journals read regularly</td>
</tr>
<tr>
<td>2 or more</td>
</tr>
<tr>
<td>&gt;20 hours of CPD in last year</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Number branch meetings attended in last year</td>
</tr>
<tr>
<td>1 or 2</td>
</tr>
<tr>
<td>3 or more</td>
</tr>
<tr>
<td>Find meetings useful</td>
</tr>
<tr>
<td>Sometimes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Feel welcome at branch meetings</td>
</tr>
<tr>
<td>Sometimes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 5 – Indicators of career satisfaction with dentistry among male and female dental practitioners (percentages in brackets; some respondents did not answer all questions)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Male</strong></td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Has dentistry fulfilled your career expectations?</td>
</tr>
<tr>
<td>No unsure</td>
</tr>
<tr>
<td>Would you study dentistry again?</td>
</tr>
<tr>
<td>No unsure</td>
</tr>
<tr>
<td>Adequate career opportunities?</td>
</tr>
<tr>
<td>No unsure</td>
</tr>
<tr>
<td>Has your partner made career adjustments to suit your dental career?</td>
</tr>
<tr>
<td>No unsure</td>
</tr>
</tbody>
</table>
practice, and worked part-time. Men were more active in continuing professional education and had higher mean career satisfaction scores.

Before discussing the study’s findings in detail, it is appropriate to examine its weaknesses and strengths. The response rate of 78.1%, although not ideal, is typical of this type of study. Because the survey was anonymous, it is not possible to accurately determine the differences between responders and non-responders. The response rate was higher for women than men, perhaps because of women’s greater interest in the issue being investigated. The respondents were slightly younger than the dental profession overall. This can be explained by the fact that there were higher proportions of women in the study than in the dental profession as a whole, and that, in New Zealand, female dentists are (on average) 10 years younger than their male counterparts. Similarly, a slightly lower percentage of dentists in the sample than in the entire dental profession were New Zealand graduates. Females comprise a higher proportion of the overseas graduate dentists in this country. Owing to the sample including only dentists with an APC, we excluded most of those who were either working overseas or on a career break lasting longer than a year. Thus, valuable information about dentists on extended career breaks or working overseas was not able to be obtained.

4.1. Career breaks

Although only 30 respondents were taking a career break at the time of the study, females far outnumbered males in this group. In accordance with previous findings, almost half of those on career breaks were caring for children. Almost one-third had been off work for more than a year but still held an APC. Despite holding an APC, approximately one-third of those on a career break were either not planning to recommence their dental career or were unsure. Newton et al. reported that 50% of dentists on career breaks did not plan to return to the occupation.

Although more women than men had taken a career break, there was no gender difference in the length of those breaks. However, there were gender differences in the reasons for taking the time off, with most women (but very few men) doing so to care for children. Larger proportions of men had time off because they were either seeking work, or having a break for study or because of personal choice. Newton et al. reported that around 60% of female and 30% of male dentists in the United Kingdom took a career break. The main reason for men taking a break was personal illness; for women, it was child rearing. In contrast to the current study’s findings, women took longer career breaks than males. However, when child rearing was excluded, there were no gender differences in the proportion taking career breaks. It has been suggested that, in the UK, female dentists are taking shorter career breaks than previously.

Career breaks have also been associated with shorter working hours on return to the profession. Newton et al. calculated that female dentists who take a career break have a working life approximately 25% shorter than dentists who do not. Almost two-thirds of women in the current study planned to retire before 60 years, whereas fewer than one-quarter of men planned to do so. This will serve to further attenuate the dentist-population ratio in the future.

It is unclear why more women than men in our study reported experiencing difficulty returning to work after a career break, particularly given that there were no gender differences in the length of career breaks. It may be that, when women return to work after having children, they are then striving to balance their careers with the demands of motherhood. Pack et al. also reported that many women experience difficulties upon their return to dentistry after a career break. In the current study, there was considerable respondent interest in participating in a refresher course before returning to work, presumably for those who had taken extended periods of leave. However, in the UK, the utilisation by females of schemes, such as “Keeping in Touch” and “Getting Back to Practice” has not been as great as had been expected.

4.2. Current working practices

As has previously been reported in the UK, a larger proportion of male than female dentists in the current study owned their own practice, with relatively more women working as associates. For women who work part-time, practice ownership may not be economical; they may also wish to avoid the extra stress and responsibility involved in practice ownership (such as employing staff, equipment maintenance and so on). A larger proportion of women than men worked in the hospital setting. A pattern of more women returning to their previous practice, and fewer who had changed practice, was also observed. The survey respondents were more likely to wish to avoid the added stress and responsibility of practice ownership than their male counterparts. It is unclear whether this is to do with the experience and specialty of respondents or whether women are less inclined to take on business commitments.

Table 6 - Career satisfaction scores by sociodemographic characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Career satisfaction mean (S.D.)</th>
<th>Statistical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>7.6 (1.7)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Female</td>
<td>7.1 (1.8)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 40</td>
<td>7.3 (1.7)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>40 or more</td>
<td>7.5 (1.3)</td>
<td></td>
</tr>
<tr>
<td>Specialist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>8.2 (1.6)</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>No</td>
<td>7.3 (1.3)</td>
<td></td>
</tr>
<tr>
<td>Principal earner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes or equal</td>
<td>7.4 (1.8)</td>
<td>NS</td>
</tr>
<tr>
<td>No</td>
<td>7.3 (1.7)</td>
<td></td>
</tr>
<tr>
<td>Children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7.4 (1.8)</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>No</td>
<td>7.1 (1.7)</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married/cohabiting</td>
<td>7.3 (1.6)</td>
<td>NS</td>
</tr>
<tr>
<td>Single/divorced/widowed</td>
<td>7.4 (1.8)</td>
<td></td>
</tr>
</tbody>
</table>

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Women worked fewer hours per week (on average) than their male counterparts. With the increasing proportion of women in the dental workforce, this represents an increasing loss of 'manpower hours'; a situation that is likely to be compounded as greater numbers of women enter undergraduate dental training. Larger proportions of women than men work part-time, and the reasons most often given for part-time employment are caring for children and personal choice. It may also reflect (or explain) the fact that fewer female than male dentists reported being the principal income earners in their family. If the income is not essential for the household, women may be less likely to work full-time. Similar observations have been reported from other recent studies.

Previous research indicates that it is only after the birth of children that male and female work patterns differ. For example, Newton et al. reported that men work more hours when they have childcare responsibilities, while women work fewer hours. Price reported that the likelihood of female dentists working more than 29 h per week was lower with greater numbers of children. Brennan et al. reported that the hours worked per year were the least for women with children aged younger than 2 years, intermediate for those with older children, and greatest for those with no dependent children. By contrast, men with children aged younger than 2 years worked the longest hours, while those with older children continued to work significantly more hours per year than those with no children. Matthews and Scully also reported that women worked more hours as their children get older; they concluded that women are only temporarily less productive in the dental labour force.

4.3. Continuing education

More male than female dentists in the current study held postgraduate qualifications. This may reflect a greater interest of (or opportunity for) males in postgraduate training, or perhaps that males are more able to fit postgraduate study into their schedules. It may in part be explained by the fact that the women were, on average, 10 years younger than male participants and some may not yet have undertaken planned postgraduate education. Women (particularly those with children) may find it more difficult to commit to postgraduate study. More male than female dentists were registered as specialists, indicating either that men were more interested in specialist work or found it easier to complete specialist training (usually a masters' degree). Newton et al. reported that men were four times more likely to take time off for study than were women (compared to 2.6 times in the current study), although the number of postgraduate qualifications achieved by men and women were equivalent.

Male dentists were also more active in other forms of continuing education, as indicated by memberships of dental societies, regularity of reading dental journals and attendance at formal continuing professional development than their female colleagues. Recent UK findings are not clear as to whether women read professional journals less frequently than men, although female dentists have been reported to spend less time at continuing education courses than males. This is of concern as dentists who do not attend continuing education sessions are at increased risk of professional isolation.

There may remain the perception that membership of dental colleges and societies is more of a male domain. For example, more male than female dentists belonged to the dental college, and fewer women reported that they found dental branch meetings useful or that they felt welcome at them. Perhaps existing dental meetings need to be made more female-friendly; alternatively, additional groups could be formed that cater more to the specific needs of women. For example, study groups could take place within school hours, with topics of greater interest to female practitioners. It may be than women have different interests within dentistry than men. Thought should be given to measures that can make continuing education more readily achievable for women (such as the availability of childcare at conferences, and web-based learning). While women need to take responsibility for their own education, course organisers should make an effort to ensure that they can access continuing education as easily as men.

4.4. Career satisfaction

More male than female dentists stated that dentistry had fulfilled their career expectations, and that they would choose to study dentistry again; moreover, their mean career satisfaction score was higher. Overall career satisfaction appeared higher than in a recent UK study, in which just under half agreed with the statement that they wished to change career, and 57% agreed that they were satisfied with their career in dentistry, with no differences in job satisfaction by age or sex. On the other hand, de Wet et al. found that 61% of male and 65% of female practitioners in South Africa would choose dentistry as a career again. In the USA, it was reported that around 60% of dentists were satisfied with their careers. Murray reported that two-thirds of a sample of women dentists in the UK said that their dental career had fulfilled their expectations, that they would choose to study dentistry again, and that they recommended dentistry to other women.

Almost half of male (but only one quarter of female) dentists considered that their partner had made career adjustments to suit their dental career. Lack of flexibility on the partner's part might limit a woman's career opportunities. Because only 35% of females (but 85% of males) were the principal earners in their family, it might be unrealistic to expect the partners to make such adjustments; conversely, if they had, perhaps more women would then be the main breadwinner!

In the current study, the career satisfaction of specialists was higher than that of general practitioners. Specialisation could be one means of improving career satisfaction for some female dentists, although this would be tempered by the expense and stress associated with specialist training. A better alternative might be restructuring general practice to increase satisfaction. This might include greater use of auxiliaries to undertake the more mundane or repetitive tasks, leaving the general practitioner to undertake the more complex and rewarding aspects of dentistry. Improving access to continuing education and peer support might also improve the career satisfaction of female practitioners.
5. Conclusion

Although dentistry can provide a satisfying career for both genders, the current study suggests that, for at least some women, there are substantial challenges limiting career potential and career satisfaction. In particular, the working lives of female dentists are more likely to be affected by the demands of child rearing, resulting in career breaks and (often) reduced hours of employment upon return to work. To compound this effect on the 'manpower' hours, female dentists plan to retire (on average) earlier than males. Women are under-represented in several key areas, such as practice ownership, specialist registration, postgraduate qualifications, college memberships and attendance at continuing education courses. In several respects, women appear to be less satisfied with their careers than their male colleagues. Further investigation of the reasons for this is indicated, because, if career satisfaction can be improved, it may improve female practitioners' productivity (in terms of the hours worked) and help to address some of the dental workforce concerns evident worldwide. There is a need for ongoing monitoring of the working patterns and job satisfaction of dental practitioners.

Acknowledgements

The authors would like to thank the 850 dentists who took the time to accurately and honestly complete the questionnaires. The assistance of So Hyun Park and So Young Park in the collection of data relating to female dentists is gratefully acknowledged, as is the financial support of both the New Zealand Dental Association Research Foundation and the Medical Assurance Society.

REFERENCES

The working practices and career satisfaction of dental therapists in New Zealand

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Objective To describe the working practices and level of career satisfaction of dental therapists in New Zealand. Design Postal survey of dental therapists identified from the New Zealand Dental Council’s dental therapy database. One mailing with one follow-up. Participants Questionnaires were sent to 683 registered dental therapists. Replies were received from 566 (82.9%). Outcome measures Current working practice, career breaks, continuing education, career satisfaction. Results Respondents had a high career satisfaction, but were much less satisfied with their remuneration. After controlling for age and income satisfaction, therapists who felt that they were valued members of the dental community had over four times the odds of having higher overall job satisfaction. There were no differences in the mean career satisfaction scale score by age, but respondents aged 45 and over had a lower mean income satisfaction scale score than their younger counterparts (p<0.05). Older respondents were more likely to report regularly placing fissure sealants (p<0.05), participating in peer review (p<0.05), and playing a role in team management/coordination (p<0.05) than younger respondents. Most therapists (412; 82.2%) had taken at least one career break, usually for child rearing. A mean of 6.5 years (SD 5.5; range six weeks to 25 years) had been taken in career breaks. Younger therapists were more interested in moving into private practice than their older colleagues (p<0.05). More than half of respondents planned to retire from dental therapy within 10 years. Conclusion Urgent action is required to improve the recruitment and retention of dental therapists in the New Zealand School Dental Service. Measures to reduce the time taken in career breaks could increase the productivity of this workforce. Remuneration and career progression are key issues; therapists need to feel that they are valued members of the dental profession.

Key words: Career satisfaction, dental auxiliaries, dental therapists, workforce

Introduction

Dental therapists in New Zealand provide oral health assessment, oral health care and preventive dental services for children and adolescents. Most work within the school dental services (SDS), usually treating children up to the age of 13 years. SDSs have provided free treatment since 1921, and 95% of children are enrolled (Ministry of Health, 2003). A recent review of the dental therapy workforce indicated that there are several difficulties facing this profession. Contributing factors to the poor recruitment and retention of dental therapists include the lack of a career structure, narrow scope of practice, outdated facilities and inadequate remuneration (Dental Therapy Technical Advisory Group, 2004).

The provision of dental services in New Zealand is undergoing a period of change, largely due to the implementation of the Health Practitioners Competence Assurance (HPCA) Act 2004. This Act allows for an expansion of the scope of practice of dental therapists, and also enables them to move into private practice for the first time. These changes parallel changes to dentistry in the United Kingdom (General Dental Council, 1998).

Little is known about the career satisfaction of dental health workers in New Zealand, despite recent interest in this area internationally. Most career satisfaction research has focused on dentists and dental hygienists (Gibbons et al., 2001; Jevack et al., 2000; Logan et al., 1997; Bader and Sams, 1992; Lancaster and Grogono, 1990; Boyer, 1996; Moltzer et al., 1990), with only three papers considering dental therapists (Gibbons et al., 2000; Naidu et al., 2002; Newton and Gibbons, 2001). Although dental therapists in the UK have been found to have relatively high levels of career satisfaction (mean = 7.3 on a 10 point scale; Gibbons et al., 2000), dental nurses in Trinidad and Tobago had a mean value of only 5.2, reportedly due to poor salary and working conditions and the lack of a career path (Naidu et al., 2002). Because the role of dental nurses in Trinidad and Tobago is similar to that of dental therapists in New Zealand, while those in the UK work in a more expanded role in the community dental services, comparing the three groups’ career satisfaction levels using the same scale would provide useful information which could enhance understanding of what is required to maximise workforce retention.

The aim of the current study was to investigate the working patterns and career satisfaction of dental therapists in New Zealand.

Method

Ethical approval for the study was granted by the University of Otago Ethics Committee. A self-completion questionnaire (and reply-paid return envelope) was sent to
all dental therapists on the New Zealand Dental Council database. Questions sought information on respondents' demographic characteristics, current occupation and working practice, previous career breaks, continuing education and career satisfaction. A follow-up letter and duplicate questionnaire were sent to those who had not replied after three weeks.

Using a previously developed and utilised career satisfaction scale (Gibbons et al., 2000; Naidu et al., 2002), respondents were asked to rate their satisfaction with their work life on a ten-point scale, to provide a career satisfaction score. The scale consisted of the numbers 1 to 10 with written anchors at each end, where 1 = minimum satisfaction and 10 = maximum satisfaction. The scale was modified to measure income satisfaction in a similar fashion.

The responses received were entered onto an Excel database and analysed using the Statistical Package for the Social Sciences (SPSS; Version 11.0 for Mac OS X, SPSS Inc., Chicago, Il). To examine differences by age, dental therapists were divided into two age groups; less than 45 years and 45 or above. Chi-square tests were used for comparing proportions, while differences between means were examined using the independent samples t-test. The level of significance was set at p<0.05. Logistic regression modelling was used to examine the correlates of job satisfaction.

Results

Characteristics of the respondents

Questionnaires were sent to 711 dental therapists, but 28 were subsequently deemed to be out of frame (18 returned unopened, and 10 were dental assistants working within the SDS rather than therapists). Replies were received from 566, giving an effective response rate of 82.9%. Some respondents did not answer all questions.

There were 555 females (98.0%) and seven males (1.2%). The average age was 47.7 years (SD=8.8, range 21-70). Male dental therapists were, on average, younger than female dental therapists (p<0.001). The majority of dental therapists (553; 97.7%) had trained in New Zealand. Respondents were permitted to self-identify with more than one ethnic group: 526 (91.2%) were New Zealand European; 56 (9.9%) Maori; 7 (1.2%) Pacific Island, and 25 (4.4%) identified with another ethnic group. Many respondents (228, 40.3%) had childcare responsibilities, although older therapists were less likely to report childcare responsibilities than their younger colleagues (p<0.001). The mean time since qualification was 27.3 years (SD=9.9). Most respondents (514, 90.8%) held a Certificate in Dental Therapy. Approximately equal numbers held a Diploma in Dental Therapy (31, 5.4%) and an Advanced Dental Therapy Certificate or Diploma (35, 6.1%). Fourteen individuals (2.5%) held a University Degree.

Current working practice

Most respondents (512; 90.5%) were currently employed as dental therapists. Data on the working circumstances of these individuals are presented in Table 1. Almost all (494, 98.2%) were employed in the SDS. On average, younger therapists worked fewer hours per week (mean 32.8 hrs, SD=7.6) than their older colleagues (mean 34.4 hrs, SD=7.0; p<0.05). A larger proportion of younger (13; 8.5%) than older therapists (11; 3.1%) stated that they would like to increase the number of hours worked (p<0.05).

The majority of participants (412; 82.2%) had taken a career break. The mean time taken in career breaks per therapist was 6.5 years (SD=5.9). Respondents aged 45 years or over were more likely to have had a career break (p<0.05) and to have taken multiple career breaks (p<0.05). The most common reason for career breaks was child rearing (361 respondents, 87.6%). The mean length of time taken off for child rearing by older therapists (7.1 years, SD=1.7) was significantly greater than the time taken by younger therapists (4.8 years; SD=5; p<0.01). One-third of respondents (135; 32.8%) who had taken a career break had done so for a holiday or travel, but there were no differences in the length of these breaks by age. Forty-five respondents (8.8%) had taken a break due to personal illness (mean 4.5 months; SD=3.7).

