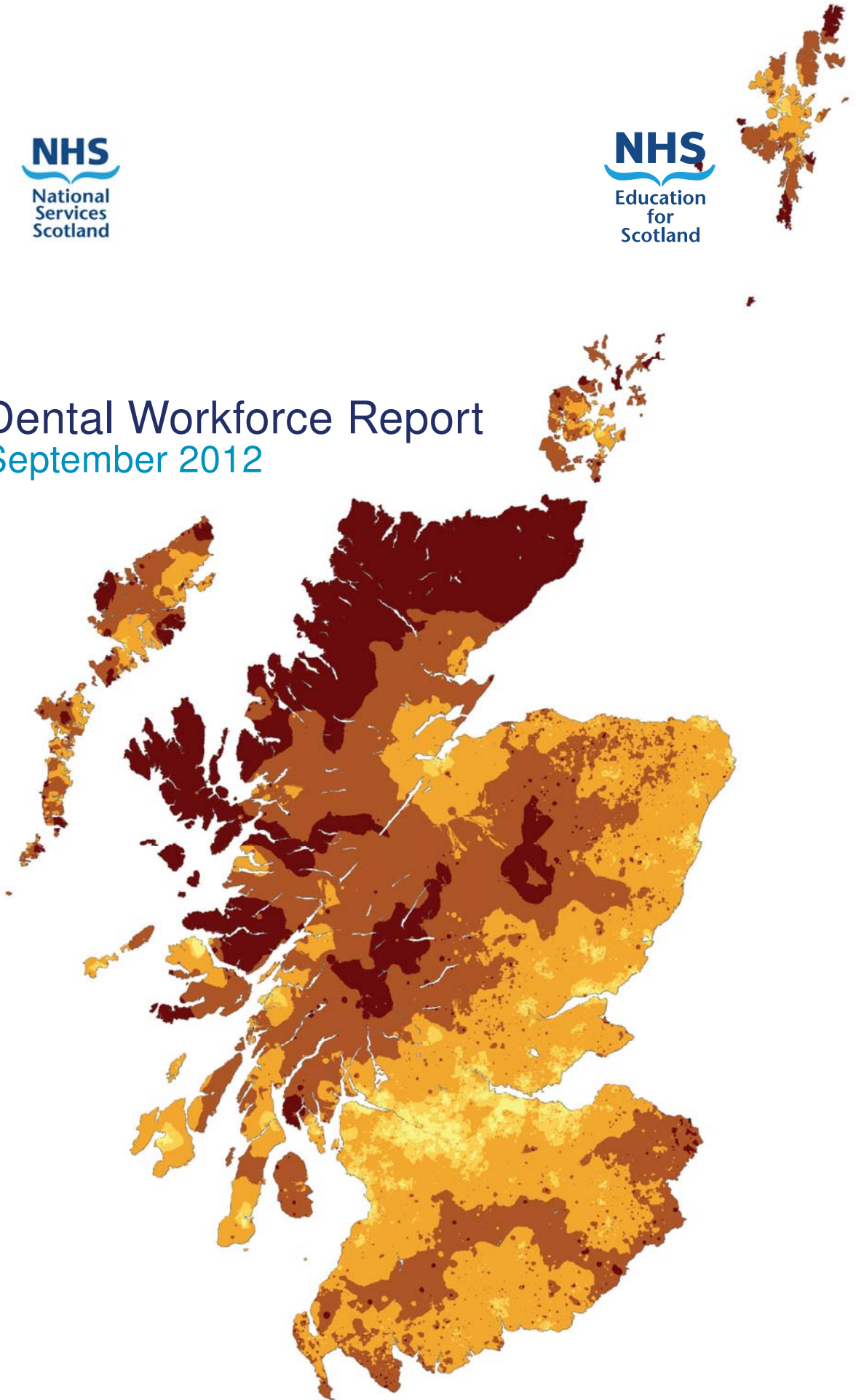




Dental Workforce Report

September 2012



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Foreword

We are delighted to see the publication of the 2012 report on the analysis of the dental workforce in Scotland. This represents the culmination of two years collaboration between NHS Education for Scotland (NES) and NHS National Services Scotland (NSS). Over the years since our joint project began in 2001 this work stream has progressed the quality and range of data collected and the outcomes are based on increasingly accurate data sets.

The project team continues to work closely with colleagues at the National Workforce Planning Unit and we are grateful for the considerable support and encouragement provided.

The report is intended to provide data and trend analyses to support workforce planning for NHS dental services in Scotland and uses the best available data from several sources to examine trends in oral health, the supply of dental services and the utilisation of dental services. The report demonstrates that there has been a significant increase in the number of NHS dentists in general and NHS general dental practitioners in particular since the publication of the Dental Action Plan in 2005. In addition there is an increase in the number of dental care professionals available to provide oral health care to the population of Scotland.

This report builds on previous dental workforce analysis undertaken jointly by NES and NSS and provides an increasingly robust evidence base for future strategic planning. We commend the work of the project team.



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Executive summary

Oral health

- The oral health of children and adults in Scotland provides a measure of the demand for dental services in Scotland.
- Data from the National Dental Inspection Programme (NDIP) showed that:
 - between 2008 and 2010 the oral health of Primary 1 (P1) children improved in each Scottish Index of Multiple Deprivation (SIMD) decile;
 - P1 children from more deprived SIMD deciles had worse oral health than children from less deprived SIMD deciles; and
 - the oral health of P1 children in the most deprived SIMD decile in 2010 was about the same as the oral health of the average P1 child in 2003.
- Data from the Scottish Health Survey (SHeS) showed that:
 - between 2008 and 2010 the oral health of adults, as measured by the proportion of adults with no natural teeth, improved in almost all age groups and should continue to improve; and
 - in 2010 adults in the most deprived areas had worse oral health than adults in the least deprived areas.
- The incidence of oral cancer in Scotland increased in all age groups, among men and women, and more rapidly among those from the most deprived communities.

The supply of dentists

- The capacity to deliver dental services is a function of the number of dentists.

- The number of NHS dentists in general and NHS General Dental Practitioners (GDPs) in particular increased significantly between the publication of the Dental Action Plan in March 2005 and September 30th 2011.
- Between September 30th 1995 and September 30th 2011 the average age of NHS GDPs decreased, the percentage of female NHS GDPs increased and the percentage of NHS GDPs who qualified outside Scotland increased.
- Data from the University and College Admission Service (UCAS) showed that:
 - the ratio of applications to accepted places for Bachelor of Dental Surgery (BDS) courses increased between 2008 and 2011.
- Data from the Higher Education Statistics Agency (HESA) showed that:
 - the output from Scottish dental schools increased between academic years 2006-07 and 2010-11;
 - over half of BDS students were female, and a large majority were domiciled in the UK; and
 - in common with Scottish domiciled medical students, a relatively small percentage of BDS students were from the most deprived SIMD quintiles.
- The latest intake targets for academic year 2012-13 mean that the output from Scottish dental schools is fixed until 2017, when the output is expected to be 165.
- The Dental Undergraduate Bursary Scheme (DUBS) provides bursaries to undergraduate dental students in return for a commitment to work in NHSScotland after graduation:
 - between academic years 2006-07 and 2011-12 3,283 bursaries were granted to 1,307 students at a total cost of £13.132m yielding an implied commitment of 4,590 dentist years;
 - the mean four-year retention rate of DUBS recipients who entered NHSScotland between 2007 and 2010 was 0.75 and the mean four-year retention rate of non-DUBS recipients who entered NHSScotland between 1996 and 2006 was 0.71.
- On September 30th 2011, there were 200 Vocational Dental Practitioners (VDPs), which was more than ever before.
- Data from NES showed that:

- there were 261 Vocational Training (VT) numbers issued in VT year 2010-11, which was more than ever before; and
- the retention rate of dentists who completed Dental Vocational Training (DVT) in the UK was much higher than the retention rate of European Economic Area (EEA) dentists.

The supply of Dental Care Professionals

- Dental Care Professionals (DCPs) are a group of healthcare professionals who work with dentists to deliver dental services.
- DCPs continue to play an important role in the provision of oral health care in Scotland, including the delivery of Childsmile services, which target inequalities in the oral health of children.
- Data from the General Dental Council (GDC) register showed that:
 - the number of registered DCPs in Scotland increased overall between 2008 and 2011, which consisted of a 22% increase in the number of registered dental nurses and a nine percent decrease in the number of registered dental technicians; and
 - the number of individuals registered in more than one profession has increased, which indicates that the DCP workforce is increasingly able to respond to changes in the demand for dental services.
- Data from UCAS showed that:
 - between 2005 and 2011 the ratio of applications to accepted places for Oral Health Science (OHS) training was relatively high, indicating significant demand to train as a dental therapist.
- Data from the Scottish Qualifications Authority (SQA) showed that:
 - Between 2008 and 2011 the number of certified dental technicians increased by 181.
- Data from HESA showed that:
 - the number of students graduating from OHS courses in Scotland and therefore able to register as a dental therapist is likely to increase during the next few years.
- Data from NOMIS and the Annual Survey of Hours and Earnings (ASHE) provided evidence of a deterioration in the labour market outcomes for dental nurses:

- the number of dental nurses claiming Jobseeker's Allowance (JA) increased relative to the number of dental nurse vacancies since 2009; and
- the average hourly pay of dental nurses decreased between 2009 and 2011.
- The number of DCPs employed by NHSScotland increased by over 80% between 2007 and 2011.
- The proposed removal of restrictions on direct access to DCPs is likely to have a significant impact upon the market for dental services.
- Very little is known about the number or activity of the majority of DCPs who work in the General Dental Service (GDS).

The utilisation of dental services

- The utilisation of dental services is a function of the supply of dental services and the demand for dental services.
- Data on GDS registration rates showed that:
 - the registration rates of both children and adults continued to increase during the past two years with more than 87% of children and 75% of adults registered at the end of March 2012.
- Data on GDS treatments between financial years 1999-2000 and 2011-12 showed that:
 - the total cost of treatment increased;
 - the total number of courses of treatment increased; and
 - there was very little variation in the composition of the cost of treatment between financial years 2005-06 and 2011-12.
- An analysis of the proximity of GDS dentists and their registered patients found that:
 - patients who lived in the most deprived areas were closer to their practice than patients in the least deprived areas;
 - patients who lived in remote areas were further away from their practice than patients who lived in urban or accessible areas; and
 - patients who lived in relatively rural or Island NHS Boards were further away from their practice than patients who lived in relatively urban NHS Boards.

- Data from the 2009 SHeS showed that:
 - during the previous 12 months, 51% of people aged 16 and over received NHS dental treatment, 17% received private dental treatment and 31% received no dental treatment; and
 - less than one percent of people aged 16 and over had never been to a dentist.
- Data from Denplan showed that:
 - Between April 2008 and April 2012 the number of patients registered with Denplan decreased by 15%.

Forecasting the dental workforce

- If recent trends continue, there is forecast to be a relatively large increase in the supply of NHS GDPs during the next 10 years.
- The projected changes in the size and composition of the population are forecast to increase the demand for NHS GDPs during the next 10 years.
- Compared to most demand forecasts, there is forecast to be an excess supply of NHS GDPs, which increases during the forecast period.
- The forecast excess supply of NHS GDPs is likely to be an underestimate because the forecast demand for NHS GDPs does not account for the potential contribution of dental therapists with or without the removal of restrictions on direct access.

Chapter 1

Introduction

The Dental Workforce Project is a collaboration between NES and the Information Services Division (ISD) of NSS, which aims to inform workforce planning in dentistry by using robust data to analyse trends in oral health, the supply of dentists, the supply of DCPs, the utilisation of dental services and by forecasting the demand for and supply of dentists.

This report extends the previous reports [1–5] by examining additional data sets that help develop a clearer picture of the market for dental services in Scotland.

The oral health of children and adults provides a measure of the demand for dental services and indicates the extent to which dental services may be contributing towards improvements in oral health. Chapter 2 reports the latest trends the oral health of children and adults in Scotland.

The total number of dentists in Scotland provides one measure of the capacity to deliver dental services. Chapter 3 begins by reporting trends in the number of dentists and their characteristics. The chapter then examines several determinants of the future supply of dentists by reporting trends in the number of dentists in training at several points along the training pathway: the ratio of applications to accepted places at Scottish dental schools; the number of students in training and the number of students expected to graduate from Scottish dental schools; and the number of VDPs in DVT. Chapter 3 ends by examining trends in the number of VT numbers issued in Scotland, which is a lead indicator of the number of NHS GPs in Scotland.

DCPs are a group of healthcare professionals who work with dentists to deliver dental services. Therefore the capacity to deliver dental services is also a function of the number of DCPs. Chapter 4 examines trends in the number of registered DCPs and the training and labour markets for DCPs.

The utilisation of dental services is a function of the supply of dental services and the demand for dental services. Chapter 5 examines several measures of the utilisation of public and private sector dental services in Scotland including GDS registration rates, the distance between patients and the prac-

tices they were registered with and the utilisation of public and private dental services.

Chapter 6 uses the information in Chapter 5 together with population projections to forecast the demand for NHS GDPs. These demand forecasts are compared with forecasts of the supply of NHS GDPs that are informed by chapter 3.

Chapter 7 sets out some avenues for future work.

Chapter 2

Oral health

2.1 Introduction

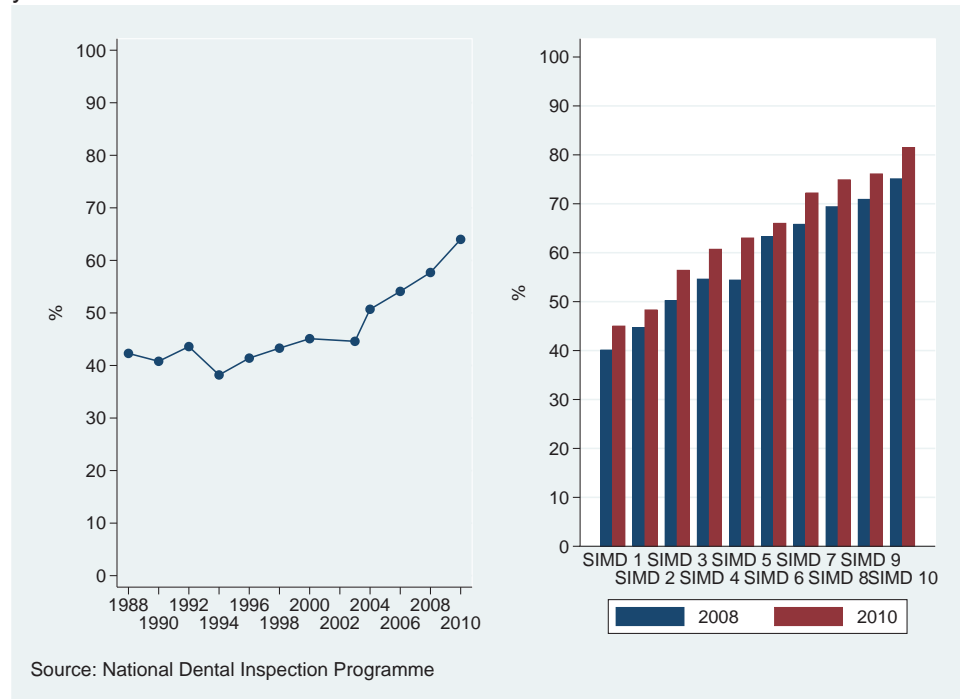
The oral health of children and adults provides a measure of the demand for dental services and indicates the extent to which dental services may be contributing towards improvements in oral health. This chapter reports the latest trends in the oral health of children and adults in Scotland.