Continuing education

The Journal of the New Zealand Dental Therapists Association and the New Zealand Dental Journal were the most popular professional journals, with 280 (54.7%) and 207 (40.4%) therapists respectively having read them within the previous three months. Older therapists were more likely to have read additional journals within the preceding quarter (p<0.05). Most respondents (311; 60.7%) had met the Dental Council continuing education target of 20 hours in the previous year. There were no differences in continuing education attendance by age.

Career satisfaction

Respondents were asked several questions regarding their career satisfaction (Table 4). The mean career satisfaction score was 7.1 (SD=2.0) and the median value was 8.0. Almost three-quarters of respondents had a career satisfaction score of seven or above. There were no differences in the degree of career satisfaction by age. The mean value of income satisfaction was 2.9 (SD=2.1) and the median value was two. Older respondents had a lower mean income satisfaction score (2.8; SD=2.1) than younger therapists (3.3; SD=2.2; P<0.05). More older (286; 80.7%) than younger (111; 72.5%) respondents had an income satisfaction scale score of less than 5 (p<0.05).
Table 1. Working circumstances of practising dental therapists by age-group\(^a\) (brackets contain percentages)

<table>
<thead>
<tr>
<th>Age group of therapists</th>
<th>Less than 45 years  (n=153)</th>
<th>45 years or older  (n=350)</th>
<th>All combined  (n=503)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current employer (^b)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School Dental Service/DHB</td>
<td>153 (100.0)</td>
<td>341 (97.4)</td>
<td>494 (98.2)</td>
</tr>
<tr>
<td>Hospital dental department</td>
<td>1 (0.6)</td>
<td>6 (1.7)</td>
<td>7 (1.4)</td>
</tr>
<tr>
<td>Teaching institution</td>
<td>1 (0.6)</td>
<td>5 (1.4)</td>
<td>6 (1.2)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (0.6)</td>
<td>9 (2.6)</td>
<td>10 (2.0)</td>
</tr>
<tr>
<td><strong>Current role (^b)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dental therapist</td>
<td>151 (98.7)</td>
<td>347 (99.1)</td>
<td>498 (99.0)</td>
</tr>
<tr>
<td>Dental assistant</td>
<td>0 (0.0)</td>
<td>2 (0.6)</td>
<td>2 (0.4)</td>
</tr>
<tr>
<td>Tutor/Lecturer</td>
<td>2 (1.3)</td>
<td>7 (1.1)</td>
<td>9 (1.8)</td>
</tr>
<tr>
<td>Team leader/Manager</td>
<td>9 (5.9)</td>
<td>16 (1.1)</td>
<td>25 (5.0)</td>
</tr>
<tr>
<td>Other</td>
<td>3 (2.0)</td>
<td>4 (0.3)</td>
<td>7 (1.4)</td>
</tr>
<tr>
<td><strong>Hours worked per week</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>32.8</td>
<td>34.4</td>
<td>34.0 (^c)</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>7.6</td>
<td>7.0</td>
<td>7.2</td>
</tr>
<tr>
<td><strong>Prefer to work</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fewer hours</td>
<td>37 (24.2)</td>
<td>99 (28.3)</td>
<td>136 (27.0)</td>
</tr>
<tr>
<td>The same number of hours</td>
<td>97 (63.4)</td>
<td>237 (67.7)</td>
<td>334 (66.4)</td>
</tr>
<tr>
<td>More hours</td>
<td>13 (8.5)</td>
<td>11 (3.1)</td>
<td>24 (4.8) (^c)</td>
</tr>
<tr>
<td>Did not state</td>
<td>6 (3.9)</td>
<td>3 (0.9)</td>
<td>9 (1.8)</td>
</tr>
<tr>
<td><strong>Number of schools/clinics per year</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One - two</td>
<td>51 (33.3)</td>
<td>128 (36.6)</td>
<td>179 (35.6)</td>
</tr>
<tr>
<td>Three - four</td>
<td>60 (39.2)</td>
<td>131 (37.4)</td>
<td>191 (38.0)</td>
</tr>
<tr>
<td>Five or more</td>
<td>39 (25.5)</td>
<td>88 (25.1)</td>
<td>127 (25.2)</td>
</tr>
<tr>
<td>Did not state</td>
<td>3 (2.0)</td>
<td>3 (0.9)</td>
<td>6 (1.2)</td>
</tr>
<tr>
<td><strong>Have a dental assistant</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usually/Sometimes</td>
<td>84 (55.0)</td>
<td>192 (54.9)</td>
<td>276 (54.9)</td>
</tr>
<tr>
<td>Rarely/Never</td>
<td>68 (44.4)</td>
<td>157 (44.9)</td>
<td>225 (44.7)</td>
</tr>
<tr>
<td>Did not state</td>
<td>1 (0.6)</td>
<td>1 (0.2)</td>
<td>2 (0.4)</td>
</tr>
<tr>
<td><strong>Holding a job of another type</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>21 (13.7)</td>
<td>43 (12.3)</td>
<td>64 (12.7)</td>
</tr>
<tr>
<td>No</td>
<td>131 (85.6)</td>
<td>307 (87.7)</td>
<td>438 (87.1)</td>
</tr>
<tr>
<td>Did not state</td>
<td>1 (0.7)</td>
<td>0 (0.0)</td>
<td>1 (0.2)</td>
</tr>
<tr>
<td><strong>No. of hours in this- (second) job</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>9.1 (5.7)</td>
<td>8.8 (6.5)</td>
<td>8.9 (6.2)</td>
</tr>
</tbody>
</table>

\(^a\) Therapists who did not state their age are not included, and some respondents did not answer all questions
\(^b\) Some therapists had more than one employer and/or worked in more than one role
\(^c\) \(p<0.05\)

More respondents with a high career satisfaction score were satisfied with their remuneration \((p<0.05)\) and felt a valued part of the dental community \((p<0.01)\) than those with a low career satisfaction score \((p<0.05)\). The logistic regression model showed that, after controlling for age and income satisfaction, therapists who felt that they were valued members of the dental community always or most of the time had over four times the odds of having higher overall job satisfaction (Table 5).

**Discussion**

This study examined the working patterns and career satisfaction of dental therapists on the Dental Council of New Zealand's database in September 2004. A high response rate (82.9%) was achieved after two mailings. It was not possible to accurately determine how responders differed to those who chose not to participate in the study. However, the demographic details of the respondents
Table 2. Duties regularly performed by dental therapists in their working practice (brackets contain percentages).

Some respondents did not answer all questions.

<table>
<thead>
<tr>
<th>Age group of therapists</th>
<th>Less than 45 years</th>
<th>45 years or older</th>
<th>All combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental health education</td>
<td>95 (62.5)</td>
<td>198 (58.6)</td>
<td>293 (59.8)</td>
</tr>
<tr>
<td>Dietary counselling</td>
<td>115 (76.7)</td>
<td>268 (79.3)</td>
<td>383 (78.5)</td>
</tr>
<tr>
<td>Fluoride application</td>
<td>97 (63.4)</td>
<td>243 (70.2)</td>
<td>340 (68.1)</td>
</tr>
<tr>
<td>Examination</td>
<td>152 (99.3)</td>
<td>347 (99.1)</td>
<td>499 (99.2)</td>
</tr>
<tr>
<td>Taking radiographs</td>
<td>78 (52.3)</td>
<td>170 (53.1)</td>
<td>248 (52.9)</td>
</tr>
<tr>
<td>Reading radiographs</td>
<td>85 (56.3)</td>
<td>197 (59.2)</td>
<td>282 (58.3)</td>
</tr>
<tr>
<td>Fissure sealant*</td>
<td>138 (90.2)</td>
<td>335 (95.7)</td>
<td>473 (94.0)</td>
</tr>
<tr>
<td>Local anaesthetic</td>
<td>150 (98.0)</td>
<td>347 (99.1)</td>
<td>497 (98.8)</td>
</tr>
<tr>
<td>Placement of restorations</td>
<td>150 (98.0)</td>
<td>345 (98.3)</td>
<td>495 (98.2)</td>
</tr>
<tr>
<td>Polishing of restorations</td>
<td>51 (34.2)</td>
<td>99 (29.1)</td>
<td>150 (30.7)</td>
</tr>
<tr>
<td>Pulpotomy</td>
<td>22 (15.2)</td>
<td>45 (14.4)</td>
<td>67 (14.6)</td>
</tr>
<tr>
<td>Direct pulp capping</td>
<td>63 (42.6)</td>
<td>158 (48.2)</td>
<td>221 (46.4)</td>
</tr>
<tr>
<td>Indirect pulp capping</td>
<td>88 (59.1)</td>
<td>193 (58.8)</td>
<td>281 (58.9)</td>
</tr>
<tr>
<td>Stainless Steel crown</td>
<td>0 (0.0)</td>
<td>5 (1.6)</td>
<td>5 (1.1)</td>
</tr>
<tr>
<td>Extraction of primary tooth</td>
<td>135 (88.2)</td>
<td>297 (85.6)</td>
<td>432 (86.4)</td>
</tr>
<tr>
<td>Extraction of permanent tooth</td>
<td>1 (0.7)</td>
<td>4 (1.3)</td>
<td>5 (1.1)</td>
</tr>
<tr>
<td>Temporary dressing</td>
<td>81 (53.6)</td>
<td>177 (50.9)</td>
<td>258 (51.7)</td>
</tr>
<tr>
<td>Other emergency treatment</td>
<td>47 (34.3)</td>
<td>127 (40.6)</td>
<td>174 (38.7)</td>
</tr>
<tr>
<td>Peer appraisal/peer review*</td>
<td>40 (26.8)</td>
<td>118 (36.0)</td>
<td>158 (33.1)</td>
</tr>
<tr>
<td>Clinical supervision</td>
<td>19 (13.0)</td>
<td>57 (17.9)</td>
<td>76 (16.4)</td>
</tr>
<tr>
<td>Clinical teaching</td>
<td>12 (8.1)</td>
<td>33 (10.5)</td>
<td>45 (9.7)</td>
</tr>
<tr>
<td>Team management/co-ordination*</td>
<td>14 (9.5)</td>
<td>58 (18.4)</td>
<td>72 (15.6)</td>
</tr>
</tbody>
</table>

* p<0.05

were found to be almost identical to those reported in the 2003 dental therapy workforce survey (Dental Therapy Technical Advisory Group, 2004) in which 80% were aged over 40, 91% were NZ European, and 98% were female. Estimates from the present study are 83%, 91% and 98% respectively. Thus, the sample can be considered to be representative of practising dental therapists in New Zealand. Individuals who have previously worked as a dental therapist but who had not applied for registration (i.e., were no longer practising dental therapy) were not able to be included in the study due to the extreme difficulty identifying and recruiting such individuals.

As expected, most respondents were employed as dental therapists within SDS. Most dental therapists worked in more than one clinic, with one-quarter working in at least five. This reflects the new SDS delivery model, which utilizes many school dental clinics for relatively brief periods over the year (Ministry of Health, 2003).

Because very few respondents were interested in working longer hours (and many more would prefer to do fewer hours), inviting therapists to work more hours may not be a viable option for increasing productivity of the workforce. However, there is potential for greater utilisation of assistants as almost half the respondents stated that they ‘rarely’ or ‘never’ used a dental assistant.

The main duties undertaken on a regular basis by therapists were basic services such as dental examinations, restorations, fissure sealants and removal of primary teeth. Some therapists performed pulpotomies (although pulp capping was a more frequent procedure), but the placement of stainless steel crowns was rare. The emphasis on dental health education was not as great as on basic restorative services, perhaps because therapists felt that it was more important to spend their time treating existing disease.

The dental therapists who participated in this study were actively involved in continuing education (journals and courses). This reflects commendable efforts by the profession and their employers to maintain fitness to practise.

Most respondents had taken at least one career break, with a total mean time taken of 6.5 years. This represents a considerable loss in ‘manpower’ hours. Older therapists had taken more time off than younger therapists, probably because they had been in the workforce for longer. As might be expected in a largely female workforce, child rearing was the predominant reason for taking breaks. The mean period taken off for this was longer for therapists in the older age group; this may be partly because the younger therapists have not yet finished having their families, but may also indicate that career breaks for child
Table 3. Information relating to respondents currently taking a career break, together with information on intentions to return to dental therapy (brackets contain percentages; n = 54)

<table>
<thead>
<tr>
<th>Duration of current break</th>
<th>Practitioners currently on career break</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 year</td>
<td>16 (29.6)</td>
</tr>
<tr>
<td>1 to 5 years</td>
<td>10 (18.5)</td>
</tr>
<tr>
<td>&gt; 5 years</td>
<td>15 (27.8)</td>
</tr>
<tr>
<td>No answer</td>
<td>13 (24.1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Areas in which respondent previously worked</th>
<th>Practitioners currently on career break</th>
</tr>
</thead>
<tbody>
<tr>
<td>School Dental Service/DHB</td>
<td>48 (88.9)</td>
</tr>
<tr>
<td>Teaching Institution</td>
<td>1 (1.9)</td>
</tr>
<tr>
<td>Other</td>
<td>4 (7.4)</td>
</tr>
<tr>
<td>Never worked as a dental therapist</td>
<td>2 (3.7)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Currently in paid employment</th>
<th>Practitioners currently on career break</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>35 (64.8)</td>
</tr>
<tr>
<td>Dental assistant</td>
<td>12 (22.2)</td>
</tr>
<tr>
<td>Other dental job</td>
<td>13 (24.1)</td>
</tr>
<tr>
<td>Other job</td>
<td>10 (18.5)</td>
</tr>
<tr>
<td>No</td>
<td>19 (35.2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reason for current career break</th>
<th>Practitioners currently on career break</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal illness</td>
<td>3 (5.6)</td>
</tr>
<tr>
<td>Family illness</td>
<td>1 (1.9)</td>
</tr>
<tr>
<td>Child rearing</td>
<td>9 (16.7)</td>
</tr>
<tr>
<td>To aid partner’s career</td>
<td>1 (1.9)</td>
</tr>
<tr>
<td>Study</td>
<td>3 (5.6)</td>
</tr>
<tr>
<td>Travelling</td>
<td>1 (1.9)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (1.9)</td>
</tr>
<tr>
<td>Not stated</td>
<td>35 (64.8)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intend to return to dental therapy</th>
<th>Practitioners currently on career break</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>28 (44.4)</td>
</tr>
<tr>
<td>Yes</td>
<td>20 (37.0)</td>
</tr>
<tr>
<td>Within 12 months</td>
<td>6 (11.1)</td>
</tr>
<tr>
<td>Longer than 12 months</td>
<td>4 (7.4)</td>
</tr>
<tr>
<td>Don’t know when</td>
<td>10 (18.5)</td>
</tr>
<tr>
<td>No answer</td>
<td>6 (11.1)</td>
</tr>
</tbody>
</table>

* 1 therapist worked in more than 1 area

Career satisfaction and income satisfaction were separated, revealing a large discrepancy between the two. Newton and Gibbons (2001) reported age differences in career satisfaction among UK therapists, with lower satisfaction among younger therapists. They suggested that role conflict could adversely affect career satisfaction; dental therapists (mostly women) may experience substantial role conflict, given that many work part-time and have childcare responsibilities. No such association was found in the current study. The reason for this is unclear, although it may be that as NZ dental therapists take longer career breaks for child rearing, role conflict is minimised.

At variance with the high career satisfaction scores, it is concerning to note that well over half of the dental therapists surveyed stated that they did not feel that they were a valued part of the dental community. This may be related to the historical relationship between dentists and dental therapists in New Zealand. The School of Dentistry now trains dental auxiliaries alongside dental rearing are shorter now than previously. It is unknown how many choose not return to the workforce after raising children. Extended holiday or travel was another common reason for breaks, although their mean duration was much shorter than those for child rearing, and was similar for both age groups. Initiatives to reduce the length of career breaks taken by dental therapists could potentially increase workforce productivity. The availability of good-quality, affordable childcare is of prime importance in this respect, and the financial advantage of returning to work earlier must considerably outweigh the cost of the required childcare.

Career satisfaction
Career satisfaction in this study was relatively high (7.1 on a 10-point scale), and similar to that reported for UK dental therapists (mean score 7.3; Gibbons et al., 2000). By contrast, dental nurses in Trinidad and Tobago were reported to have a mean career satisfaction score of only 5.2 (Naidu et al., 2002). In this study, the scales for career satisfaction and income satisfaction were separated, revealing a large discrepancy between the two.

Newton and Gibbons (2001) reported age differences in career satisfaction among UK therapists, with lower satisfaction among younger therapists. They suggested that role conflict could adversely affect career satisfaction; dental therapists (mostly women) may experience substantial role conflict, given that many work part-time and have childcare responsibilities. No such association was found in the current study. The reason for this is unclear, although it may be that as NZ dental therapists take longer career breaks for child rearing, role conflict is minimised.

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Table 4. Dental therapists’ career satisfaction, interests and intentions (brackets contain percentages).
Some respondents did not answer all questions.