2.2 Children's oral health

Surveys of P1 children (five-year-olds) provide the most sensitive barometer of change in the oral health of the population as they include information about decay in the primary dentition only. Figure 2.1 shows the percentage of P1 children in Scotland with no obvious decay using data from the Scottish Health Boards Dental Epidemiological Programme (SHBDEP) and the NDIP by year and SIMD decile. The latest data on P1 children from NDIP [6] show a continuation of the marked improvement in oral health. The percentage with no obvious decay experience increased from 44.6% in 2003 to 64.0% in 2010, which was greater than the national outcome indicator that 60% of school children in P1 would have no sign of dental disease by 2010. The right hand panel of figure 2.1 shows that while the oral health of P1 children in the most deprived SIMD decile, SIMD 1, had worse oral health than children in the least deprived SIMD decile, SIMD 10, oral health improved within every SIMD decile between 2008 and 2010. However, the right and left hand panels of figure 2.1 show that the oral health of P1 children in SIMD 1 in 2010 was about the same as the average P1 child in 2003.

Figure 2.2 uses information from the latest NDIP report on Primary 7 (P7) children (11-year-olds) [7]. The left hand panel shows that the oral health of P7 children improved between 2009 and 2011. The right hand panel of figure 2.2 shows that while children in SIMD 1 had worse oral health than children in SIMD 10, oral health improved within every SIMD decile between 2009 and

Figure 2.1: Percentage of P1 children with no obvious decay experience by year and SIMD decile



2011. However, the right and left hand panels of figure 2.2 shows that the oral health of P7 children in SIMD 1 in 2011 was about the same as the average P7 child in 2005.

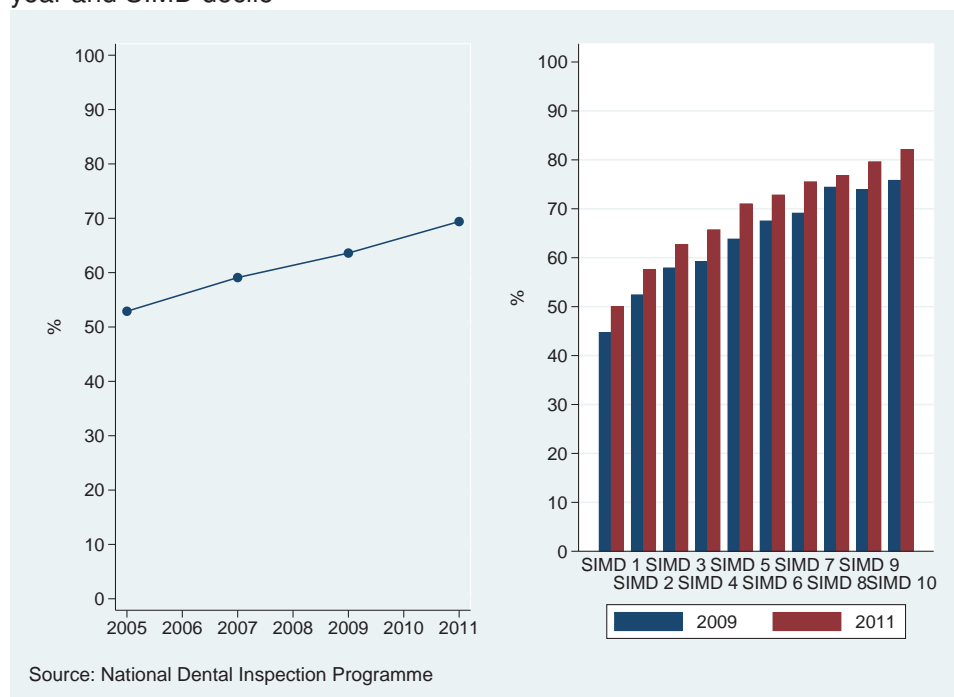
2.3 Adults' oral health

2.3.1 Tooth loss

Total tooth loss is a good indicator of oral health in adults [8]. Figure 2.3 shows the proportion of adults with all false teeth or no natural teeth in each of the SHeSs by age group. While in 2009 the oral health of adults in Scotland was worse than in the rest of the UK [9], figure 2.3 shows that as recently as 2010, only four percent of 45- to 54-year-olds had no natural teeth. Figure 2.3 also shows strong cohort effects: in 1998 15% of 45- to 54-year-olds had no natural teeth and 10 years later, 15% of 54- to 65-year-olds had no natural teeth. This suggests that the improvements in oral health made during recent years should continue into the future.

Figure 2.4 shows that adults in the most deprived SIMD quintile, SIMD 1, were much more likely to have no natural teeth than adults in the least deprived SIMD quintile, SIMD 5.

Figure 2.2: Percentage of P7 children with no obvious decay experience by year and SIMD decile



2.3.2 Oral cancer

Figure 2.5 shows that the incidence of oral cancer in Scotland continues to rise in all age groups, among men and women, and more rapidly among those from the most deprived communities [10–12]. Oropharyngeal cancer is the fastest increasing cancer in Scotland, especially in men. This disfiguring disease incurs major multidisciplinary planning and care across NHS health care services and dentists have several roles to play along the care pathway.

2.4 Summary

- The oral health of children and adults in Scotland provides a measure of the demand for dental services in Scotland.
- Data from NDIP showed that:
 - between 2008 and 2010 the oral health of P1 children improved in each SIMD decile;
 - P1 children from more deprived SIMD deciles had worse oral health than children from less deprived SIMD deciles; and

Figure 2.3: Proportion of adults with all false teeth (1995-2003) or no natural teeth (2008-2010)

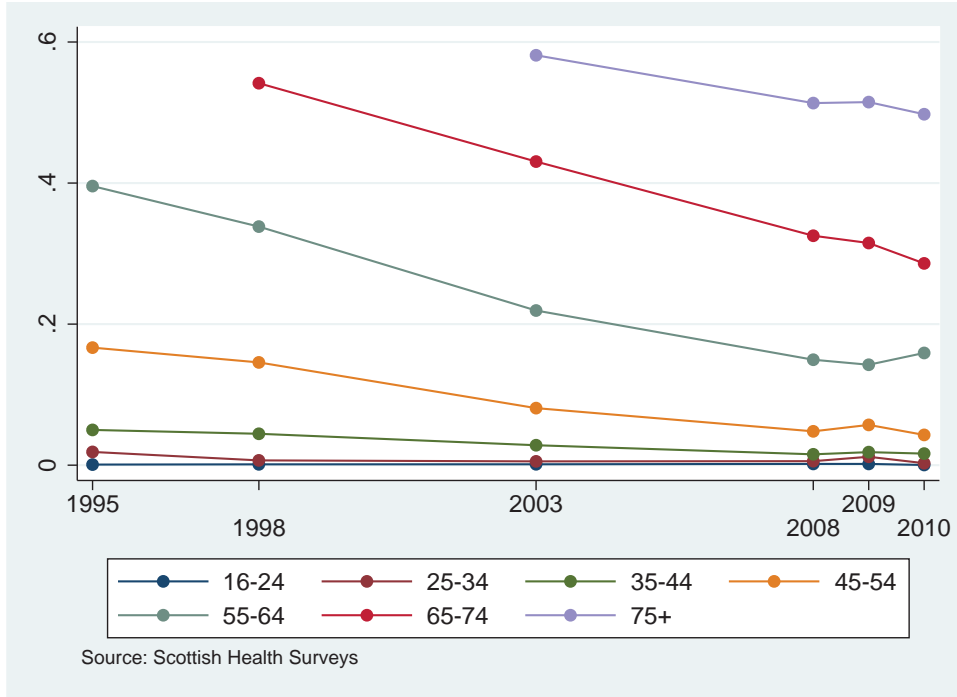


Figure 2.4: Proportion of adults with no natural teeth by SIMD quintile in 2010

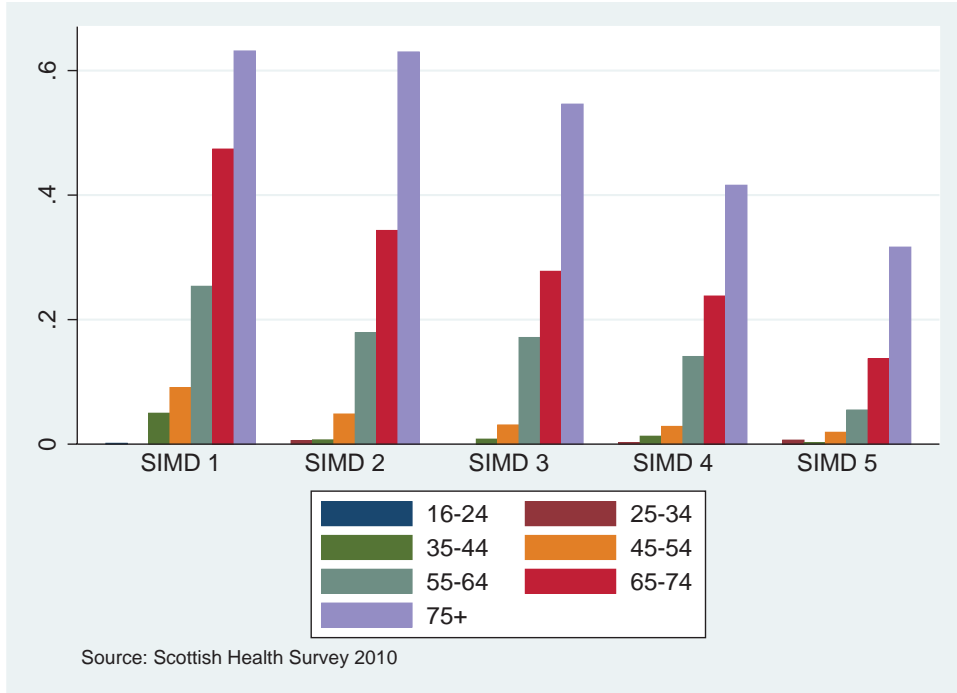
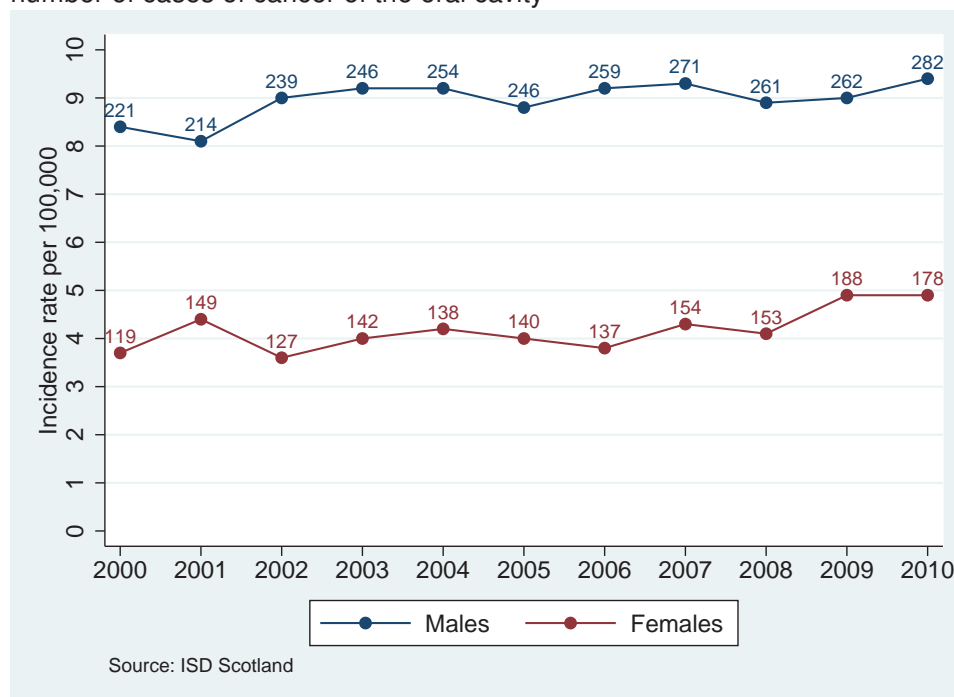


Figure 2.5: European age-standardised incidence rates per 100,000 and the number of cases of cancer of the oral cavity



- the oral health of P1 children in the most deprived SIMD decile in 2010 was about the same as the oral health of the average P1 child in 2003.
- Data from SHeS showed that:
 - between 2008 and 2010 the oral health of adults, as measured by the proportion of adults with no natural teeth, improved in almost all age groups and should continue to improve; and
 - in 2010 adults in the most deprived areas had worse oral health than adults in the least deprived areas.
- The incidence of oral cancer in Scotland increased in all age groups, among men and women, and more rapidly among those from the most deprived communities.

Chapter 3

The supply of dentists

3.1 Introduction

The total number of dentists in Scotland provides one measure of the capacity to deliver dental services. This chapter reports trends in the number of dentists and their characteristics during the recent past. The chapter then reports several determinants of the future supply of dentists by examining trends in the number of dentists in training at several points along the training pathway: the ratio of applications to accepted places at Scottish dental schools; the number of students in training and the number of students expected to graduate from Scottish dental schools; and the number of VDPs in DVT. The chapter ends by examining trends in the number of VT numbers issued in Scotland, which is a lead indicator of the number of NHS GDPs in Scotland.

3.2 The stock and flow of dentists in NHSScotland

The total number, or stock, of dentists in Scotland provides a measure of the capacity to deliver dental services at a particular point in time. The number of dentists in the future is determined by the current stock of dentists and the number of dentists who leave, outflows, and join, inflows.