<table>
<thead>
<tr>
<th></th>
<th>Respondents aged less than 45 years</th>
<th>Respondents aged 45 and over</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Career Satisfaction</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td>72 (48.0)</td>
<td>168 (49.0)</td>
<td>240 (48.7)</td>
</tr>
<tr>
<td>Higher</td>
<td>78 (52.0)</td>
<td>175 (51.0)</td>
<td>253 (51.3)</td>
</tr>
<tr>
<td><strong>Satisfaction with income</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td>67 (43.8)</td>
<td>188 (54.2)</td>
<td>255 (51.0)</td>
</tr>
<tr>
<td>Higher</td>
<td>86 (56.2)</td>
<td>159 (45.8)</td>
<td>245 (49.0)</td>
</tr>
<tr>
<td><strong>Feel a valued part of dental community</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always/Mostly</td>
<td>60 (39.5)</td>
<td>142 (41.0)</td>
<td>202 (40.6)</td>
</tr>
<tr>
<td>Sometimes/Seldom/Never</td>
<td>92 (60.5)</td>
<td>204 (59.0)</td>
<td>296 (59.4)</td>
</tr>
<tr>
<td><strong>Interested in moving to private practice?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Definitely/Maybe</td>
<td>100 (65.8)</td>
<td>170 (49.4)</td>
<td>270 (54.4)</td>
</tr>
<tr>
<td>No</td>
<td>51 (33.6)</td>
<td>169 (49.1)</td>
<td>220 (44.4)</td>
</tr>
<tr>
<td>Already in private practice</td>
<td>1 (0.7)</td>
<td>5 (1.5)</td>
<td>6 (1.2)</td>
</tr>
<tr>
<td><strong>Interested in treating adults?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Definitely/Maybe</td>
<td>92 (60.1)</td>
<td>183 (52.9)</td>
<td>275 (55.1)</td>
</tr>
<tr>
<td>No</td>
<td>59 (38.6)</td>
<td>153 (44.2)</td>
<td>212 (42.5)</td>
</tr>
<tr>
<td>Already treating adults</td>
<td>2 (1.3)</td>
<td>10 (2.9)</td>
<td>12 (2.4)</td>
</tr>
<tr>
<td><strong>Would choose to pursue dental therapy again</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>66 (44.3)</td>
<td>155 (45.1)</td>
<td>221 (44.9)</td>
</tr>
<tr>
<td>No</td>
<td>83 (55.3)</td>
<td>189 (54.9)</td>
<td>271 (55.1)</td>
</tr>
<tr>
<td><strong>Intentions to retire from dental therapy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 10 years</td>
<td>51 (36.2)</td>
<td>217 (63.6)</td>
<td>268 (55.6)</td>
</tr>
<tr>
<td>10 years or more</td>
<td>90 (63.8)</td>
<td>124 (36.4)</td>
<td>214 (44.4)</td>
</tr>
</tbody>
</table>

* Divisions based on median split
b p < 0.05
c p < 0.001

Table 5. Logistic regression model for career satisfaction

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aged over 45 years</td>
<td>1.08 (0.73, 1.61)</td>
</tr>
<tr>
<td>Feel a valued part of the dental community</td>
<td>4.14 (2.78, 6.17)</td>
</tr>
<tr>
<td>Higher income satisfaction</td>
<td>0.52 (0.84, 1.83)</td>
</tr>
</tbody>
</table>

a Nagelkerke R2 = 0.15; Hosmer and Lemeshow test p = 0.65

students as part of a plan to better integrate the dental workforce. However, it will take time for what will be a major change in the professional culture of dentistry to come about. Also at variance with the high career satisfaction scores was the finding that over half the respondents indicated that they would not again choose to pursue a career in dental therapy. This may relate more to dissatisfaction with their income than to their overall career. The low mean score for income satisfaction indicates that most dental therapists (particularly those aged 45+) are unhappy with their current remuneration, suggesting that the current SDS salary scales do not allow for adequate progression for long-term employees. The Dental Therapy Technical Advisory Group (2004) identified remuneration as a contributor to the difficulties in recruiting and retaining dental therapists. Employers need to consider methods of improving dental therapists’ income satisfaction. While incentives such as student loan repayments may be beneficial in recruiting and retaining recently qualified therapists, strategies to aid established
dental therapists are more limited. Seniority payments might be one mechanism, and could be combined with a clearer career structure and opportunities for further progression.

This study was conducted immediately prior to the implementation of the HPCA Act, which introduced the registration of dental therapists, allowed for an expansion of their scope of practice, and has enabled them to move to private practice. The current findings indicate that about half of therapists are interested in moving to private practice and extending their services to adults. Such a diaspora might benefit some adult groups, but it could be a serious threat to the viability of the SDS.

The finding that over half of the dental therapy workforce plans to retire within 10 years is of great concern from a planning perspective. The main reason for this relates to the age structure of this workforce. Considerable effort is required to maximise the 'manpower' hours from the existing workforce (reducing career breaks and keeping therapists in the profession), as well as promoting dental therapy as an attractive career to prospective students. There is a need to continue to monitor the dental therapy workforce to determine the longer-term effects of the HPCA Act, and to inform workforce planning.

Conclusion

Factors such as career satisfaction and remuneration are major contributors to the recruitment and retention of a workforce. These issues are critical in the school dental services in New Zealand as over 50% of the workforce plans to retire within 10 years. While dental therapists in this study had a relatively high mean career satisfaction, urgent efforts are required to improve their income satisfaction and to make therapists feel more valued.

Acknowledgements

The authors are grateful to the dental therapists who took part in the study. They also gratefully acknowledge the financial support of the New Zealand Dental Association Research Foundation.

References


The Working Practices and Job Satisfaction of Dental Hygienists in New Zealand

Kathryn M.S. Ayers, MDS; Alison M. Meldrum, MDS; W. Murray Thomson, PhD; J. Timothy Newton, PhD

Abstract

Objectives: To describe the current working practices and level of job satisfaction of dental hygienists in New Zealand. Methods: Postal survey of all dental hygienists on the New Zealand Dental Council’s database. An initial mailing was followed by a 3-week follow-up. Information was sought on respondents’ demographic characteristics, current occupation and working practice, history of career breaks, continuing education and career satisfaction. Results: 213 responses were received (73.2%); 90.6% were currently working as hygienists, mostly in private practice. Many worked part time, particularly those with children. Almost 50% of respondents had taken at least one career break, most frequently for childrearing. The mean time taken in career breaks was 3.6 years. Overall, dental hygienists reported high levels of satisfaction with their careers and their income. Older hygienists had higher career satisfaction scores. Most respondents were actively involved in continuing education. Almost half were interested in expanding the range of procedures they perform. Over one-third plan to retire within the next 10 years. Conclusions: While many hygienists take career breaks and work part time, most have a high level of career satisfaction, actively participate in continuing education, and are satisfied with their remuneration.

Key Words: Dental auxiliaries, dental hygienists, career satisfaction, workforce

Introduction

Although dental hygiene tasks have been undertaken in New Zealand for some years, the providers have not been (until recently) officially designated as dental hygienists; rather they have been categorized as unregistered “Section 11 workers,” practicing under Section 11 of the 1988 Dental Act. They were permitted to: remove deposits from the teeth; apply materials to the teeth for the purpose of preventing disease; give advice on oral health; and carry out other similar work. Those practicing thus included not only trained dental hygienists but also former dental therapists with limited (if any) dental hygiene training, and untrained persons (1).

In 2004, the Health Practitioners Competence Assurance Act superseded the 1988 Dental Act. Under that new framework, dental hygienists are required to register with the Dental Council of New Zealand. In order to do so, applicants must submit evidence of an appropriate qualification. While the Dental Council does not define “dental hygienist”, it promulgates a “Scope of Practice” whereby dental hygienists are involved in providing oral health education and preventing oral diseases. Their tasks usually relate to the prevention and nonsurgical treatment of periodontal diseases, with clinical guidance required to be provided by a dentist. Dental auxiliaries without hygiene qualifications are accommodated under a “Scope of Dental Auxiliary Practice” which allows them 5 years to gain appropriate qualifications. A “Scope of Orthodontic Auxiliary Practice” is also available. In this paper, the term “dental hygienist” also includes these other auxiliaries.

Training for dental hygienists in New Zealand has been controversial and varied (1). The first course (a 1-year, Army-based training program) commenced in 1974. In 1990, a short-lived 2-week course was established to teach dental hygiene procedures to school dental nurses, enabling them to practice as “Section 11” workers (1). It was succeeded by a 15-month Polytechnic course (the Certificate in Dental Hygiene), producing its first graduates in 1995. This was superseded by a 2-year Diploma of Dental Hygiene at the University of Otago, which now offers either a diploma or a degree in dental hygiene.

There are concerns about how best to ensure that New Zealanders receive appropriate, accessible and affordable dental services. Two of the options being explored include expanding the roles of dental hygienists and therapists, and training new auxiliaries to undertake both types of tasks. Information about the existing dental workforce (including each professional group’s role, career patterns and job satisfaction) is essential in order to plan effectively (2). To date, dental hygienists have been difficult to assess because almost all work in the private sector (many in several practices), and they lacked a registering body until 2004. There is minimal current information on their workforce retention, daily working circumstances or career satisfaction. The new Dental Council database offers the first opportunity to contact all dental hygienists and obtain such information.

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The aim of this study was to investigate working patterns, continuing education and career satisfaction among New Zealand dental hygienists.

Methods

The Otago University Ethics Committee approved the study. A self-complete questionnaire (and reply-paid return envelope) was sent to all dental hygienists on the Dental Council database (N = 316). Questions sought information on respondents’ demographic characteristics, current occupation and working practice, previous career breaks (defined as any period taken off work longer than 6 weeks), continuing education and career satisfaction. A follow-up letter and duplicate questionnaire were sent to non-respondents after 3 weeks.

Using a previously validated career satisfaction scale (3-5), respondents were asked to rate their satisfaction with their work life. Response options were 1 to 10, where 1 = minimum satisfaction and 10 = maximum satisfaction. The scale was also modified to measure income satisfaction.

To examine differences by age, a median split was used to divide respondents into those aged <36 years and those aged 36+. Chi-square tests were used for testing the statistical significance of differences between proportions, while means were compared using the independent samples t-test. The level of significance was set at P<0.05. The responses received were analyzed using the Statistical Package for the Social Sciences (SPSS; Version 11.0 for Mac OS X, SPSS Inc., Chicago, IL).

Results

Respondent characteristics. Of the 316 questionnaires posted, 25 were returned unopened. Completed questionnaires were received from 213 hygienists, giving an effective response rate of 73.2% (completion rate 67.4%). Some respondents did not answer all questions. Ninety-five percent (95.3%) were females, and respondents’ average age was 37.7 years (SD=8.6, median 36, range 21-61 years). On average, males were younger than females (mean age 33.4 and 37.9 respectively). Respondents were permitted to self-identify with more than one ethnic group: 72.8% were New Zealand European; 5.6% Maori; 0.5% Pacific Island; and 25.4% identified as “Other.” When asked if they currently had childcare responsibilities, 44.6% of hygienists stated that they did, and those aged 36+ were more likely than younger respondents to report these (50.9% and 37.1% respectively; P<0.05).

Table 1

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Percent (n=213)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diploma in Dental Hygiene</td>
<td>39.4</td>
</tr>
<tr>
<td>Certificate in Dental Hygiene</td>
<td>13.1</td>
</tr>
<tr>
<td>Army Training</td>
<td>6.6</td>
</tr>
<tr>
<td>Bachelor of Dental Surgery</td>
<td>6.6</td>
</tr>
<tr>
<td>Dental therapy qualification plus periodontal training</td>
<td>4.7</td>
</tr>
<tr>
<td>Degree in Dental Hygiene</td>
<td>1.9</td>
</tr>
<tr>
<td>Other/Not stated</td>
<td>16.0</td>
</tr>
<tr>
<td>No formal training/qualification</td>
<td>11.7</td>
</tr>
</tbody>
</table>

Table 2

<table>
<thead>
<tr>
<th>Age group</th>
<th>Up to 35 years</th>
<th>36+ years</th>
<th>All combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=89)</td>
<td>(n=86)</td>
<td>(n=185)</td>
</tr>
<tr>
<td>Current employer*</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Private dental practitioner</td>
<td>83.1</td>
<td>76.0</td>
<td>79.4</td>
</tr>
<tr>
<td>Orthodontist</td>
<td>22.4</td>
<td>22.9</td>
<td>22.7</td>
</tr>
<tr>
<td>Another dental specialist</td>
<td>9.0</td>
<td>7.3</td>
<td>8.1</td>
</tr>
<tr>
<td>Hospital dental department</td>
<td>0.0</td>
<td>2.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Teaching institution</td>
<td>2.2</td>
<td>2.1</td>
<td>2.2</td>
</tr>
<tr>
<td>Other</td>
<td>1.1</td>
<td>7.3</td>
<td>4.3</td>
</tr>
</tbody>
</table>

* Some hygienists had more than one employer and/or worked in more than one role

<table>
<thead>
<tr>
<th>Number of practices</th>
<th>%</th>
<th>%</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>58.4</td>
<td>65.3</td>
<td>62.1</td>
</tr>
<tr>
<td>Two or more</td>
<td>41.6</td>
<td>34.7</td>
<td>37.9</td>
</tr>
<tr>
<td>Prefer to work b</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Fewer hours</td>
<td>13.6</td>
<td>29.4</td>
<td>22.1</td>
</tr>
<tr>
<td>The same number of hours</td>
<td>70.5</td>
<td>60.8</td>
<td>65.3</td>
</tr>
<tr>
<td>More hours</td>
<td>15.9</td>
<td>9.8</td>
<td>12.6</td>
</tr>
<tr>
<td>Have a dental assistant</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Usually/Sometimes</td>
<td>24.1</td>
<td>31.7</td>
<td>28.2</td>
</tr>
<tr>
<td>Rarely/Never</td>
<td>75.9</td>
<td>68.3</td>
<td>71.8</td>
</tr>
<tr>
<td>Holding a job of another type</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>15.7</td>
<td>22.5</td>
<td>19.4</td>
</tr>
<tr>
<td>No</td>
<td>84.3</td>
<td>77.5</td>
<td>80.6</td>
</tr>
</tbody>
</table>

* p<0.05
Fewer than half of respondents (42.7%) had trained in New Zealand; 10.3% had trained in the United Kingdom, 2.7% in South Africa, 1.4% in the United States, and 9% in another country, while 35.2% did not specify. The mean time since qualification was 8.8 years (SD=7.6).

Most respondents held a formal vocational qualification (12 had more than 1). There was considerable variation in the qualifications held (Table 1). Of the New Zealand trained dental hygienists (n=91), 60.4% had a Diploma in Dental Hygiene, while 22.0% had a Certificate in Dental Hygiene. All of the army-trained hygienists had trained in New Zealand, while all of those who had previously graduated as a dentist (but were currently working in New Zealand as a hygienist) had done so overseas.

**Current working practice.** Of those not currently practicing (n=20), 70.0% had been on a career break for at least 12 months, and 20.0% had never worked as dental hygienists. Thirty-five percent of those not currently practicing were in paid employment, with 25.0% working in the dental field. The most common career break reasons of those not currently working were child rearing (25.0%) and study (10.0%). Over one third (35.0%) of those on a career break planned to return to dental hygiene practice.

The remaining 193 respondents were employed as dental hygienists. Data on their working situations by age are presented in Table 2. Most were employed by private dentists, worked as dental hygienists, and worked more than 30 hours per week. A greater proportion (48.9%) of those with childcare responsibilities worked more than 30 hours per week (37.2%) than those without such responsibilities (27.2%; p<0.05).

Data on respondents' regular clinical duties by age are presented in Table 3. The only significant association was that more (59.6%) hygienists in the older age group took radiographs regularly than those who were younger (37.2%). The great majority of procedures reported were non-invasive and reversible in nature. Almost all provided dental health education.

A higher proportion of overseas-trained than New Zealand-trained hygienists reported undertaking dental counseling regularly (69.8% and 46.5% respectively, p<0.05). Conversely, a higher proportion of New Zealand than overseas-trained hygienists reported that they regularly undertook team management/coordination (27.2% and 10.0% respectively, p<0.05).

**Career breaks.** One or more career breaks had been taken by 46.5% of the 185 who provided this information; 27.6% had taken 2 or more. The most common reason was child rearing/maternity leave (58.1%), with a mean time of 36.9 months. A further 33.7% had taken an extended break for holiday or travel (mean time 17.3 months); 8.1% had taken a break due to personal illness (mean time 6.5 months). The mean total career-break time was 42.7 months (SD 70.8).

**Continuing education.** The New Zealand Dental Journal was the most popular journal, with 46.5% having read it in the previous 3 months. The New Zealand Dental Hygienists Association Newsletter had been read by 13.1%, other dental hygiene/auxiliary journals by 25.3%, and periodontal journals by 22.5% respondents. Over two-fifths of the sample (42.3%) met the New Zealand Dental Council continuing education target of 20 hours per year.

**Job satisfaction.** Overseas-trained hygienists planned to retire earlier than those trained in New Zealand (p<0.05). Data relating to job satisfaction, intentions and interests of dental hygienists by age are presented in Table 4. Older hygienists planned to retire sooner than their younger colleagues (p<0.01).
Dental hygienists' career satisfaction, interests and intentions by age group: Percentages or Mean (SD)

<table>
<thead>
<tr>
<th>Age group</th>
<th>Feel a valued part of dental community</th>
<th>Interested in expanding range of procedures</th>
<th>Would choose to pursue dental hygiene again</th>
<th>Mean job satisfaction score (SD)†</th>
<th>Mean income satisfaction score (SD)†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 35 years</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>7.7 (1.6)</td>
<td>6.7 (2.3)</td>
</tr>
<tr>
<td>36+ years</td>
<td>78.2</td>
<td>22.1</td>
<td>85.1</td>
<td>19.1</td>
<td>71.9</td>
</tr>
<tr>
<td>All combined</td>
<td>78.2</td>
<td>22.1</td>
<td>85.1</td>
<td>19.1</td>
<td>71.9</td>
</tr>
</tbody>
</table>

* p < 0.05
b p < 0.01
† scale one to ten

Discussion

This study reports on a survey of the working patterns and job satisfaction of New Zealand dental hygienists. The 73.2% response rate was satisfactory (6); it compares favorably with some recent surveys of dental auxiliaries (7, 8, 9), but was slightly lower than some others (2, 10). While it is possible that non-responders differ in their working patterns and job satisfaction, there are no data to determine this. While the first New Zealand dental hygienists were army-trained, and approximately half were male (11), that dental hygienist workforce is now predominantly female, and more closely resembles the gender profile in other countries (4, 12). This study's mean age of dental hygienists is similar to the United Kingdom's 38 years (4) but is somewhat higher than the 30 years previously reported in New Zealand (13). Few respondents entered the profession directly from high school; the mean age of 37.7 years and mean time since qualification of 8.8 years indicate an average age of 28.9 at the time of qualification. It is likely that, as in other countries (4), many individuals enter training after working as dental assistants. It would be of interest to investigate previous employment histories in future studies of dental hygienists.

The number of dental hygienists self-identifying as Maori or Pacific Islanders is low and may reduce the opportunities to address reductions in health inequalities in these populations. The proportion of New Zealand-trained dental hygienists was less than reported earlier, indicating that the projected increase in that proportion (13) has not taken place. However, this finding should be interpreted with caution, as many respondents did not state a country of qualification, and some did not report having a relevant qualification. The hygienists currently practicing in New Zealand are, on average, more experienced than those surveyed earlier (mean 8.8 and 5.5 years respectively).