Table 3.1 reports the stock and flow of dentists in NHSScotland between 1995 and 2011. The number of dentists reported in table 3.1 differs slightly from the National Statistics reported by ISD. This difference reflects additional quality assurance work since the publication of these data, which is described in appendix A.¹ Table 3.1 shows that between the publication of the Dental Action

¹In response to the recommendations made by the Scottish Government (SG) [5], ISD has established a Workforce Data Implementation group. Among other things, this group will recommend clear responsibility, accountability and timescales for the collection, quality assurance and analysis of dental workforce and activity data and consider the resource implications of implementing its recommendations.

Plan [13] in March 2005, and September 30th 2011 the number of dentists in NHSScotland increased by almost 30%.

Table 3.1: NHS workforce trends as at September 30th

	Stock	Outflow	Inflow	
			Returners	Other Joiners
1995	2307	159		
1996	2323	158		175
1997	2358	157	26	167
1998	2411	153	38	172
1999	2462	194	44	160
2000	2465	193	35	162
2001	2488	163	52	164
2002	2550	192	62	163
2003	2583	206	57	168
2004	2617	203	57	183
2005	2669	218	62	193
2006	2841	257	79	311
2007	2914	303	76	254
2008	3072	272	120	341
2009	3241	291	120	321
2010	3392	287	124	318
2011	3464		69	290

3.3 The stock and flow of NHS GDPs in NHSScotland

NHS GDPs are defined as salaried and non-salaried NHS GDPs and NHS assistants.

Table 3.2 reports the stock and flow of NHS GDPs in NHSScotland and shows that between the publication of the Dental Action Plan in March 2005 and September 30th 2011 the number of NHS GDPs increased by 33%.

3.3.1 Characteristics of NHS GDPs

Age

Figure 3.1 illustrates the age distribution of NHS GDPs in selected years. In 1995 the age distribution of NHS GDPs was unimodal, with the mode about 35. The age distributions in 1999 and 2003 reflected the ageing of the NHS GDPs in 1995. By contrast, the age distributions in 2007 and 2011 were bimodal, which reflected both the continued ageing of the NHS GDPs in 1995 and the

Table 3.2: NHS GDP workforce trends as at September 30th

	Stock	Outflow Leavers	VT joiners	Inflow Returners	Other Joiners
1995	1786	95			
1996	1790	96	51		48
1997	1825	96	58	13	60
1998	1862	99	63	15	55
1999	1907	123	61	25	58
2000	1902	110	58	18	42
2001	1945	100	66	28	59
2002	1970	102	60	23	42
2003	2002	123	66	24	44
2004	2036	127	83	26	48
2005	2134	127	80	56	89
2006	2288	130	99	37	145
2007	2396	148	92	35	111
2008	2542	238	109	40	145
2009	2593	204	116	39	134
2010	2783	195	138	121	135
2011	2848		134	35	91

inflow of relatively young NHS GDPs. In 2011 the median age of NHS GDPs was 40, 10% were older than 55 and five percent were older than 59.

Sex

Figure 3.2 shows the sex distribution of NHS GDPs. In 1995 less than 30% of NHS GDPs were female. In 2011 almost 45% of NHS GDPs were female.

Country of qualification

Figure 3.3 illustrates the country of qualification of NHS GDPs. As recently as 2005, EEA dentists accounted for only 2.5% of NHS GDPs. In 2011 EEA dentists accounted for more than 10% of NHS GDPs. Similarly, dentists who qualified from countries categorised as the Rest of the World accounted for 1.1% in 2005 and 4.5% in 2011.

3.4 The ratio of applications to accepted places

The ratio of applications to expected places at Scottish dental schools is a measure of the demand for dental school places in Scotland, which may indicate potential applicants' perceptions of the relative benefits of the dental profession.