Consistent with the findings of previous studies, both in New Zealand (7, 13) and overseas (2, 4, 8, 12), a large proportion of the workforce works part-time. However, the mean number of hours worked per week by New Zealand hygienists has doubled, from 15.2 hours in 1996 (13) to 30.4 hours. Accordingly, fewer hygienists were looking to increase their working hours now than previously (13): As reported elsewhere (4), hygienists with childcare responsibilities were more likely to report working part-time. As with overseas studies, many hygienists work in more than one practice (2, 4, 12), but more in the current study reported working in only one practice than previously reported in New Zealand (7, 13). A similar trend has been reported in Scotland (8). This may reflect an increasing demand for hygiene services, meaning that individuals can achieve enough hours of employment in one office. It could also relate to an anecdotal increase in the number of group dental practices, allowing a hygienist to treat patients of several dentists in one setting. It would be of interest to seek more detailed information regarding practice settings in future studies.

It has been suggested that the range of duties performed by many dental hygienists is limited (14). This study indicates that there is potential for dental hygienists to diversify in the tasks they perform. For example, only 13% reported placing fissure sealants regularly. This is lower than the 20% of recent graduates reported to place fissure sealants daily (7) but is higher than the 5% reported for a larger sample of New Zealand hygienists two decades ago (13). Fissure sealant provision may be related to a larger sample of New Zealand hygienists has doubled, from 15.2 hours in 1996 (13) to 30.4 hours. Accordingly, fewer hygienists were looking to increase their working hours now than previously (13): As reported elsewhere (4), hygienists with childcare responsibilities were more likely to report working part-time. As with overseas studies, many hygienists work in more than one practice (2, 4, 12), but more in the current study reported working in only one practice than previously reported in New Zealand (7, 13). A similar trend has been reported in Scotland (8). This may reflect an increasing demand for hygiene services, meaning that individuals can achieve enough hours of employment in one office. It could also relate to an anecdotal increase in the number of group dental practices, allowing a hygienist to treat patients of several dentists in one setting. It would be of interest to seek more detailed information regarding practice settings in future studies.

Another example is providing local anesthetic; this was performed regularly by only 1.2% of dental hy-
gienists in this study, compared to 63% in the United Kingdom (4). Dental hygienists have only been legally allowed to administer local anesthetic in New Zealand since September 2004. Orlando and Pack (13) reported that 70% of hygienists felt restricted by not being able to do so. The 49% of respondents who reported taking radiographs regularly is much greater than reported previously (4,7,13). Radiography is now included in the training of New Zealand hygienists. That many in the current study reported regularly taking impressions and placing/removing orthodontic bands or wires is most likely due to the inclusion of orthodontic auxiliaries in the sample (based on list available) in addition to qualified dental hygienists. Such activities are undertaken much less frequently by dental hygienists in the United Kingdom (4). Dietary counseling was more commonly reported than in a previous New Zealand study (13), while the frequency of fluoride application was similar.

There were some differences between locally trained hygienists and those trained overseas with respect to their regular duties. That more overseas-trained than New Zealand-trained dental hygienists undertake dietary counseling regularly may reflect a difference in training-program emphasis. Conversely, a higher proportion of New Zealand-trained than overseas-trained dental hygienists reported regularly undertaking team management. The reasons for this are unclear.

Over 80% of respondents indicated a desire to expand the range of procedures they perform. Similar interest in broadening the scope of practice has been observed in other studies (8,12,13). In recent years, dental hygiene training in New Zealand has become more comprehensive. Maximizing the scope of practice has been reported to provide greater task diversity for hygienists, increasing their career satisfaction (14).

As in other studies (2,4,8), career breaks were common, with almost 60% of respondents having taken at least one. The mean duration of 3.6 years (and median of 1.4 years) was considerably longer than the mean of 30 months (and median of 11 months) reported for the United Kingdom (4). In both studies, there was considerable variation in career-break length. Consistent with other reports (2,4,12), the most commonly cited reason for taking a career break was bearing and raising children.

A strong commitment to continuing education was evident in this study. Previous studies have also reported this (4,7,12), despite concerns about the availability of continuing education (2). It is expected that the requirements for annual registration will lead to an increase in availability of (and involvement in) continuing education courses in New Zealand.

High levels of career satisfaction among dental hygienists have been reported elsewhere (2, 4,10,17), and those seen in this study were similar. That income satisfaction scores were higher than previously reported in New Zealand (13) may reflect an increasing demand for dental hygienists (enabling them to command higher incomes) or it may reflect the greater number of hours worked than in the previous study. In this study, as reported elsewhere (4), the mean job satisfaction of older dental hygienists was higher than that of younger respondents. This may reflect the flexibility of a dental hygiene career, where family-life and part-time work can be optimally balanced. Conversely, it may represent a degree of selection bias because hygienists who enjoy their job are more likely to remain in the workforce (4).

Workforce retention is an important issue. It has been suggested that dental hygienist "burnout" is common. Some United States hygienists leave the profession after a short time (14), while most Scottish hygienists remain employed for at least 30 years, with only one-third retiring early (8). Hillam (2) concluded that hygienists continue to work in their chosen career at least as much as female dentists do in theirs. However, as one-third of respondents in the current study intend to cease practice within the next decade, the current emphasis on recruiting students into dental hygiene training needs to continue. Government policy (for example interest-free student loans, funding of training) is instrumental in determining student intake numbers in New Zealand. Another factor relates to the registration of overseas-trained dental personnel. Overseas-qualified dentists represent a substantial component of the New Zealand dental hygiene workforce, but it is not known how long these individuals work as dental hygienists; it may represent temporary employment prior to obtaining dentist registration. The new registration requirements for dental hygienists in New Zealand will make it more difficult for overseas-trained dentists to do this.

Conclusions

Workforce planning for dental hygienists (as for other dental professionals) must be informed by information on their working patterns. The hygienist workforce is a small but growing provider of dental care in New Zealand. The new registration requirements brought about by the Health Practitioners Competence Assurance Act 2004 are likely to have a significant effect on this workforce. Ongoing research is required to determine such effects. Further research is indicated to investigate the need for further expansion of the scope of practice of dental hygiene and for continuing education opportunities, and to determine the effect of any new training programs upon the workforce.

Acknowledgements

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Financial Support

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References
A comparison of career satisfaction amongst dental healthcare professionals across three health care systems: Comparison of data from the United Kingdom, New Zealand and Trinidad & Tobago

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Abstract

Background: The aim of this study was to compare the expressed levels of career satisfaction of three groups of comparable dental healthcare professionals, working in Trinidad, the United Kingdom and New Zealand.

Methods: Three questionnaire surveys were carried out of comparable dental healthcare professionals. Dental nurses in Trinidad and dental therapists in the UK and New Zealand. Questionnaires were sent to all registered dental nurses or dental therapists.

Results: Career satisfaction was lowest amongst Dental Therapists working in Trinidad and Tobago. Approximately 59% of the Therapists working in New Zealand reported stated that they felt they were not a valued member of the dental team, the corresponding proportion in the United Kingdom was 32%, and for Trinidad 39%.

Conclusion: Dental therapists working in different healthcare systems report different levels of satisfaction with their career.

Background

The career development and career satisfaction expressed by dental professionals is an area which has attracted much recent research [1-5]. Most studies have focussed on hygienists and dental practitioners. In the United Kingdom (UK) Evans &Blinkhorn [6] found that the majority of dental hygienists (87%) found their work fulfilling and interesting, while a more recent national survey carried out by the British Dental Hygienists Association [7] also found high levels of job satisfaction among respondents. Similar findings are reported in surveys of UK hygienists qualifying from one particular school of dental hygiene [8,9] and amongst dental hygienists working outside the UK[10-14]. Amongst dental practitioners expressed levels of job and career satisfaction have generally been lower than those reported for hygienists. Low levels of career satisfaction have been reported amongst UKdentists [15-17] and dentists working in the United States [18,19].

The expressed levels of job satisfaction among dental therapists working in the UK was described by Gibbons et al [3] who reported that the average level was high. Further Newton and Gibbons [4] compared the satisfaction levels of three professional groups using a single item measure,
revealing that dental practitioners had the lowest levels compared to dental hygienists and dental therapists. The present study compares the job satisfaction of three comparable groups of dental professionals working in the UK, Trinidad & Tobago and New Zealand using the same measure.

Trinidad & Tobago is a twin island state situated at the southern end of the Caribbean chain of islands. It is a democratic republic within the British Commonwealth having gained independence in 1962. The country's dental needs are currently served by dental professionals working in government health centres and in private practices. The Dental Council of Trinidad & Tobago presently only recognises two categories of dental professionals: dentists and dental nurses (the equivalent of dental therapists in the UK and New Zealand), with 216 and 50 registered and enrolled respectively [20]. The Dental Nurse Training Scheme in Trinidad & Tobago was modelled on the New Zealand program and began operating in 1976, producing its first graduates in 1978. The aim of the programme was to improve the dental operator to population ratio, improve access to dental services, particularly in the rural areas of the country and provide oral screenings and health promotion in schools [21]. Under the 1980 Dental Profession Act of Trinidad & Tobago, "A dental nurse is permitted to treat children (under 12 years old) only and such treatment shall be carried out in facilities or services operated or conducted by government or under direct or indirect supervision of a dentist in private clinics" [22]. These healthcare professionals have expressed confidence in their ability to perform their duties but low job satisfaction, due to poor working conditions and lack of opportunities for career development [20].

Currently, most dental therapists in New Zealand work within the School Dental Service treating children up to the age of 13 years. School dental services have provided free treatment since 1945 and it is estimated that more than 95% of New Zealand children are enrolled [23]. A recent review of the dental therapy workforce indicated several difficulties facing this profession: the lack of career structure, a narrow scope of practice, outdated facilities and inadequate remuneration. These difficulties are believed to be contributing factors to the poor recruitment and retention of dental therapists in New Zealand [24].

The provision of dental services in New Zealand is undergoing a period of change, largely due to the implementation of the Health Practitioners Competence Assurance (HCPA) Act in September 2004. This act allows for an expansion of the scope of practice of dental therapists, and also enables these oral health providers to move into private practice for the first time, hitherto dental therapists in New Zealand have been restricted to working in the publicly funded health sector, where remuneration is low. It is not yet known how these changes will affect the dental therapy in New Zealand though it is anticipated that many therapists will choose to shift their practice to the private sector where their potential earnings are higher.

Following the report of the Dental Auxiliary Review Group and the subsequent publication of a consultation document concerning professionals complementary to dentistry by the General Dental Council, recent legislation in the UK has allowed Dental Therapists to work in all sectors of oral healthcare. Prior to this dental therapists in the UK were limited to working in hospitals, community dental services or the armed forces where they were employed in salaried posts. This situation parallels that in New Zealand and it is again anticipated that UK therapists will seek to enhance their income by working in the primary care sector where their earnings are likely to be paid on an item of service basis.

Three issues arise from a review of the reported career satisfaction of dental professions. First, there are few data available on the perceptions of some groups. Second, different studies have used different measures, making comparisons both within and across professions difficult. Third, there are no studies which have compared similar professional groups across countries (and by implication health care systems). The aim of the present study is to compare the expressed levels of career satisfaction of three groups of comparable dental healthcare professionals, working in Trinidad & Tobago, the UK and New Zealand.

Methods

Three postal surveys were conducted. Parallel questionnaires, including a question about career satisfaction, were mailed to all dental therapists registered with the General Dental Council in the UK (n = 380), all dental nurses (n = 50) enrolled by the Trinidad & Tobago Dental Council and currently practising in Trinidad & Tobago, and all dental therapists on the Dental Council of New Zealand database (n = 716). Overall response rates for the surveys were: UK therapists 80%; Trinidad & Tobago nurses 76%; New Zealand 83%. Only dental therapists currently employed in that role were included in the analyses, reducing the sample size to: UK, 221 dental therapists; Trinidad & Tobago 38, New Zealand 502.

Measure of satisfaction

Job satisfaction was determined by a single question. Participants were asked to rate their overall satisfaction with their career as a dental nurse or therapist (according to country) on a ten point scale with markers at each end where the value 1 was labelled "No satisfaction" and the value 10 labelled "Complete satisfaction".
Table 1: Univariate comparisons of dental professionals working in Trinidad & Tobago, in New Zealand and in the UK

<table>
<thead>
<tr>
<th></th>
<th>New Zealand (n = 502)</th>
<th>Trinidad &amp; Tobago (n = 38)</th>
<th>United Kingdom (n = 221)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>47.70* (8.80)</td>
<td>38.76* (6.09)</td>
<td>45.35* (7.69)</td>
</tr>
<tr>
<td>Career Break</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>412 (82%)</td>
<td>18 (47%) *</td>
<td>168 (76%)</td>
</tr>
<tr>
<td>No</td>
<td>89 (18%)</td>
<td>20 (53%) *</td>
<td>53 (24%)</td>
</tr>
<tr>
<td>Do you feel a valued member of staff?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All the time or most of the time</td>
<td>208 (41%) *</td>
<td>24 (63%)</td>
<td>151 (68%)</td>
</tr>
<tr>
<td>Some of the time, seldom or never</td>
<td>299 (59%) *</td>
<td>14 (37%)</td>
<td>70 (32%)</td>
</tr>
<tr>
<td>Career Satisfaction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>7.13 (1.95)*</td>
<td>5.21 (2.15)*</td>
<td>7.34 (1.94)*</td>
</tr>
<tr>
<td>Median</td>
<td>8</td>
<td>5</td>
<td>8</td>
</tr>
</tbody>
</table>

1 Means with different superscripts are significantly different (post-hoc Scheffe test)
2 Means with different superscripts are significantly different (post-hoc Mann Whitney U tests)
* For Chi-square analysis, these cells have the largest corrected residuals suggesting that these cells make the largest contribution to the Chi-square value.

In addition information was collected on the following:

- Age of respondent
- Whether the respondent had ever taken a career break in their career
- Whether the respondent felt a valued part of the dental team

Analysis

Univariate analyses were conducted to compare dental personnel across the three countries, on the variables identified. Mean and median scores on the satisfaction scale were calculated and compared using the Kruskal-Wallis test (a non-parametric version of the one-way ANOVA) since the satisfaction data had a skewed distribution (the standard error of the skewness statistic was greater than twice the skewness). Age was treated as a continuous variable and compared using a one-way analysis of variance, since the distribution of the data was approximately normal. The proportion of individuals who had ever taken a career break was compared across countries, and the respondents perception of whether they felt a valued part of the dental team was treated as a dichotomous variable (all the time or most of the time vs some of the time, seldom or never) and compared using the Chi-square statistic.

In order to examine the relative importance of each variable in predicting satisfaction, a logistic regression analysis was conducted. The outcome variable was satisfaction score dichotomised around the median value for the sample (two categories were defined, scores of 1 to 7 inclusive, and scores of 8 to 10 inclusive. Age (as a continuous variable), whether the individual had taken a career break, place (entered as three separate dummy variables coding each of the three countries) and whether the individual felt a valued member of the dental team (dichotomised most and all of the time vs all other categories) were entered stepwise as predictor variables, in order of their simple correlation with the outcome variable. Additional variables were entered until there was no significant increase in the predictive utility of the variables. For each variable in the equation the following statistics were calculated: coefficient $\beta$, the standard error of $\beta$, significance, estimated odds ratio (exp $[\beta]$). For the final model the model chi-square and the log-likelihood statistic were calculated.

Results

Table 1 summarises the univariate comparisons of dental professionals working in New Zealand, Trinidad & Tobago and in the UK. There was a significant difference in the age of the three groups of therapists. Post hoc Scheffe tests revealed that each of the three means was significantly different from the other means. There were significant differences between the three groups of therapists in career satisfaction, post hoc Mann Whitney U tests comparing the three groups revealed that the Trinidad & Tobago based therapists had significantly lower career satisfaction than the other two groups. There was no significant difference in the career satisfaction of dental therapists in the UK and New Zealand.

The final logistic regression analysis model is summarised in Table 2. The Cox & Snell R-square for the final model was 0.106, and the log-likelihood was -945.8. Dental therapists working in New Zealand were almost twice as likely to express high levels of career satisfaction in comparison...
to the other two countries, while those working in Trinidad & Tobago were less likely than individuals from the other two countries to express high career satisfaction. Finally individuals from all countries who feel a valued member of the dental team express higher levels of career satisfaction.

Discussion

The job satisfaction of three comparable groups of dental professionals working in different countries was compared, and found to be lowest in Trinidad & Tobago. These findings should be interpreted with some caution given the limitations of the study. This study adopted a single item measure of career satisfaction. Whilst this allows for comparison with other studies that have used similar single item measures for example [1,4], single item measures do not allow the investigation of the specifics of the work environment that are satisfying or dissatisfying. However a single item was chosen for its convenience in a postal survey and since it was felt that it provided a simple response format comparable across the three countries, and since it had been used in previous studies [1-3]. It is still possible however that the findings represent a cultural difference in the interpretation of career satisfaction. The three groups differed significantly in age, and the findings may in part be attributable to age, with younger participants being less satisfied with their career.

The extent to which an individual is satisfied with their job will be determined by many factors, including the pay and employment conditions. Country of work emerged as significant in the regression model, and is likely to act as a proxy measure for the working conditions, type of payment, healthcare system and experiences of the participants. However the present study did not investigate these explanatory variables in any depth. Surprisingly, whilst satisfaction was lowest amongst dental nurses in Trinidad & Tobago, this group had the highest proportion of members who felt a ‘valued’ member of the team. A feeling of being valued was lowest amongst dental therapists in New Zealand, suggesting that the satisfaction item was measuring something more than the perception of being valued in a team. The three countries in the present study place similar restrictions on the practice of dental therapy, and all three propose changes in the employment of this group of healthcare professionals but differ in the extent to which this change has been implemented. The UK system has taken the most steps towards changing the employment of dental therapists, followed by the New Zealand system. Career satisfaction was lowest amongst Dental Therapists in Trinidad and Tobago where the role is most restricted. Future research should address the extent to which the characteristics of the working environment impact upon job and career satisfaction. Research with dental practitioners has determined that system of remuneration, the characteristics of the working environment, and the type of service in which an individual works all exert an influence upon the practitioner’s experience of their working life [15,16,25]. There is a need for further research addressing the impact of low career satisfaction on the dental workforce, including retention of workforce, the impact on the quality of patient care and interactions with patients. It might be hypothesised that a dissatisfied workforce would be more likely to leave the career or be less motivated to deliver care of a high quality. Such associations have been found in studies of physicians [26] and rehabilitation professionals [27].

Conclusion

Dental therapists working in different healthcare systems report different levels of satisfaction with their career, being lowest in Trinidad & Tobago. Career satisfaction in all three countries was related to feeling a valued member of the dental team.

Competing interests

The author(s) declare that they have no competing interests.

Authors’ contributions

RN was responsible for the conduct of the survey in Trinidad & Tobago. JTN was responsible for the collection of data in the United Kingdom collated the data from the three countries and performed the statistical analysis. KA

Table 2: Results of logistic regression analysis predicting career satisfaction (dichotomised around the median value (categories 1 to 7 inclusive versus 8 to 10 inclusive) as the dependent variable

<table>
<thead>
<tr>
<th>Variables included in the analysis</th>
<th>Beta coefficient</th>
<th>Standard error</th>
<th>P</th>
<th>Exp(B)</th>
<th>95% CI of Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country = New Zealand (Comparison=all other participants)</td>
<td>0.67</td>
<td>0.21</td>
<td>&lt;0.001</td>
<td>2.60</td>
<td>1.92 – 3.52</td>
</tr>
<tr>
<td>Country=Trinidad &amp; Tobago (Comparison=all other participants)</td>
<td>-1.95</td>
<td>0.47</td>
<td>&lt;0.001</td>
<td>0.14</td>
<td>0.06 – 0.36</td>
</tr>
<tr>
<td>Feeling a Valued member of dental team (Most or all the time vs all other participants)</td>
<td>1.49</td>
<td>0.20</td>
<td>&lt;0.001</td>
<td>4.45</td>
<td>3.00 – 6.59</td>
</tr>
</tbody>
</table>

Log-likelihood=-945.8; model Chi-square = 83.48 (p < 0.001)
was responsible for the conduct of the survey in New Zealand. All authors contributed to the production of the manuscript.

References

Pre-publication history
The pre-publication history for this paper can be accessed here.

http://www.biomedcentral.com/1472-6963/6/32/prepub
Appendix 2: The Gender Study

A2.1  Investigation of women in the dental workforce – Cover letter
A2.2  Investigation of women in the dental workforce – Reminder letter
A2.3  Women in the New Zealand dental workforce – Questionnaire
A2.4  Gender and the New Zealand Dental Workforce – Cover letter
A2.5  Gender and the New Zealand Dental Workforce – Reminder letter
A2.6  Men in the New Zealand dental workforce - Questionnaire
Investigation of Women in the New Zealand Dental Workforce

Dear Dentist

We would like to invite you to take part in this investigation of women in the New Zealand dental workforce.

There are genuine concerns about the ability of the dental workforce to serve the New Zealand population both now and in the future. We are undertaking a study to investigate the contribution of women dentists to the workforce in New Zealand, their attitudes to dental practice, the challenges involved in combining work and family, and possible initiatives to facilitate women's return to the dental workforce. The results of the study will be useful for future workforce planning in New Zealand, and in the development of initiatives to aid women's return to the workforce following career breaks.

We have sent this questionnaire to all female dentists currently registered to practice in New Zealand. We ask that you take a few minutes to complete the survey and return it to us in the envelope provided. We appreciate that some questions are of a personal nature, and assure you that all responses will remain anonymous. You do not have to answer all of the questions if you do not want to. To thank you for your participation, we will enter you in a prize draw for a $500 voucher (provided by Medical Assurance Society) to spend in the store of your choice or one of two Clarins cosmetic gift packs.

If you have any questions regarding the study, please contact us at the number below.

Thank you

Yours sincerely

Sue Park Lisa Park Katie Ayers
(Final year dental students) (Supervisor)
Investigation of Women in the New Zealand Dental Workforce.

Dear Dentist

We would like to remind you of the letter we sent you a few weeks ago inviting you to participate in our study investigating the contribution of women dentists to the workforce in New Zealand.

If you have completed and returned the questionnaire, we thank you. However, if you have forgotten to do so, we would be very grateful if you would take a few minutes to complete the duplicate questionnaire enclosed and return it in the pre-paid envelope provided.

We appreciate that some questions are of a personal nature, and assure you that all responses will remain anonymous.

To thank you for your participation, if you reply by 21 May, we will enter you in a prize draw for a $500 gift voucher (sponsored by Medical Assurance Society) to spend in the store of your choice, or one of two Clarins cosmetic gift packs.

If you have any questions regarding the study, please do not hesitate to contact us at the number below.

Thank you

Yours sincerely,

Sue Park
Lisa Park
Katie Ayers

(Final year dental students)
(Supervisor)
QUESTIONNAIRE – Women in the New Zealand Dental Workforce

A) DEMOGRAPHIC INFORMATION

1. In what year did you graduate from dental school? 

2. In which country did you train to be a dentist? 

3. What is your age? 

4. With which ethnic group(s) do you identify? (tick all which apply)

   New Zealand European   
   New Zealand Maori      
   Pacific Island        
   Chinese               
   Indian                
   Other (please specify) 

5. What is your marital status?

   Single          
   Married        
   Living with partner 
   Separated/Divorced 
   Widowed         
   Other           

6. If married or living with partner, what is your partner’s occupation?
7. Are you the principal income earner for your household?

Yes □
No □
Equal contribution □

8. Do you currently have a current student loan debt?

Yes □
No □

9. If yes, what is the approximate value of your student loan?

$ ______________

10. How many children do you have?

______________

If you do not have children, please proceed to Question 13

11. Was your first child born:

a) Before graduating as a dentist □
b) After graduating as a dentist □

12. If your first child was born after graduation, how many years after graduation did you have your first child?

______________
B) CURRENT WORKING PATTERNS

13. In a typical week, how many hours do you spend working as a dentist?

________________________ hours

14. Where do you currently practise dentistry?

My own practice  □
As an associate in dental practice  □
Hospital dental department  □
Teaching institution  □
Other (please specify)  □

C) POSTGRADUATE EDUCATION

15. To which professional societies/associations do you belong? (e.g. NZDA, RACDS, ANZSPD etc)

____________________________________

____________________________________

____________________________________

16. Which professional journals do you read regularly?

____________________________________

____________________________________

____________________________________

____________________________________
17. Including conferences, courses, seminars and the scientific component of NZDA branch meetings, during 2003 did you attend 20 hours or more of formal continuing education?

Yes ☐
No ☐

18. How many NZDA branch meetings have you attended in the past year?

_________ meetings

19. Do you find branch meetings useful?

Yes ☐
No ☐
Sometimes ☐

20. Do you feel welcome at branch meetings?

Yes ☐
No ☐
Sometimes ☐

21. Which (if any) post-graduate qualifications do you hold?

PG DipClinDent ☐
MDS ☐
MComDent ☐
FRACDS ☐
Other (please specify) ☐

22. Are you currently enrolled as a postgraduate student for any of the above qualifications? If so, which? _______________________________
23. Are you registered as a specialist with the Dental Council of New Zealand?

   Yes ☐
   No ☐

   If no, please proceed to Question 27

24. If yes, for how long have you been registered as a dental specialist?

   ________ years

25. Did you train as a dental specialist:

   Part-time ☐
   Full-time ☐

26. Did you train as a dental specialist:

   Before having children ☐
   While having children ☐
   After having children ☐
   Not applicable (no children) ☐
D) CAREER BREAKS

27. Are you currently working as a dentist?
   Yes □
   No □

   If yes, please proceed to Question 36

28. If you are not currently practising dentistry, what is/are the reason/s for this?
   On maternity/parental leave □
   Taking a break to care for children □
   Taking a break to care for other relative □
   Personal illness □
   Personal choice □
   Seeking a job in dentistry □
   Working outside dentistry □
   Other □

29. How long have you been out of dental practice?
   _________ years and _________ months

30. Do you plan to return to dental practice?
   Yes □
   No □

31. If yes, when do you plan to return to work?
   In _________ years and _________ months
32. If no, why do you not plan to return to work?

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

33. If a refresher course was available, would you be interested in this?

Yes ☐
No ☐

If no, please proceed to Question 36

34. Would you like such a course to contain

Lectures/seminars only ☐
Clinical sessions only ☐
A combination of seminars and clinical practice ☐

35. How long would you expect a refresher course to be?

Less than 1 week ☐
1 or 2 weeks ☐
3 or 4 weeks ☐
2-3 months ☐
6 months ☐
Other ☐ (please specify)
36. Have you had a career break in the past?

Yes ☐
No ☐

37. If yes, how long was your career break?

______ years and ________ months

38. What was the reason for your career break?

- Parental leave ☐
- Taking a break to care for children ☐
- Taking a break to care for other relative ☐
- Personal illness ☐
- Personal choice ☐
- Seeking a job in dentistry ☐
- Working outside dentistry ☐
- Study ☐
- Other ☐

39. Did you experience problems when returning to dental practice?

Yes ☐
No ☐

40. If yes, what problems did you experience?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
E. CHILD CARE

Please complete this section only if you have a child/children. If you do not have children, please proceed to Question 48.

41. What principal form of pre-school childcare do/have you used?

- Husband/partner
- Other relative
- Friend
- Daycare centre
- Home-based care
- Nanny
- Other (please specify)
- I have not had a pre-school child in care

42. Do/did you feel comfortable with these care arrangements?

- Yes
- No

43. What form of after-school childcare do/have you used?

- Husband/partner
- Other relative
- Friend
- Daycare centre
- Home-based care
- Nanny
- Other (please specify)
- I have not had a pre-school child in care
44. Do/did you feel comfortable with these after-school care arrangements?

Yes  ☐
No   ☐

45. What form of school holiday childcare do/have you used?

Husband/partner  ☐
Other relative  ☐
Friend  ☐
Daycare centre  ☐
Home-based care ☐
Nanny  ☐
Other (please specify) ☐

______________________________
I have not had a child in school holiday care ☐

46. Do/did you feel comfortable having your child in school holiday care?

Yes  ☐
No   ☐

47. Who cares/cared for your child if he/she is sick at a time that you are scheduled to be at work?

Myself  ☐
My husband/partner  ☐
Another relative  ☐
Nanny  ☐
Other  ☐
F. PART-TIME WORK
If you do not work part-time, please proceed to Question 51

48. If you currently work part-time, what are your reasons for doing so?

- Caring for children  
- Caring for other relation  
- Ill-health  
- Personal choice  
- Work outside dentistry  
- Undertaking further study  
- Other

49. Do you plan to return to full-time work in the future?

- Yes  
- No  
- Don't know

50. If yes, when do you plan to return to full-time work?

__________ years and _________ months
G. CAREER SATISFACTION

51. On a scale of 1 to 10, where 1 is the lowest and 10 the highest, how would you rate your current level of career satisfaction? (please circle)

1 2 3 4 5 6 7 8 9 10

52. Has your career in dentistry fulfilled your expectations?

Yes ☐
No ☐

53. If you had your time again, would you still choose to study dentistry?

Yes ☐
No ☐

54. Do you feel that there are adequate career opportunities for female dentists?

Yes ☐
No ☐

55. Do you feel that your husband/partner has had to make any personal career adjustments in order to allow you to continue to work? (please describe)

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

56. At what age do you plan to retire from dentistry?

__________ years
57. What do you consider to be the benefits of dentistry as a career for women?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

58. What do you consider to be the disadvantages of dentistry as a career for women?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

59. Are there any other comments you would like to make about women in the dental workforce?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Thank you for taking the time to complete this questionnaire.
Dear Dentist

I would like to invite you to take part in this investigation of the New Zealand dental workforce. This study has been funded by the New Zealand Dental Association Research Foundation Board and is complementary to the workforce project being undertaken by the New Zealand Dental Association.

There are genuine concerns about the ability of the dental workforce to serve the New Zealand population both now and in the future. Problems that have been identified include the loss of recent graduates overseas and the increasing proportion of women in the workforce. We are undertaking a study to investigate the contribution of male and female dentists to the workforce in New Zealand, attitudes to dental practice, the challenges involved in combining work and family, and possible initiatives to facilitate dentists’ return to the dental workforce after career breaks and travel. The results of the study will be useful for future workforce planning in New Zealand, and in the development of initiatives to aid dentists’ return to the workforce following career breaks.

This questionnaire has been sent to a random sample of male dentists currently registered to practice in New Zealand (an equivalent survey has been sent to female dentists). I ask that you take a few minutes to complete the survey and return it in the envelope provided. I appreciate that some questions are of a personal nature, and assure you that all responses will remain anonymous. You do not have to answer all of the questions if you do not want to. To thank you for your participation, I will enter you in a prize draw for a $500 voucher to spend in the store of your choice.

If you have any questions regarding the study, please contact me at the number below.

Thank you

Yours sincerely

Katie Ayers
Senior Lecturer, Dental Public Health
Gender and the New Zealand Dental Workforce.

Dear Dentist

I would like to remind you of the letter I sent you a few weeks ago inviting you to participate in a study investigating the contribution of male (and female) dentists to the workforce in New Zealand.

If you have completed and returned the questionnaire, thank you. However, if you have forgotten to do so, I would be very grateful if you would take a few minutes to complete the duplicate questionnaire enclosed and return it in the pre-paid envelope provided.

I appreciate that some questions are of a personal nature, and assure you that all responses will remain anonymous.

To thank you for your participation, if you reply by 13 September, you will be entered into a prize draw for a $500 gift voucher to spend in the store of your choice.

If you have any questions regarding the study, please do not hesitate to contact me at the number below.

Thank you

Yours sincerely,

Katie Ayers
Senior Lecturer
Dental Public Health
QUESTIONNAIRE – Men in the New Zealand Dental Workforce

A) DEMOGRAPHIC INFORMATION

1. In what year did you graduate from dental school? 

2. In which country did you train to be a dentist? 

3. What is your age? 

4. With which ethnic group(s) do you identify? (tick all which apply)
   - New Zealand European
   - New Zealand Maori
   - Pacific Island
   - Chinese
   - Indian
   - Other (please specify) 

5. What is your marital status?
   - Single
   - Married
   - Living with partner
   - Separated/Divorced
   - Widower
   - Other

6. If married or living with partner, what is your partner’s occupation?
7. Are you the principal income earner for your household?

Yes

No

Equal contribution

8. Do you currently have a current student loan debt?

Yes

No

9. If yes, what is the approximate value of your student loan?

$ ____________

10. How many children do you have?

____________

If you do not have children, please proceed to Question 13

11. Was your first child born:

a) Before graduating as a dentist

b) After graduating as a dentist

12. If your first child was born after graduation, how many years after graduation did you have your first child?

____________
B) CURRENT WORKING PATTERNS

13. In a typical week, how many hours do you spend working as a dentist?

____________________ hours

14. Where do you currently practise dentistry?

- My own practice □
- As an associate in dental practice □
- Hospital dental department □
- Teaching institution □
- Other (please specify) □

C) POSTGRADUATE EDUCATION

15. To which professional societies/associations do you belong?
   (e.g. NZDA, RACDS, ANZSPD etc)

____________________
____________________
____________________
____________________

16. Which professional journals do you read regularly?

____________________
____________________
____________________
____________________
17. Including conferences, courses, seminars and the scientific component of NZDA branch meetings, during 2003 did you attend 20 hours or more of formal continuing education?

Yes [ ]
No [ ]

18. How many NZDA branch meetings have you attended in the past year?

__________ meetings

19. Do you find branch meetings useful?

Yes [ ]
No [ ]
Sometimes [ ]

20. Do you feel welcome at branch meetings?

Yes [ ]
No [ ]
Sometimes [ ]

21. Which (if any) post-graduate qualifications do you hold?

PG DipClinDent [ ]
MDS [ ]
MComDent [ ]
FRACDS [ ]
Other (please specify) [ ]

22. Are you currently enrolled as a postgraduate student for any of the above qualifications? If so, which? ________________________________
23. Are you registered as a specialist with the Dental Council of New Zealand?

Yes ☐
No ☐

If no, please proceed to Question 27

24. If yes, for how long have you been registered as a dental specialist?

__________ years

25. Did you train as a dental specialist:

Part-time ☐
Full-time ☐

26. Did you train as a dental specialist:

Before having children ☐
While having children ☐
After having children ☐
Not applicable (no children) ☐
D) CAREER BREAKS

27. Are you currently working as a dentist?
   Yes □
   No □

   If yes, please proceed to Question 36

28. If you are not currently practising dentistry, what is/are the reason/s for this?
   On paternity/parental leave □
   Taking a break to care for children □
   Taking a break to care for other relative □
   Personal illness □
   Personal choice □
   Seeking a job in dentistry □
   Working outside dentistry □
   Other □

29. How long have you been out of dental practice?

   ___________ years and ___________ months

30. Do you plan to return to dental practice?

   Yes □
   No □

31. If yes, when do you plan to return to work?

   In ___________ years and ___________ months
32. If no, why do you not plan to return to work?

____________________________________

____________________________________

33. If a refresher course was available, would you be interested in this?

Yes  ☐

No   ☐

If no, please proceed to Question 36

34. Would you like such a course to contain

Lectures/seminars only  ☐

Clinical sessions only  ☐

A combination of seminars and clinical practice  ☐

35. How long would you expect a refresher course to be?

Less than 1 week  ☐

1 or 2 weeks  ☐

3 or 4 weeks  ☐

2-3 months  ☐

6 months  ☐

Other  ☐ (please specify)
36. Have you had a career break in the past?

Yes □
No □

37. If yes, how long was your career break?

_________ years and __________ months

38. What was the reason for your career break?

Parental leave □
Taking a break to care for children □
Taking a break to care for other relative □
Personal illness □
Personal choice □
Seeking a job in dentistry □
Working outside dentistry □
Study □
Other □

39. Did you experience problems when returning to dental practice?

Yes □
No □

40. If yes, what problems did you experience?

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
E. CHILD CARE

Please complete this section only if you have a child/children. If you do not have children, please proceed to Question 48.

41. What principal form of pre-school childcare do/have you used?

- Wife/partner
- Other relative
- Friend
- Daycare centre
- Home-based care
- Nanny
- Other (please specify)

________________________________________________________________

I have not had a pre-school child in care

42. Do/did you feel comfortable with these care arrangements?

- Yes
- No

43. What form of after-school childcare do/have you used?

- Wife/partner
- Other relative
- Friend
- Daycare centre
- Home-based care
- Nanny
- Other (please specify)

________________________________________________________________

I have not had a child in after-school care
44. Do/did you feel comfortable with these after-school care arrangements?