Figure 3.1: Age distribution of NHS GDPs

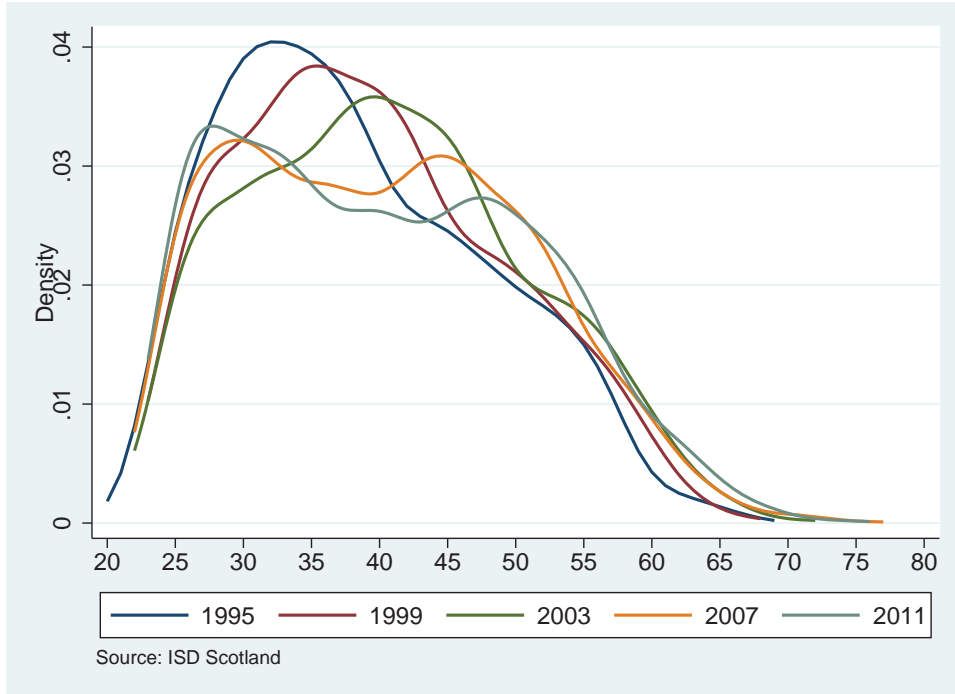


Figure 3.2: Sex distribution of NHS GDPs

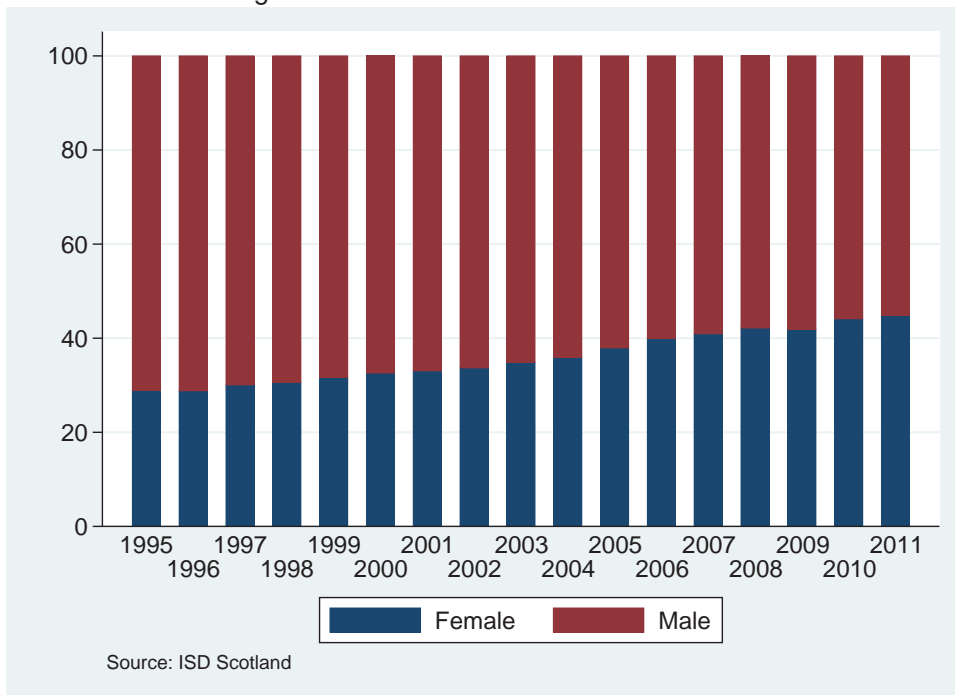


Figure 3.3: Country of qualification of NHS GDPs

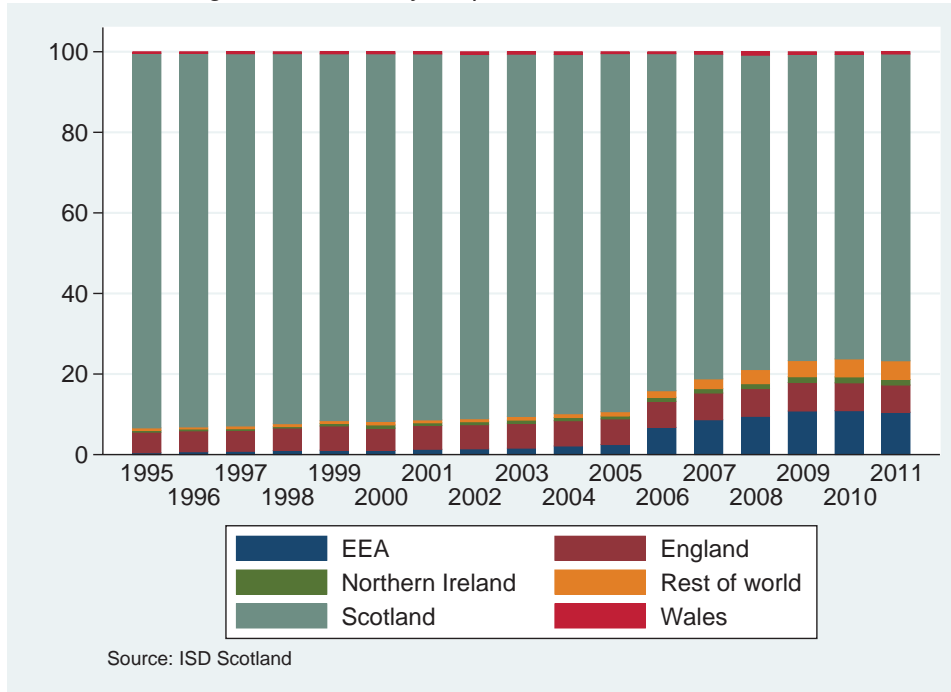


Figure 3.4 shows the ratio of applicants to accepted places for BDS courses using data from UCAS and Aberdeen Dental School.² In 2011 there were about six applications per accepted place at Dundee and Glasgow dental schools and about eight applications per accepted place at Aberdeen Dental School. The ratio of applications to acceptances at all three schools increased between 2008 and 2011. By contrast, the mean ratio of applications to accepted places for undergraduate medicine in Scotland was about eight during the past eight years.

Figure 3.4 provides no evidence to indicate that the recent increases in the size of the dental workforce has decreased the demand for dental school places.

3.5 Dental undergraduates

3.5.1 BDS student numbers

Figure 3.5 shows the number of BDS students recorded as either active or having completed successfully at the end of each academic year. The intake into Aberdeen Dental School is shown from academic year 2008-09 onwards.

²In 2008 applicants applied directly to Aberdeen Dental School.

Figure 3.4: The ratio of applications to accepted places

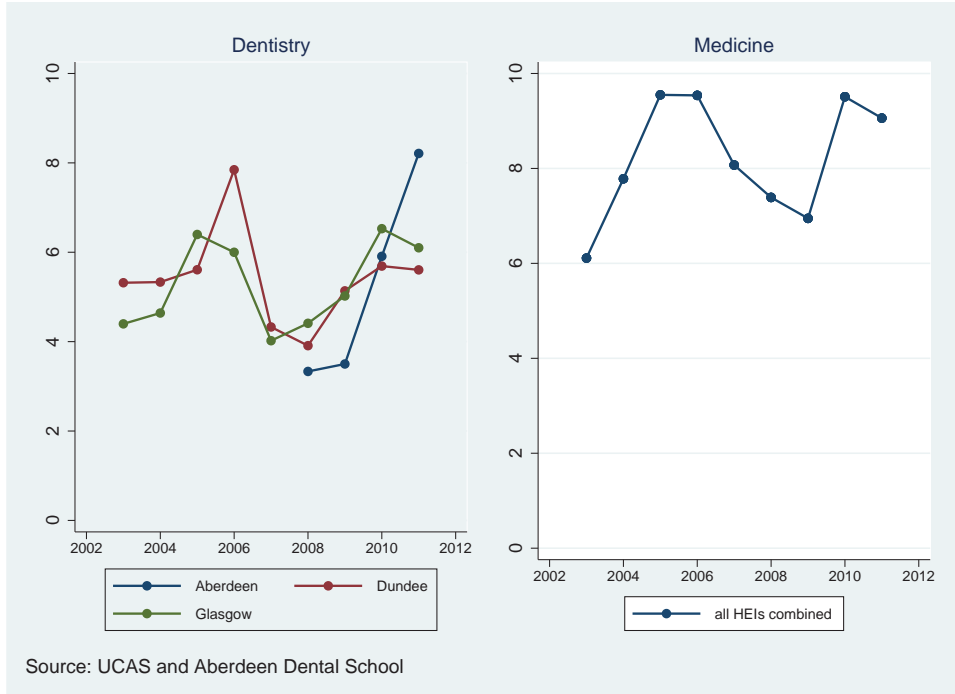
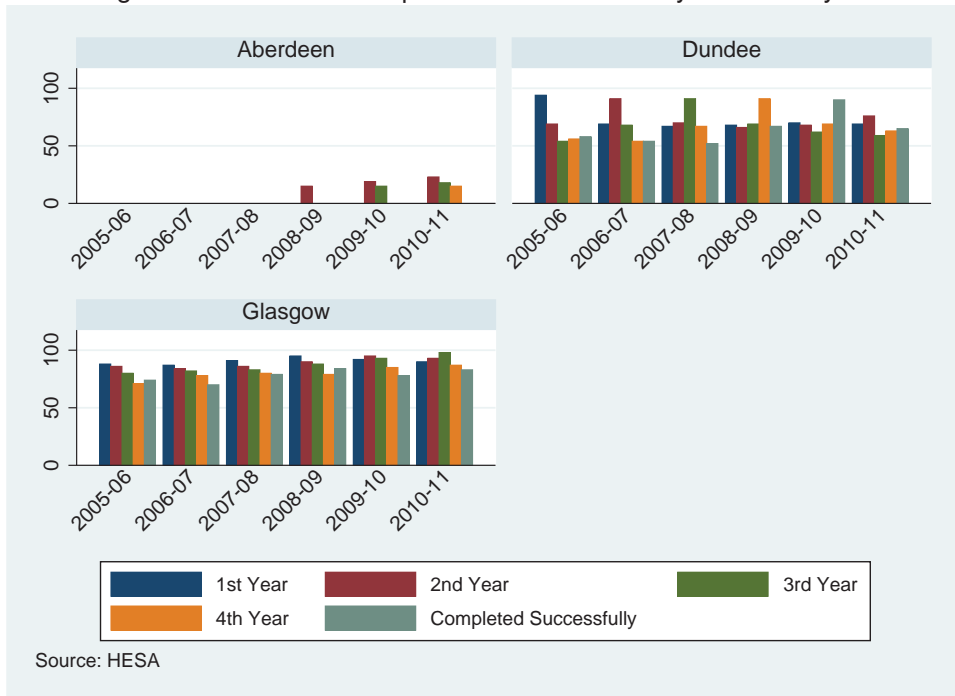


Figure 3.5: Active or completed BDS students by academic year



The total number of BDS students who completed successfully each year increased from 137 in academic year 2005-06 to 168 in academic year 2009-10. The number fell slightly in academic year 2010-11 to 146. The first cohort of BDS students at Aberdeen Dental School completed at the end of academic year 2011-12.