   Yes □
   No □

45. What form of school holiday childcare do/have you used?

   Wife/partner □
   Other relative □
   Friend □
   Daycare centre □
   Home-based care □
   Nanny □
   Other (please specify) □

   I have not had a child in school holiday care □

46. Do/did you feel comfortable having your child in school holiday care?

   Yes □
   No □

47. Who cares/cared for your child if he/she is sick at a time that you are scheduled to be at work?

   Myself □
   My wife/partner □
   Another relative □
   Nanny □
   Other □
F. PART-TIME WORK

If you do not work part-time, please proceed to Question 51

48. If you currently work part-time, what are your reasons for doing so?

- Caring for children
- Caring for other relation
- Ill-health
- Personal choice
- Work outside dentistry
- Undertaking further study
- Other

49. Do you plan to return to full-time work in the future?

- Yes
- No
- Don’t know

50. If yes, when do you plan to return to full-time work?

_________ years and _________ months
51. On a scale of 1 to 10, where 1 is the lowest and 10 the highest, how would you rate your current level of career satisfaction? (please circle)

1 2 3 4 5 6 7 8 9 10

52. Has your career in dentistry fulfilled your expectations?

Yes ☐
No ☐

53. If you had your time again, would you still choose to study dentistry?

Yes ☐
No ☐
Maybe/Don’t know ☐

54. Do you feel that there are adequate career opportunities for male dentists?

Yes ☐
No ☐

55. Do you feel that your wife/partner has had to make any personal career adjustments in order to allow you to continue to work? (please describe)

Yes ☐
No ☐
56. At what age do you plan to retire from dentistry?

_______ years

57. What do you consider to be the benefits of dentistry as a career for men?

_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

58. What do you consider to be the disadvantages of dentistry as a career for men?

_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

59. Are there any other comments you would like to make about men in the dental workforce?

_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

Thank you for taking the time to complete this questionnaire.
Appendix 3: The Therapist Study

A3.1 Working patterns and career satisfaction of dental therapists – Cover letter
A3.2 Working patterns and career satisfaction of dental therapists – Reminder letter
A3.3 The career development of dental therapists – Questionnaire
Working Patterns and Career Satisfaction of Dental Therapists in New Zealand

Dear Dental Therapist

We would like to invite you to take part in this investigation of the working patterns and career satisfaction of dental therapists in New Zealand.

Dental therapists play an important role in the provision of dental services in New Zealand, but little is known about their working patterns or level of satisfaction with their careers. We are undertaking a study to collect information about this group of dental health professionals. The results of the study will be useful for future workforce planning in New Zealand, and will also serve as baseline data about this group, which can be compared with new data collected some time after the implementation of the Health Practitioners Competency Assurance Act.

We have sent this questionnaire to all dental therapists on the Dental Council of New Zealand’s database. We ask that you take a few minutes to complete the survey and return it to us in the envelope provided. We appreciate that some questions are of a personal nature, and assure you that all responses will remain anonymous. You do not have to answer all of the questions if you do not want to.

To thank you for your participation, we will enter you in a prize draw for a $500 voucher to spend in the store of your choice.

If you have any questions regarding the study, please contact us at the number below.

Thank you

Yours sincerely

Alison Meldrum
Senior Lecturer

Katie Ayers
Senior Lecturer

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Sec Tel +64 3 479 7113 • Fax +64 3 479 7113 • Email oral.health@dent.otago.ac.nz
www.otago.ac.nz
Working Patterns and Career Satisfaction of Dental Therapists in New Zealand

Dear Dental Therapist

We would like to remind you of the letter we sent you a few weeks ago inviting you to participate in a study investigating the working patterns and career satisfaction of dental therapists in New Zealand.

If you have completed and returned the questionnaire, thank you. However, if you have forgotten to do so, we would be very grateful if you would take a few minutes to complete the duplicate questionnaire enclosed and return it in the pre-paid envelope provided.

We appreciate that some questions are of a personal nature, and assure you that all responses will remain anonymous.

To thank you for your participation, if you reply by 22 October, you will be entered into a prize draw for a $500 gift voucher to spend in the store of your choice.

If you have any questions regarding the study, please do not hesitate to contact us at the number below.

Thank you

Yours sincerely,

Alison Meldrum
Senior Lecturer

Katie Ayers
Senior Lecturer
The Career Development of Dental Therapists

A. **ABOUT YOU**

1. Are you
   - Male □  or  Female □

2. In which area do you live?
   - Northland
   - Auckland
   - Waikato/Bay of Plenty
   - Central Districts
   - Gisborne/Hawkes Bay
   - Taranaki
   - Wellington
   - Nelson/Marlborough
   - Canterbury/South Canterbury
   - Otago/North Otago
   - Southland
   - Other (please specify) ____________________________

3. What is your age? (please state) __________

4. With which ethnic group(s) do you identify? (tick all which apply)
   - New Zealand European □
   - New Zealand Maori □
   - Pacific Island □
   - Chinese □
   - Indian □
   - Other (please specify) ____________________________

5. Do you have childcare responsibilities?
   - Yes □
   - No □

6. In which year did you qualify as a dental therapist? (please state) __________
7. In which country did you qualify as a dental therapist?

New Zealand  
Australia  
United Kingdom  
United States  
Other (please specify)  

8. What qualifications do you hold?

Certificate in Dental Therapy  
Diploma in Dental Therapy (Otago)  
Degree endorsed in Dental Therapy (Otago)  
BA  
BSc  
DPH  
MPH  
Other (please state)  

B. ABOUT YOUR CURRENT OCCUPATION

9. Are you currently working as a dental therapist?

Yes  
No  

If YES, please turn to Section C  
If NO, please go to Question 10:

10. Did you ever work as a dental therapist?

Yes  
No  

If NO, go to Question 13  
If YES, please answer questions 11 and 12

11. When did you stop working as a dental therapist?

12. In which of these areas did you work as a dental therapist?

School Dental Service/DHB  
A hospital dental department  
A teaching institution  
Other (please state)  

13. Are you currently in paid employment?

Yes [ ]
No [ ]

14. If YES, what is your current occupation?

[ ]

15. If NO, have you taken a break from your career for any of the following reasons?

- Personal illness [ ]
- Family illness [ ]
- Child rearing [ ]
- Family problems [ ]
- To aid partner's career [ ]
- Full time carer [ ]
- Taking up another career [ ]
- Study [ ]
- Travelling [ ]
- Other [ ]
(please specify) [ ]

16. Do you intend to return to work as a dental therapist?

Yes [ ]
No [ ]

17. If YES, when do you intend to return?

[ ]

If you are not currently working as a dental therapist, you do not need to complete any further questions. Thank you for completing this questionnaire. Please return it in the envelope provided.
C. **ABOUT YOUR CURRENT WORKING PRACTICE**

18. I am currently employed by:
   (Please tick as many boxes as apply)
   - School Dental Service/DHB
   - A hospital dental department
   - A teaching institution
   - Other (please state) 

19. In my current employment, I am working as:
   (Please tick as many boxes as apply)
   - A dental therapist
   - A dental assistant
   - A tutor/lecturer
   - Other (please specify) 

20. Thinking about the last week in which you worked, how many hours did you work that week?

   ____________________________ hours

21. Would you prefer to work?

   - Fewer hours
   - The same number of hours
   - More hours

22. Do you have a dental assistant with you when you are working with patients?

   - Usually
   - Sometimes
   - Rarely
   - Never

23. In how many different schools/clinics do you work each year?

   - One
   - Two
   - Three
   - Four
   - More than four
24. Please indicate which of the following duties you undertake.

<table>
<thead>
<tr>
<th>Duty</th>
<th>Regularly Undertake</th>
<th>Occasionally Undertake</th>
<th>Never Undertake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental health education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dietary counselling</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Fluoride application</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Examination</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking radiographs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading radiographs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fissure sealant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local anaesthetic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placement of restorations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polishing of restorations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulpotomy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct pulp capping</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirect pulp capping</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Stainless steel crown</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraction of primary tooth</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Extraction of permanent tooth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking impressions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placing or removing orthodontic bands/wires</td>
<td></td>
<td></td>
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<tr>
<td>Suture/Pack removal</td>
<td></td>
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<tr>
<td>Curettage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporary dressing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other emergency treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer appraisal/peer review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical supervision</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical teaching</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team management/co-ordination</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

25. Some dental therapists do other jobs, either because they only work part-time in the school dental service or for other reasons.

Do you have a job of any other type?

Yes [ ]

No [ ]

26. If YES, what is your other job?

__________________________

27. How many hours (on average) do you spend working at your other job each week?

__________________________
D. ABOUT YOUR CAREER BREAKS

In this section we are interested in looking at any periods of time you have taken away from work which have lasted longer than six weeks. We call these ‘career breaks’.

28. How many career breaks have you taken, using the above definition?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
</tr>
<tr>
<td>One</td>
<td></td>
</tr>
<tr>
<td>Two</td>
<td></td>
</tr>
<tr>
<td>Three</td>
<td></td>
</tr>
<tr>
<td>Four or more</td>
<td></td>
</tr>
</tbody>
</table>

If NONE, please turn to section E.

29. What was the reason for taking your break and how long did you take a break for? (Indicate as many as apply)

<table>
<thead>
<tr>
<th>Reason</th>
<th>Number of breaks</th>
<th>Total length of time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal illness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family illness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child rearing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To aid partner’s career</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full time carer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking up another career</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travelling/holiday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>(please specify)</td>
<td></td>
</tr>
</tbody>
</table>

E. KEEPING UP TO DATE

30. Which, if any, professional journals/publications have you read in the last 3 months? e.g. Dental Therapists Association Journal, New Zealand Dental Journal

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

31. In the last year, how many hours in total have you spent in attendance at conferences or training courses?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
</tr>
<tr>
<td>1-9 hours</td>
<td></td>
</tr>
<tr>
<td>10-19 hours</td>
<td></td>
</tr>
<tr>
<td>20-29 hours</td>
<td></td>
</tr>
<tr>
<td>30 or more hours</td>
<td></td>
</tr>
</tbody>
</table>
F. **YOUR VIEW OF YOUR JOB**

This section asks how you feel about your work life

32. Overall, how much satisfaction do you get from your job as a dental therapist?

**Please circle**

(A score of 1 would indicate that you get no satisfaction from your job, a score of 10 that you get a great deal of satisfaction)

<table>
<thead>
<tr>
<th>Minimum satisfaction</th>
<th>Maximum satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
</tbody>
</table>

33. Are you satisfied with the income you receive as a dental therapist?

**Please circle**

(A score of 1 would indicate that you are completely unsatisfied with your income, a score of 10 that you are completely satisfied with your income from dental therapy)

<table>
<thead>
<tr>
<th>Not at all satisfied</th>
<th>Very satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
</tbody>
</table>

34. Do you feel that you are a valued part of the dental community?

- [ ] Always
- [ ] Mostly
- [ ] Sometimes
- [ ] Seldom
- [ ] Never

35. If you had your time again, would you still choose to pursue a career in dental therapy?

- [ ] Yes
- [ ] No
36. Are you interested in moving to private dental practice?

Yes, I would definitely like to move to private practice
I would consider moving to private practice
I am not interested in moving to private practice
I am already working in private practice

37. Would you like to treat adult patients?

Yes, I would definitely like to treat adults
I would consider treating adults
I am not interested in treating adults
I am already treating adults

38. When do you plan to give up practising dental therapy?

Less than 5 years
5-9 years
10-14 years
15-19 years
20-29 years
30+ years

39. Are there any comments you would like to make regarding dental therapy as a career?

Thank you for completing this questionnaire
Please return it in the envelope provided
Appendix 4: The Hygienist Study

A4.1 Working patterns and career satisfaction of dental hygienists – Cover letter
A4.2 Working patterns and career satisfaction of dental hygienists – Reminder letter
A4.3 The career development of dental hygienists – Questionnaire
Working Patterns and Career Satisfaction of Dental Hygienists and Section 11 workers in New Zealand.

Dear Dental Hygienist/Section 11 Worker

We would like to invite you to take part in this investigation of the working patterns and career satisfaction of dental hygienists and other Section 11 workers in New Zealand.

Dental hygienists have an important role in the provision of dental services in New Zealand, but little is known about their working patterns or level of satisfaction with their careers. We are undertaking this study to collect information about this group of dental health professionals. The results of the study will be useful for future workforce planning in New Zealand, and will also serve as baseline data about this group, which can be compared with new data collected some time after the implementation of the Health Practitioners Competency Assurance Act.

We have sent this questionnaire to all dental hygienists and other Section 11 workers on the Dental Council of New Zealand’s database. We ask that you take a few minutes to complete the survey and return it to us in the envelope provided. We appreciate that some questions are of a personal nature, and assure you that all responses will remain anonymous. You do not have to answer all of the questions if you do not want to.

To thank you for your participation, we will enter you in a prize draw for a $500 voucher to spend in the store of your choice.

If you have any questions regarding the study, please contact us at the number below.

Thank you

Yours sincerely

Alison Meldrum
Senior Lecturer

Katie Ayers
Senior Lecturer

Discipline of Dental Public Health and Epidemiology
Division of Health Sciences, School of Dentistry
310 Great King Street, PO Box 647, Dunedin 9054, New Zealand
Sec Tel +64 3 479 7113 • Fax +64 3 479 7113 • Email oral.health@dent.otago.ac.nz
www.otago.ac.nz
Working Patterns and Career Satisfaction of Dental Hygienists in New Zealand

Dear Dental Hygienist

We would like to remind you of the letter we sent you a few weeks ago inviting you to participate in a study investigating the working patterns and career satisfaction of dental hygienists in New Zealand.

If you have completed and returned the questionnaire, thank you. However, if you have forgotten to do so, we would be very grateful if you would take a few minutes to complete the duplicate questionnaire enclosed and return it in the pre-paid envelope provided.

We appreciate that some questions are of a personal nature, and assure you that all responses will remain anonymous.

To thank you for your participation, if you reply by 22 October, you will be entered into a prize draw for a $500 gift voucher to spend in the store of your choice.

If you have any questions regarding the study, please do not hesitate to contact us at the number below.

Thank you

Yours sincerely,

Alison Meldrum
Senior Lecturer

Katie Ayers
Senior Lecturer

Discipline of Dental Public Health and Epidemiology
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www.otago.ac.nz
A. ABOUT YOU

1. Are you
   Male ☐ or Female ☐

2. In which area do you live?
   Northland ☐
   Auckland ☐
   Waikato/Bay of Plenty ☐
   Central Districts ☐
   Gisborne/Hawkes Bay ☐
   Taranaki ☐
   Wellington ☐
   Nelson/Marlborough ☐
   Canterbury/South Canterbury ☐
   Otago/North Otago ☐
   Southland ☐
   Other (please specify) ____________________________________ ☐

3. What is your age? (please state)
   ________

4. Which ethnic group(s) do you belong to? (tick all which apply)
   New Zealand European ☐
   New Zealand Maori ☐
   Pacific Island ☐
   Chinese ☐
   Indian ☐
   Other (please specify) ____________________________

5. Do you have childcare responsibilities?
   Yes ☐
   No ☐

6. In which year did you qualify as a dental hygienist? (please state if applicable)
   ________
7. In which country did you qualify as a hygienist (if applicable)?

New Zealand  □
Australia     □
United Kingdom □
United States □
Other (please specify) □

8. What qualifications do you hold?

None □
Diploma in Dental Hygiene (Otago) □
Degree endorsed in Dental Hygiene (Otago) □
BA □
BSc □
DPH □
MPH □
Other (please state) □

B. ABOUT YOUR CURRENT OCCUPATION

9. Are you currently working as a dental hygienist or Section 11 worker?

Yes □
No □

If YES, please turn to Section C

If NO, please go to Question 10:

10. Did you ever work as a hygienist or Section 11 worker?

Yes □
No □

If NO, go to Question 13

If YES, please answer questions 11 and 12

11. When did you stop working as a dental hygienist/Section 11 worker?

12. In which of these areas did you work as a hygienist/Section 11 worker?

General dental practice □
Hospital dental department □
School of Dentistry □
Armed forces □
Industry or research □
Overseas □
13. Are you currently in paid employment?

Yes ☐
No ☐

14. If YES, what is your current occupation?

15. If NO, have you taken a break from your career for any of the following reasons?

Personal illness ☐
Family illness ☐
Child rearing ☐
Family problems ☐
To aid partner's career ☐
Full time carer ☐
Taking up another career ☐
Study ☐
Travelling ☐
Other ☐
(please specify) ☐

16. Do you intend to return to work as a dental hygienist/Section 11 worker?

Yes ☐
No ☐

17. If YES, when do you intend to return?

If you are not currently working as a hygienist or Section 11 worker, you do not need to complete any further questions. Thank you for completing this questionnaire. Please return it in the envelope provided.
C. ABOUT YOUR CURRENT WORKING PRACTICE

18. In how many different locations do you work?
   
   One ☐
   Two ☐
   Three ☐
   Four ☐
   More than four ☐

19. I am currently employed by:
    
    (Please tick as many boxes as apply)
    
    A general dental practitioner ☐
    An orthodontist ☐
    Another dental specialist ☐
    A hospital dental department ☐
    A teaching institution ☐
    Other (please state) ☐

20. In my current employment, I am working as:
    
    (Please tick as many boxes as apply)
    
    A dental hygienist ☐
    A dental assistant ☐
    A practice manager ☐
    A teacher ☐
    A researcher ☐
    A sales representative ☐
    Other (please specify) ☐

21. Thinking about the last week in which you worked, how many hours did you work that week?

   ____________________________ hours

22. Would you prefer to work?

   Fewer hours ☐
   The same number of hours ☐
   More hours ☐

23. Do you have a dental assistant with you when you are working with patients?

   Usually ☐
   Sometimes ☐
   Rarely ☐
   Never ☐
24. Please indicate which, if any, of the following duties you regularly undertake in any of the establishments in which you work.

<table>
<thead>
<tr>
<th>Duty</th>
<th>Regularly Undertake</th>
<th>Occasionally Undertake</th>
<th>Never Undertake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental health education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dietary counselling</td>
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<td>Fissure sealants</td>
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<tr>
<td>Local anaesthetic</td>
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<tr>
<td>Suture/Pack removal</td>
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<tr>
<td>Curettage</td>
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<td></td>
<td></td>
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<tr>
<td>Temporary dressing</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Permanent restoration</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Other emergency treatment</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Peer support/review</td>
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<td></td>
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<tr>
<td>Clinical supervision (recent graduate)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Clinical teaching (undergraduate)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team management/coordination</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

25. Some dental hygienists do other jobs, either because they only work part-time in practice or for other reasons.

Do you have a job of any other type?