3.5.2 Characteristics of BDS students

Sex

Table 3.3 shows the sex composition of BDS students in Scottish dental schools. While there is some variation between dental schools, most students are female. By contrast, section 3.3 reported that the percentage of female NHS GPs was 45% in 2011. This suggests that the percentage of female NHS GPs is likely to increase in the future.

Table 3.3: Percentage of female BDS students

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Glasgow	55.0	56.4	54.6	56.4	59.8	60.0
Dundee	61.1	57.0	56.3	54.7	54.8	55.1
Aberdeen				60.0	59.8	67.9

Country of domicile

HESA data contain information on each student's country of domicile, which was categorised into one of four groups: Scotland, Rest of the UK, EEA and Rest of the world. Figure 3.6 shows that almost all students were from the UK and the majority of students at each dental school were from Scotland.

Age

Figure 3.7 shows the age distribution of all active and completed BDS students in academic year 2010-11. While the age distribution of students at Dundee and Glasgow dental schools are almost identical, students at Aberdeen Dental School are older, which reflects its graduate intake.

Socioeconomic status

HESA data contain information on the postcode of students on entry to dental school. The postcodes of Scottish domiciled BDS students were matched to the Scottish Neighbourhood Statistics (SNS), which were used to identify the SIMD quintile of each student. Figure 3.8 shows that while just under 75% of students

Figure 3.6: Country of domicile of BDS students

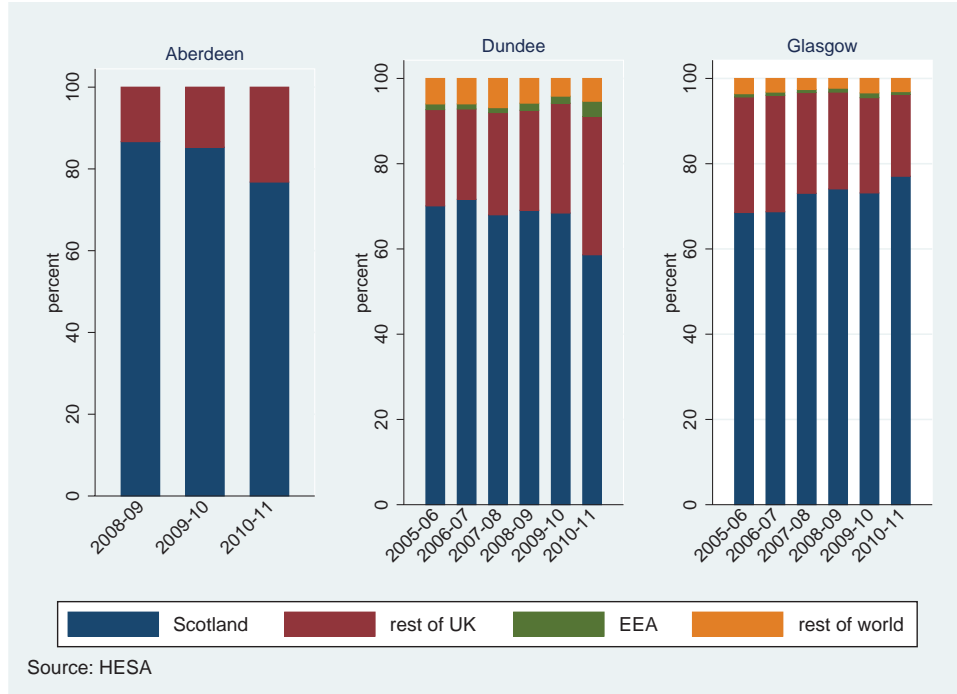
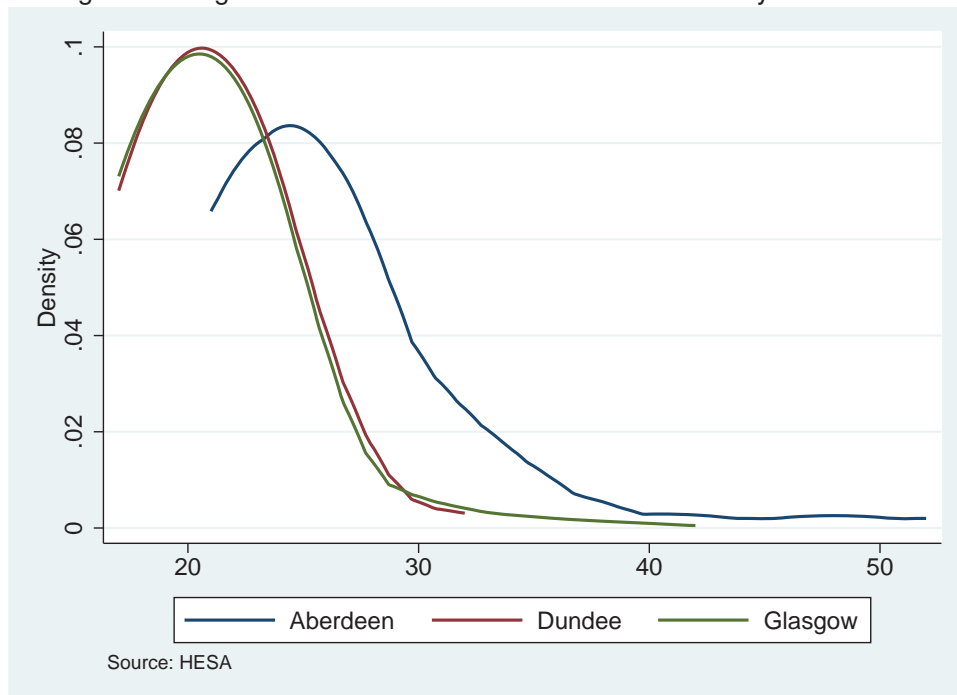


Figure 3.7: Age distribution of BDS students in academic year 2010-11



at Dundee and Glasgow dental schools were from the two least deprived SIMD quintiles, SIMD 1 and 2, only 61% of Aberdeen students were from the two least deprived SIMD quintiles. By contrast, 73% of medical students were from the two least deprived SIMD quintiles.

Figure 3.8: The distribution of BDS students by SIMD quintile



3.5.3 The expected number of dental graduates

The expected number of dental graduates from Scottish dental schools provides an estimate of the number of dentists entering the profession who were trained in Scotland.