Yes [ ]
No [ ]

26. If YES, what is your other job?
D. ABOUT YOUR CAREER BREAKS

In this section we are interested in looking at any periods of time you have taken away from work which have lasted longer than six weeks. We call these ‘career breaks’.

27. How many career breaks have you taken, using the above definition?

- None
- One
- Two
- Three
- Four or more

If NONE, please turn to section E.

28. What was the reason for taking your break and how long did you take a break for? (Indicate as many as apply)

<table>
<thead>
<tr>
<th>Number of breaks</th>
<th>Total length of time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal illness</td>
<td></td>
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<tr>
<td>Family illness</td>
<td></td>
</tr>
<tr>
<td>Child rearing</td>
<td></td>
</tr>
<tr>
<td>Family problems</td>
<td></td>
</tr>
<tr>
<td>To aid partner’s career</td>
<td></td>
</tr>
<tr>
<td>Full time carer</td>
<td></td>
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<tr>
<td>Taking up another career</td>
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<tr>
<td>Study</td>
<td></td>
</tr>
<tr>
<td>Travelling</td>
<td></td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
</tr>
</tbody>
</table>

E. KEEPING UP TO DATE

29. Which, if any, professional journals/publications have you read in the last 3 months? e.g. New Zealand Dental Journal

30. In the last year, how many hours in total have you spent in attendance at conferences or training courses?

- None
- 1-9 hours
- 10-19 hours
- 20-29 hours
- 30 or more hours
F. **YOUR VIEW OF YOUR JOB**

This section asks how you feel about your work life

31. Overall, how much satisfaction do you get from your job?

**Please circle**

(A score of 1 would indicate that you get no satisfaction from your job, a score of 10 that you get a great deal of satisfaction)

Minimum satisfaction | Maximum satisfaction
--- | ---
1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

32. Are you satisfied with the income you receive as a dental hygienist/Section 11 worker?

**Please circle**

(A score of 1 would indicate that you are completely unsatisfied with your income, a score of 10 that you are completely satisfied with your income)

Not at all satisfied | Very satisfied
--- | ---
1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

33. Do you feel that you are a valued part of the dental community?

Always | Mostly | Sometimes | Seldom | Never
--- | --- | --- | --- | ---

34. If you had your time again, would you still choose to pursue a career in dental hygiene?

Yes | No
--- | ---

35. If the option was available, would you be interested in expanding the range of procedures you perform (e.g. restoration of teeth, extraction of teeth etc.?)

Yes | Maybe | No
--- | --- | ---
36. When do you plan to give up practicing dental hygiene?
   Less than 5 years □
   5-9 years □
   10-14 years □
   15-19 years □
   20-29 years □
   30+ years □

37. Are there any comments you would like to make regarding dental hygiene as a career?

Thank you for completing this questionnaire
Please return it in the envelope provided
Appendix 5: The Stress Study

A5.1 Dentist Survey 2006
Dentist Survey 2006

(Student researchers: T Gwengo, P Choi, S Choi, L Adsett, S Goldsmith, J Antoun, R Lee, D Chi)

Each year, final-year BDS students are required to conduct an elective research project, and we have chosen to conduct a survey of dental practitioners. Our project supervisor is Professor Murray Thomson (Phone 03 479 7116; Email: murray.thomson@stonebow.otago.ac.nz). Professor R Love and Dr P Yoganathan are also involved.

We invite you to take part. Please take the time to fill in this questionnaire and return it in the attached FREEPOST envelope (no stamp is necessary) as soon as possible. Most questions in this survey simply require you to tick the box (or boxes) which apply to you. Our pre-testing has shown that this survey is simple and quick to complete.

Remember – all responses are confidential. Data entry and analysis will be done using anonymised data. The University of Otago Human Ethics Committee has reviewed and approved this project.

The number at the bottom right of this sheet is to enable us to identify the winners in the prize draw. Responses received by 1 June will be entered into a draw for 2 prize packs sponsored by SellAgence Ltd and Henry Schein Regional Ltd. These are: (1) a state-of-the-art Oral-B Triumph electric toothbrush and $100 in music vouchers; or (2) a state-of-the-art Oral-B Triumph electric toothbrush, a $50 book voucher and $50 in music vouchers.

Once this is done, the numbers drawn will be matched with the master list by an individual who does not have access to your responses. Winners will be notified by mail. The front sheet with the ID number will be separated from the responses and only used to enable a prize draw to be completed, and to undertake a follow-up of people who don’t reply (if needed).
First, we would like some information about you to help us interpret the survey findings. Remember, your responses are confidential.

What is your gender? Male ☐ Female ☐

What year did you graduate BDS or equivalent? ☐

Which of the following is your nearest NZDA branch?

- Northland ☐
- Auckland ☐
- Waikato-BOP ☐
- Gisborne ☐
- Hawke’s Bay ☐
- Central Districts ☐
- Taranaki ☐
- Wellington ☐
- Nelson-Marlborough ☐
- Canterbury-South Cant’y ☐
- Otago/North ☐
- Southland ☐
- Otago ☐

The following questions pertain to your use of posterior restorative materials

In a typical week:

1. How many patients do you see? ☐

2. How many restorations do you place? (ie. excluding temporary fillings) ☐

3. How many of those are on posterior teeth? (ie. premolars and molars, excluding wisdom teeth) ☐

4. Of those posterior restorations, please specify the number of each of the following types of restorative material you used for PERMANENT posterior restorations:

   - GIC ☐
   - Composite ☐
   - Amalgam ☐
   - Other (please specify) ☐

5. When you are treating an adult patient, who usually makes the choice on choosing the type of material?

   - Dentist only ☐
   - Patient only ☐
   - Dentist and patient ☐
6. Which of the following considerations do you take into account in deciding on the type of material? (Tick as many of the following apply)

- Financial
- Aesthetics
- Durability of the material
- Patient request
- Ease of use
- Conservation of tooth tissue
- Availability of material
- Other

7. Do you have amalgam in your surgery? Yes □ No □

If not, why not?

The following questions refer to your use of antibiotic prophylaxis in dental practice. For each question, please tick the box which applies.

1. Which antibiotic prophylaxis guidelines do you usually follow?

- New Zealand National Heart foundation
- American Heart Association
- British Society for Antimicrobial Chemotherapy
- European Consensus
- Australian Dental Association

2. Which prophylactic oral regimen for adults do you normally prescribe for at risk patients?

- Penicillin V. 500mg 1 hour before treatment followed by 500mg 6 hourly for 2 days
- Penicillin V. 2 grams 1 hour before treatment plus 1 gram 6 hours later
- Amoxycillin 3 grams 1 hour before treatment
- Amoxycillin 2 grams 1 hour before treatment
- Amoxycillin 2 grams 1 hour before treatment and 1 gram 6 hours later
3. If a patient is allergic to Penicillin, what antibiotic would you prescribe (orally)?

☐ Erythromycin 1.5 grams 1-2 hours before treatment followed by 500mg 6 hours later
☐ Clindamycin 600mg 1 hour before treatment
☐ Oral Clarithromycin 500mg 1 hour before treatment
☐ Oral Cefuroxime Axetil 1 gram 1 hour before treatment and 1 gram 6 hours later

4. Do you use Chlorhexidine or Povidone-Iodine mouthwashes 5 minutes before dental treatment in patients who need antibiotic prophylaxis?

☐ Yes, always
☐ Sometimes
☐ Not at all

5. Do you use Chlorhexidine gingival irrigation before dental treatment in patients who need antibiotic prophylaxis?

☐ Yes, always
☐ Sometimes
☐ Not at all

6. If you have to use the same antibiotic for prophylactic cover, what is the usual spacing between appointments?

☐ 14 days
☐ 7 days
☐ 28 days

7. Where a patient is undergoing kidney dialysis, for which type of dialysis would you prescribe antibiotic prophylaxis?

☐ Haemodialysis
☐ Peritoneal dialysis
☐ Both
☐ I wouldn’t prescribe
8. Would you give antibiotic cover for a patient with total joint replacement?
   - Always
   - Only up to 6 months after the hip replacement
   - Up to 2 years after the hip replacement
   - Always under certain medical conditions
   - Not at all

9. Would you give antibiotic cover for a patient with a coronary bypass?
   - Yes
   - No

10. Would you give antibiotic cover for a patient with a coronary artery stent?
    - Yes always
    - No
    - Only up to 1 month after placement
    - Only up to 6 months after placement

11. For a patient who requires emergency dental treatment but is not sure whether he/she has heart valve problems or a heart murmur, do you:
    - Usually give antibiotic cover and treat the patient?
    - Give antibiotic cover first time and refer the patient to a medical practitioner to evaluate the cardiac condition?
    - Don’t give antibiotic cover at all?

12. Do you give antibiotic cover for a patient with a cardiac pacemaker or an implanted defibrillator?
    - Yes
    - No
13. Do you routinely administer antibiotic cover for dental restorative procedures for a patient who is at risk of endocarditis?

☐ Yes
☐ No
☐ Sometimes – when anticipating bleeding

14. Is your workplace well-equipped to handle allergic or hypersensitive reactions?

☐ Yes
☐ No

15. In a typical month at your practice, how often would you administer antibiotics for prophylactic purposes?

☐ < 5 patients
☐ 5-10 patients
☐ > 15 patients
☐ Not at all

The next few questions relate to the legal basis of dental practice.

16. Has your practice of dentistry changed since the introduction of the Health Practitioners Competence Assurance Act (2003) (HPCAA)?

☐ Yes
☐ No

17. Are you familiar with the recertification requirements under the HPCAA?

☐ Yes
☐ No

18. Are you familiar with your professional obligations under the HPCAA?

☐ Yes
☐ No
19. Do you think the HPCAA will change the way dentistry is practised in New Zealand?

☐ Yes
☐ No
☐ Don’t know

20. Which one of the following organisations regulates dentistry in New Zealand?

☐ New Zealand Dental Association
☐ Dental Council of New Zealand

21. Do you think the HPCAA ensures public safety?

☐ Yes
☐ No
☐ Don’t know

Comment: __________________________

22. Do you think there has been enough information about the HPCAA disseminated to practising dentists?

☐ Yes
☐ No

The next few questions relate to the oral health of older people.

1. Have you had experience working as a dentist in a public hospital?

☐ Yes
☐ No

2. Do you believe that the prevalence of edentulism is:

☐ Constant
☐ Increasing
☐ Decreasing
3. Do you believe that older people's rate of caries attack over time is:
   □ Less than that of adolescents
   □ More than that of adolescents
   □ The same as adolescents

4. Do you believe that older people's coronal caries rate over time is:
   □ Greater than that of root surface caries
   □ Similar to that of root surface caries
   □ Less than that of root surface caries

5. Do you believe that periodontal disease is a significantly active disease among older people?
   □ Yes
   □ No
   □ Don't know

6. What do you think is the single most important factor influencing the oral health of older people?
   □ Age
   □ Functional Dependency
   □ Their attitudes toward oral health
   □ The cost of dental care

7. Do you believe that oral health care improves older people's quality of life?
   □ Yes
   □ Yes, but only in dentate patients
   □ Yes, but only in edentulous patients
   □ No. It only improves the quality of life in younger people
   □ No. Oral health care has little effect on anyone's quality of life.
8. Treating older people with complex medical conditions:
   □ Is the same as treating other patients
   □ Is within your current clinical scope of practice
   □ Requires a special CPD course
   □ Is a postgraduate specialty area

9. In the last 2 years, have you visited a rest home or hospital to treat older patients?
   □ No
   □ Occasionally (please specify ............... visits/year)
   □ Frequently (please specify ............... visits/year)

10. Would you like to be involved in treating dependent older people in rest-homes, homes or hospitals?
    □ Yes □ Not sure
    □ No

11. What do you believe to be the major factors that prevent the treatment of dependent older people in rest homes by general dentists? (please tick all which apply)
    □ The inconvenience of leaving surgery
    □ Poor patient attitudes
    □ Poor financial reward/incentive
    □ Complex medical conditions and medications
    □ Unique treatment needs
    □ Other ........................................................................................................

12. Which area of dentistry do you think would require the most attention and development if the oral health care of older people is to be improved?
    □ Undergraduate teaching of Gerodontology and treatment needs
    □ Oral health knowledge and attitudes of nursing staff
    □ Appropriate Government funding and policies
    □ The skills and knowledge of general dental practitioners
    □ Geriatric dental research
13. Older peoples' ability to maintain oral hygiene is:
   □ Poorer than middle-aged adults
   □ The same as middle-aged adults
   □ Better than middle-aged adults

The next series of questions are about how you manage patients with diabetes.

For your patients who have diabetes, to what extent is communication with the patient's medical practitioner (GP) part of your routine?

□ Never □ Seldom □ Sometimes □ Often

For your new diabetic patients, do you routinely ask the following questions?
(please circle the option which applies)

<table>
<thead>
<tr>
<th>Question</th>
<th>Never</th>
<th>Almost Never</th>
<th>Fairly Often</th>
<th>Often</th>
<th>Almost Always</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Type of diabetes?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>b. When first diagnosed?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>c. Any diabetic complications?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>d. Regimen used to control blood glucose?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

To what extent is each of the following a part of your evaluation/management of a diabetic patient?

<table>
<thead>
<tr>
<th>Question</th>
<th>Never</th>
<th>Seldom</th>
<th>Sometimes</th>
<th>Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Discuss oral implications of diabetes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>b. Discuss how periodontal therapy can affect diabetic control</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c. Refer for/monitor blood glucose levels</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>d. Discuss how well-controlled the patient is</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>e. Discuss postoperative meds/infection control</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>f. Adjust frequency of dental visits</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
To what extent are the following likely to hinder your taking a more active role in the evaluation/management of diabetic patients?

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Not at All Likely</th>
<th>Not Very Likely</th>
<th>Somewhat Likely</th>
<th>Very Likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Lack of patient education materials</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>b. Lack of continuing education opportunities</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c. You view more active management of diabetic patients as the responsibility of others</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

How strongly do you agree or disagree? I am willing to...

<table>
<thead>
<tr>
<th>Agreement</th>
<th>Agree Strongly</th>
<th>Agree Somewhat</th>
<th>Disagree Somewhat</th>
<th>Disagree Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Change/adjust the treatment plan, if patient is diabetic</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>b. Refer patient for evaluation of suspected diabetes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c. Screen for diabetes using a finger-stick test</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Overall, how would you rate your knowledge about....

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Limited</th>
<th>Moderate</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Managing patients with diabetes in your own surgery</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>b. Diabetes and its risk factors</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c. Preventing/dealing with in-office diabetic emergencies</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

How confident are you in your ability to.....

<table>
<thead>
<tr>
<th>Confidence</th>
<th>Not at All</th>
<th>Not Very</th>
<th>Somewhat</th>
<th>Very</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Manage a patient with diabetes in your surgery</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>b. Screen patients for diabetes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c. Prevent/deal with in-surgery diabetic emergencies</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
How strongly do you agree or disagree with these statements?

<table>
<thead>
<tr>
<th></th>
<th>Agree Strongly</th>
<th>Agree Somewhat</th>
<th>Disagree Somewhat</th>
<th>Disagree Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. My colleagues</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>expect me to take a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>more active role in</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>diabetes management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. My patients</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>expect me to take a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>more active role in</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>diabetes management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Approximately how many patients have you referred for evaluation of suspected diabetes in the past year? (Please fill in blank)

[Blank] patients

How many patients have you ever screened for diabetes using a finger-stick test? (Please fill in blank)

[Blank] patients

Taking a more active role in diabetes management is:
(Please circle one number in each line)

<table>
<thead>
<tr>
<th>Extremely</th>
<th>Neither</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Easy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b. Useful</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Un-useful</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
The final questions are about stress.

Please rate each of the following stressors (factors causing stress) associated with dentistry according to the frequency with which you usually experience them. Please circle one number for each stressor, according to the following descriptors:

0 = Never; 1 = Seldom; 2 = Sometimes; 3 = Often; 4 = Frequently; 5 = All the Time

<table>
<thead>
<tr>
<th>Time pressures</th>
<th>Never</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant time pressure</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Maintaining high levels of concentration</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Seeing more patients for income reasons</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Long working hours</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Finding time for family and friends</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Financial issues</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Conflict between profit needs and professional ethics</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Earning enough money to meet lifestyle needs</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Quoting fees/collecting payments</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Cancellations/no show</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Rising costs</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patients' unfavourable perceptions</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling underrated by patients</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Lack of patient appreciation</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Perceived problems with colleagues</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Problems dealing with patients</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Possibility of making mistakes</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Actually making mistakes</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Medical emergencies in surgery</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Treating extremely nervous patients</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Coping with difficult patients</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Working with children</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Treating difficult children</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Causing pain</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Staff and technical problems</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff-related problems (absenteeism, personal friction)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Unsatisfactory auxiliary help</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Equipment breakdown/defective materials</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Unsatisfactory laboratory service from technicians</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nature of work</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetitive nature of work</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Feeling isolated</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Inability to meet own expectations/standards</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Possible viral infection contraction</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Concerns about the future

- Decisions about future career directions/limited options
- Supply of dentists
- The new CPD requirements under the HPCA Act
- Ability to sell practice in future

Never | All the time
-----|------------------
0 | 1 2 3 4 5
0 | 1 2 3 4 5
0 | 1 2 3 4 5
0 | 1 2 3 4 5

Please rank the 5 most intense stressors in descending order of their intensity (irrespective of their frequency). e.g. 26, 33, 3, 17, 2 (26 being the most stressful)

COPING STRATEGIES

1. How do you manage your stress? Please tick all of the ones that apply to you.
   - Alcohol
   - Smoking
   - Recreational drugs
   - Prescribed drugs (e.g. Antidepressants)
   - Consultations
   - Change the work environment
   - Change the relationship with the patient/staff
   - Sports
   - Eating
   - Resting
   - Spending money
   - Hobby
   - Forgetting about work
   - Interactions with people (family/friends/coworkers)
   - Other, please specify: ____________________________

2. Do you think it would have helped you if there were lectures/a course on stress management when you were a dental student or a new graduate?

   □ Yes  □ No

Thank you for taking part in this study! Please place this questionnaire in the attached FREEPOST envelope (no stamp is necessary) and post it back to us as soon as possible so that you are entered into the prize draw.
Appendix 6: The Immigrant Dentist Study

A6.1 Immigrant dentists information sheet
A6.2 Immigrant dentists consent form
A6.3 Structured interview for immigrant dentists
A qualitative investigation of the difficulties experienced by immigrant dentists working in New Zealand

INFORMATION SHEET FOR PARTICIPANTS

Please read this information sheet carefully before deciding whether or not to participate in this project. If you decide to participate we will be very grateful. However, if you decide not to take part there will be no disadvantage to you of any kind and we thank you for considering our request.

What is the aim of the project?
This project is being undertaken as part of the requirements for the PhD in Dental Public Health and with the support of the New Zealand Dental Association.

The aim is to determine the difficulties experienced by overseas-trained dentists when working in New Zealand.

What type of participants are being sought?
We would like to interview a some overseas-qualified dentists who are working in general dental practice in New Zealand to identify the most commonly-experienced difficulties. We are particularly interested in your ideas about ways we can make it easier for immigrant dentists to settle into dental practice in New Zealand.

What will participants be asked to do?
Should you agree to take part in this project, you will be asked to meet with the principal investigator for an interview that is expected to last between 30 and 60 minutes. You will be asked a range of questions related to your experiences of dental practice in New Zealand.

You do not have to answer all the questions if you don't want to, and you may decide not to take part in the project without any disadvantage to yourself.

What data or information will be collected and what use will be made of it?
Each interview will be recorded on audiotape and transcribed. Analysis will involve reading through the transcripts several times and identifying patterns and themes expressed by the participants. The qualitative data obtained will be used to make recommendations about appropriate support systems for overseas-trained dentists, and to prepare a paper for publication in a peer-reviewed journal. You are most welcome to request a copy of the results of the project should you wish.
Every effort will be made to preserve your anonymity. The data collected will be securely stored in such a way that only the primary researchers will be able to gain access to it. At the end of the project any personal information will be destroyed immediately except that, as required by the University's research policy, any raw data on which the results of the project depend will be retained in secure storage for five years, after which it will be destroyed.

This project involves an open-questioning technique where the precise nature of the questions which will be asked have not been determined in advance, but will depend on the way in which the interview develops. Consequently, although the University of Otago Human Ethics Committee is aware of the general areas to be explored in the interview, the Committee has not been able to review the precise questions to be used.

In the event that the line of questioning does develop in such a way that you feel hesitant or uncomfortable you are reminded of your right to decline to answer any particular question(s) and also that you may withdraw from the project at any stage without any disadvantage to yourself of any kind.

What if participants have any questions?
If you have any questions about our project, either now or in the future, please feel free to contact either:-

Katie Ayers
PO Box 840
Hamilton
(07) 957 4934

Prof Murray Thomson,
Department of Oral Sciences
University of Otago.
(07) 479 7116

This project has been reviewed and approved by the Department of Oral Sciences, University of Otago.
A qualitative investigation of the difficulties experienced by immigrant dentists working in New Zealand

CONSENT FORM FOR PARTICIPANTS

I have read the Information Sheet concerning this project and understand what it is about.

All my questions have been answered to my satisfaction and I am free to request further information at any stage.

I know that:-

• my participation in the project is entirely voluntary;

• I am free to withdraw from the project at any time without any disadvantage

• the data (audio-tapes) will be destroyed at the conclusion of the project but any raw data on which the results of the project depend will be retained in secure storage for five years, after which it will be destroyed

• this project involves an open-questioning technique where the precise nature of the questions which will be asked have not been determined in advance, but will depend on the way in which the interview develops and that in the event that the line of questioning develops in such a way that I feel hesitant or uncomfortable I may decline to answer any particular question(s) and/or may withdraw from the project without any disadvantage of any kind

• the results of the project may be published but every attempt will be made to preserve my anonymity

I agree to take part in this project.

(Signature of participant)                             (Date)

This project has been reviewed and approved by the Department of Oral Sciences, University of Otago
STRUCTURED INTERVIEW FOR OVERSEAS DENTISTS

A. DEMOGRAPHIC INFORMATION

<table>
<thead>
<tr>
<th>Gender</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region</td>
<td>Auckland</td>
<td>Waikato</td>
</tr>
<tr>
<td>Age range</td>
<td>&lt;35</td>
<td>35 &lt; 50</td>
</tr>
<tr>
<td>Number of sessions worked per week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DNZREX?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Length of time living in NZ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of time working in NZ</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. STRUCTURED INTERVIEW

1. Coming to NZ
   - When did you come to New Zealand?
   - What country did you come from?
   - Is that where you did your dentistry training?
   - Have you worked in any other countries?
   - Why did you decide to come to New Zealand?

2. Gaining registration
   - Did you have to sit the NZDREX exam?
   - How did you find it?
   - Did you have any contact with NZ dentists during that time?
   - Was that helpful?
   - Did you have any other support?
   - Did it cost a lot of money?

3. Experiences of working in NZ
   - How did you get your first job as a dentist in NZ?
   - Did you apply for any hospital/University jobs?
   - What is your current job like? – type of practice, wages/commission
   - Is there anything you would like to change about your job?
   - Do you think it is difficult working as an immigrant dentist in NZ?
   - What are the most stressful things about being a dentist in NZ?
   - Are the methods of dentistry here different to where you trained (eg equipment/materials)?
4. **NZDA/ other support**
   - Do you belong to the NZDA? Why did you join? Is it useful?
   - Have you been to any NZDA branch meetings? Why not/Are they useful?
   - What other types of support have been useful for you?

6. **Life in NZ**
   - Do you feel that NZ is home now?
   - Have you had any problems settling in NZ?
   - Is your family happy here?

7. **Advice for new dentists.**
   - What advice do you have for other dentists moving to New Zealand?
   - Do you think that there is a need for additional support for overseas-trained dentists in NZ? What would be helpful?
Appendix 7: The Occupational Health Study

A7.1 Occupational Health survey form
A7.2 Occupational Health reminder letter
Occupational Health Survey

(Researchers: Katie Ayers, Murray Thomson, Alison Rich, Kate Morgaine, Tim Newton)

We are undertaking a survey of the Occupational Health of Dentists in New Zealand and would be very pleased if you would take part. Please take the time to fill in this questionnaire and return it in the attached FREEPOST envelope (no stamp is necessary) as soon as possible. Most questions in this survey simply require you to tick the box which applies to you. Our pre-testing has shown that this survey is simple and quick to complete.

Remember – all responses are confidential. Data entry and analysis will be done using anonymised data. The University of Otago Human Ethics Committee has reviewed and approved this project.

The number at the bottom right of this sheet is to enable us to identify the winners in the prize draw. Responses received by 15 February will be entered into a draw to win $500 (sponsored by the Medical Assurance Society).

Once the closing date has been passed, the numbers drawn will be matched with the master list by an individual who does not have access to your responses. The winner will be notified by mail. The front sheet with the ID number will be separated from the responses and only used to enable a prize draw to be completed, and to undertake a follow-up of people who don’t reply (if needed).

Please return your questionnaire by 15 February.

We sincerely appreciate your support.

Kind regards

Katie Ayers
Dear colleague

I am writing to remind you of the letter I sent inviting you to participate in a study of occupational health among New Zealand dentists. I am pleased to report that over sixty percent of the questionnaires have been returned. However, we would like to have even more responses to improve the quality of the study.

If you have completed and returned the questionnaire, thank you very much. I appreciate that some respondents chose to return the questionnaire without the identification number so I apologize for sending you a reminder letter. However, if you have forgotten to return your questionnaire, I would be very grateful if you would take a few minutes to complete the duplicate form enclosed and return it in the pre-paid envelope provided.

I appreciate that some questions are of a personal nature, and assure you that all responses will remain anonymous. The cover sheet with identification number will only be used for the purposes of the prize draw.

To thank you for your participation, if you reply by 10 March you will be entered in a prize draw for $200. You will have at least a 1:200 chance of winning!

If you have any questions regarding the study, please do not hesitate to contact me (katie.ayers@mac.com).

Thank you very much. Your support is greatly appreciated.

Yours sincerely,

Katie Ayers
Questionnaire

First, we need to ask some general questions about you. Please remember that your responses are confidential.

1. What is your gender?
   □ Female
   □ Male

2. How old are you?
   .................. years

3. How many years have you been working as a dentist?
   .................. years

4. Where did you train to be a dentist?
   □ New Zealand
   □ Overseas

5. What type of practice do you work in?
   □ Solo
   □ Group

6. What type of remuneration do you receive?
   □ Employee salary
   □ Employee commission
   □ Self-employed income

7. On average, how many hours a week do you treat patients?
   .................. hours

8. On average, how many hours do you spend on administrative tasks per week (e.g. paperwork, practice management etc)?
   .................. hours

9. On average, how many patients do you treat per day?
   .................. patients

10. How much do you weigh?
    .................. kg

11. How tall are you?
    .................. cm

12. Which hand do you use to operate the dental drill?
    □ Left
    □ Right
13. Do you practise four-handed dentistry?
   □ Yes
   □ No
   □ Sometimes

14. Do you offer dental treatment under sedation (including nitrous oxide) or GA for your patients?
   □ Yes
   □ No

15. Do you use amalgam in your practice?
   □ Never
   □ Sometimes
   □ Regularly

16. Do you use magnification (eg loupes) in your practice?
   □ Never
   □ Sometimes
   □ Regularly

17. Do you wear prescription glasses or contact lenses?
   □ Yes
   □ No
   □ Sometimes

18. Excluding prescription glasses, do you wear eye protection at work?
   □ Never
   □ Sometimes
   □ Regularly

19. Have you undergone an eye examination in the last 2 years?
   □ Yes
   □ No

20. Do you have an Oral Health Services Agreement?
   □ Yes
   □ No

21. Do you treat preschool children?
   □ Never
   □ Sometimes
   □ Regularly

GENERAL HEALTH

22. Do you smoke?
   □ Yes
   □ No
   □ Occasionally

23. Do you consume alcohol?
   □ Yes
   □ No
24. If yes, how many units (on average) do you consume per week? (1 unit = 1 small glass wine, ½ pint beer or 1 nip of spirits)

............... units

25. How many cups of coffee do you drink per day (on average)?

............... cups

26. Do you eat breakfast before starting work?

☐ Never
☐ Rarely
☐ Sometimes
☐ Usually
☐ Always

27. Do you stop to eat lunch at work?

☐ Never
☐ Rarely
☐ Sometimes
☐ Usually
☐ Always

28. Do you allow space in your day to accommodate emergency patients?

☐ Never
☐ Rarely
☐ Sometimes
☐ Usually
☐ Always

29. In the last year, how many days have you taken off work due to illness?

............... days

30. In the last year, how many days have you attended work when you have not felt physically well?

............... days

31. How do you rate your general health?

☐ Excellent
☐ Very good
☐ Good
☐ Fair
☐ Poor

32. How do you rate your physical fitness?

☐ Excellent
☐ Very good
☐ Good
☐ Fair
☐ Poor
33. What is your usual feeling?
   □ Happy and interested in life
   □ Somewhat happy
   □ Somewhat unhappy
   □ Unhappy with little interest in life
   □ So unhappy that life is not worthwhile

34. How would you describe your life?
   □ Very stressful
   □ Fairly stressful
   □ Not very stressful
   □ Not at all stressful

35. To what degree do you experience pain and discomfort?
   □ Free from pain and discomfort
   □ Pain not preventing any activity
   □ Pain preventing a few activities
   □ Pain preventing some activities
   □ Pain preventing most activities

36. What drugs/medications have you taken in the previous 4 weeks?
   □ Pain relievers
   □ Medicine for heart or blood pressure
   □ Stomach remedies or laxatives
   □ Tranquillisers or sleeping pills
   □ Penicillin or other antibiotics
   □ Cough/cold remedies
   □ Allergy remedies/antihistamines
   □ Codeine
   □ Antidepressants
   □ Diet pills or stimulants
   □ Vitamins
   □ Homeopathic medicines
   □ Recreational drugs
   □ Other (Please state)

37. Overall, how satisfied are you with your health?
   □ Very satisfied
   □ Somewhat satisfied
   □ Not too satisfied
   □ Not at all satisfied

KEEP GOING, YOU'RE HALFWAY THERE!
38. What actions do you have planned for personal health improvement in next 12 months? (tick any that apply)
   □ Increase exercise
   □ Lose weight
   □ Gain weight
   □ Improve eating habits
   □ Quit/reduce smoking
   □ Reduce drug/medication use
   □ Drink less alcohol
   □ Have blood pressure checked
   □ Deal with stress better
   □ Receive medical treatment
   □ Change jobs
   □ Something else (please specify)

   □ No actions

39. Have you experienced a needlestick injury in the last year?
   □ Yes
   □ No
   If yes, please describe: ..............................................................................................................

40. Have you ever had an eye injury at work?
   □ Yes
   □ No
   If yes, please describe: ..............................................................................................................

41. Have you ever suffered any other injuries at work? If yes, please describe:
   □ Yes
   □ No

42. Have you ever experienced any violent or abusive incidents in your workplace?
   □ Yes
   □ No

43. Have you ever experienced workplace bullying?
   □ Yes
   □ No
44. Have you experienced any of the following symptoms:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>During the previous 12 mths</th>
<th>During your practising life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red swollen hands</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Red hands or fingers</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Dry cracked hands</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Vesicles on hands or fingers</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Scaling hands or fingers</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Itching hands or fingers</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Irritation of eyes, airways or nose</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

45. Have you experienced headaches in the last 12 months?

- [ ] No
- [ ] Yes

If yes, what is the total length of time that you have experienced headaches during the last 12 months?

- [ ] 0 days
- [ ] 1-7 days
- [ ] 8-30 days
- [ ] More than 30 days but not every day
- [ ] Every day

46. Have you experienced any temporomandibular joint pain in the last 12 months?

- [ ] No
- [ ] Yes

If yes, what is the total length of time that you have experienced TMJ pain during the last 12 months?

- [ ] 0 days
- [ ] 1-7 days
- [ ] 8-30 days
- [ ] More than 30 days but not every day
- [ ] Every day

MUSCULOSKELETAL HEALTH

Anatomical Guide for the questions which follow

In this picture, you can see the approximate position of the parts of the body referred to in the questionnaire. Limits are not sharply defined, and certain parts overlap. You should decide for yourself in which part (if any) you have had your symptoms.
47. Please answer by putting a tick in the appropriate box.

Note: If you have answered 'Yes' to any question in the first column, please answer the questions immediately to the right.

<table>
<thead>
<tr>
<th>Have you at any time during the last 12 months had symptoms (e.g. aches, pain, discomfort) in your:</th>
<th>Have you at any time during the last 12 months been prevented from doing your normal tasks (at home or work) because of those symptoms?</th>
<th>Have you had symptoms at any time during the last 7 days?</th>
<th>How many days have you had off work due to these symptoms in the last year?</th>
<th>Have you seen a doctor, physiotherapist, chiropractor or other such person because of these symptoms during the last 12 months?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neck&lt;br&gt; □ No&lt;br&gt; □ Yes&lt;br&gt; If yes: □ No&lt;br&gt; □ Yes</td>
<td>□ No&lt;br&gt; □ Yes</td>
<td>□ No&lt;br&gt; □ Yes</td>
<td>□ No&lt;br&gt; □ Yes</td>
<td>□ No&lt;br&gt; □ Yes</td>
</tr>
<tr>
<td>Shoulders&lt;br&gt; □ No&lt;br&gt; □ Yes - in the right R shoulder&lt;br&gt; □ Yes - in the L one&lt;br&gt; □ Yes - in both</td>
<td>□ No&lt;br&gt; □ Yes</td>
<td>□ No&lt;br&gt; □ Yes</td>
<td>□ No&lt;br&gt; □ Yes</td>
<td>□ No&lt;br&gt; □ Yes</td>
</tr>
<tr>
<td>Elbows&lt;br&gt; □ No&lt;br&gt; □ Yes - in the right R elbow&lt;br&gt; □ Yes - in the L one&lt;br&gt; □ Yes - in both</td>
<td>□ No&lt;br&gt; □ Yes</td>
<td>□ No&lt;br&gt; □ Yes</td>
<td>□ No&lt;br&gt; □ Yes</td>
<td>□ No&lt;br&gt; □ Yes</td>
</tr>
<tr>
<td>Wrists/hands&lt;br&gt; □ No&lt;br&gt; □ Yes - in the right R wrist/hand&lt;br&gt; □ Yes - in the L one&lt;br&gt; □ Yes - in both</td>
<td>□ No&lt;br&gt; □ Yes</td>
<td>□ No&lt;br&gt; □ Yes</td>
<td>□ No&lt;br&gt; □ Yes</td>
<td>□ No&lt;br&gt; □ Yes</td>
</tr>
<tr>
<td>Upper back&lt;br&gt; □ No&lt;br&gt; □ Yes</td>
<td>□ No&lt;br&gt; □ Yes</td>
<td>□ No&lt;br&gt; □ Yes</td>
<td>□ No&lt;br&gt; □ Yes</td>
<td>□ No&lt;br&gt; □ Yes</td>
</tr>
</tbody>
</table>
Have you at any time during the last 12 months had symptoms (e.g. aches, pain, discomfort) in your:

<table>
<thead>
<tr>
<th></th>
<th>Have you at any time during the last 12 months been prevented from doing your normal tasks (at home or work) because of those symptoms?</th>
<th>Have you had symptoms at any time during the last 7 days?</th>
<th>How many days have you had off work due to these symptoms in the last year?</th>
<th>Have you seen a doctor, physiotherapist, chiropractor or other such person because of these symptoms during the last 12 months?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower back (small of the back)</td>
<td>□ No □ Yes If yes: □ No □ Yes</td>
<td>□ No □ Yes</td>
<td>□ No □ Yes</td>
<td>□ No □ Yes</td>
</tr>
<tr>
<td>One or both hips/thighs</td>
<td>□ No □ Yes If yes: □ No □ Yes</td>
<td>□ No □ Yes</td>
<td>□ No □ Yes</td>
<td>□ No □ Yes</td>
</tr>
<tr>
<td>One or both knees</td>
<td>□ No □ Yes If yes: □ No □ Yes</td>
<td>□ No □ Yes</td>
<td>□ No □ Yes</td>
<td>□ No □ Yes</td>
</tr>
<tr>
<td>One or both ankles/feet</td>
<td>□ No □ Yes If yes: □ No □ Yes</td>
<td>□ No □ Yes</td>
<td>□ No □ Yes</td>
<td>□ No □ Yes</td>
</tr>
</tbody>
</table>

Thank you very much for your time. We are very grateful for your support of this research. Please return this questionnaire in the reply-paid envelope provided. Good luck for the draw!