In consultation with the SG and NES, the Scottish Funding Council (SFC) sets the intake targets for the number of undergraduate dental students in order to achieve the output target of qualified dentists required by the SG. The latest intake targets for the academic year 2012-13 [14], which are reported in table 3.4, means that the output of Scottish dental schools is now fixed until 2017. The output from Scottish dental schools in 2017 is expected to be 165. By contrast, the number of BDS students who successfully completed in academic year 2010-11, the year before the first cohort of students from Aberdeen Dental School completed, was 146.³

³The calculation of the expected number of dental graduates used data from HESA to estimate completion rates. For Dundee and Glasgow dental schools, the five- and six-year com-

Table 3.4: Intake targets for academic year 2012-13

	UK and EU	Overseas
Aberdeen	20	0
Dundee	63	3
Glasgow	87	3
Total	170	176

3.6 The Dental Undergraduate Bursary Scheme

3.6.1 Introduction

Undergraduate students at Scottish dental schools are eligible to apply for a bursary of £4,000 during each clinical year of their course. In return they commit to full-time NHS dental work in Scotland for one more year than the number of bursaries they received, or part-time equivalent. Aberdeen Dental School students are eligible for a bursary for each of the four years of their course. Therefore, a student who receives one bursary must commit to work in NHSScotland for two years and a student who receives four bursaries must commit to work in NHSScotland for five years.

3.6.2 Trends in the number of DUBS bursaries

Table 3.5 reports the number of DUBS bursaries granted in each academic year since 2006-07.

Table 3.5: DUBS bursaries by academic year

Academic year	Bursaries
2006-07	447
2007-08	492
2008-09	546
2009-10	588
2010-11	607
2011-12	603
Total	3283

Table 3.6 shows that these 3,283 bursaries were granted to 1,307 students at a total cost of £13.132m, yielding an implied commitment of 4,590 NHS

pletion rate was estimated to be 0.865 and 0.933 respectively. For Aberdeen Dental School the four-year completion rate was estimated to be 1.

dentist-years.⁴ Based on the mean number of patients registered per NHS GDP as at September 30th 2011 (1,386), the implied commitment from DUBS is equivalent to 6.4m patient-years of registration.

Table 3.6: DUBS recipients, cost and implied commitment

Number of bursaries	Students	Cost (£m)	Implied commitment (Dentist-years)
1	327	1.308	654
2	330	2.640	990
3	307	3.684	1228
4	340	5.440	1700
5	3	0.060	18
Total	1307	13.132	4590

3.6.3 The retention of DUBS bursary recipients

The retention of DUBS bursary recipients was examined by linking their information to the dental workforce data using probability matching. The matching process used each dentist's forename, surname, date of birth, and Higher Education Institution (HEI). Of the 1,307 bursary recipients, 632 were matched to at least one variable in the dental workforce data of which there were 576 perfect matches. The 56 imperfect matches were reviewed individually and another 47 matches were found.

One way to evaluate the impact of DUBS is to compare the retention rates of DUBS recipients with the retention rates of non-DUBS recipients. Table 3.7 shows the retention rates for the first four years after entry of all initial entrants to NHSScotland who qualified in Scotland. For example, the fourth column shows that 78% of DUBS recipients who initially entered NHSScotland between 2007 and 2010 were in NHSScotland the following year. The second column reports the mean retention rates of dentists who qualified in Scotland and initially entered NHSScotland between 1996 and 2006. The third column reports the mean retention rates of dentists who qualified in Scotland and initially entered NHSScotland between 2007 and 2010.

The mean four-year retention rate of DUBS recipients who entered NHSScotland between 2007 and 2010 was 0.75 and the mean four-year retention rate of non-DUBS recipients who entered NHSScotland between 1996 and 2006 was 0.71.

⁴This assumes that the dentists with five bursaries are required to commit to NHSScotland for six years.

Table 3.7: The impact of DUBS on retention rates

Years since initial entry	1996-2006	2007-10	2007-10
	Non-DUBS	Non-DUBS	DUBS
0	1	1	1
1	0.82	0.77	0.78
2	0.81	0.64	0.82
3	0.74	0.64	0.81
4	0.71	0.53	0.75

3.7 Dental Vocational Training in Scotland

3.7.1 Introduction

New or recent graduates from UK dental schools must complete a one-year programme of DVT in order to be eligible to hold an NHS Board list number, which allows dentists to work as associates or principals in the GDS. Table 3.2 in section 3.3 showed that DVT is one of the key sources of inflow into the GDS.

3.7.2 Trends in Dental Vocational Training

Figure 3.9 shows the number of VDPs in NHSScotland between 1995 and 2011. In 2011 there were 200 VDPs, the highest number ever and almost twice the number of VDPs in 2000.

3.7.3 The retention of Vocational Dental Practitioners in Scotland

Figure 3.10 compares the retention rates of VDPs by cohort. There was relatively little variation in retention rates between cohorts. The mean retention rate decreased during the time since DVT but over 60% of the 1995 cohort were working in NHSScotland 16 years later.

The relatively small amount of variation in retention rates between cohorts suggests that if the number of VDPs remains as high as it has been during the recent past, the inflow of VDP to NHSScotland will remain relatively high.

3.8 Vocational Training numbers issued in Scotland

3.8.1 Introduction

In order to obtain an NHS Board list number to practise as a principal dentist in NHSScotland, dentists need to be issued with a VT number to indicate they have satisfactorily completed DVT or are exempt from the requirement to complete DVT because:

Figure 3.9: The number of VDPs in NHSScotland as at September 30th

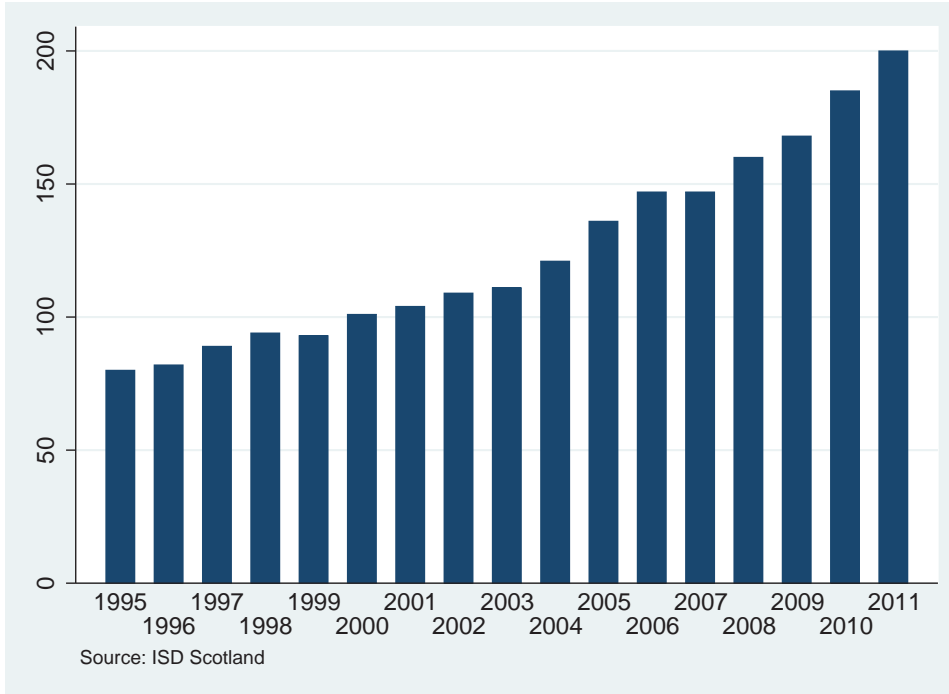
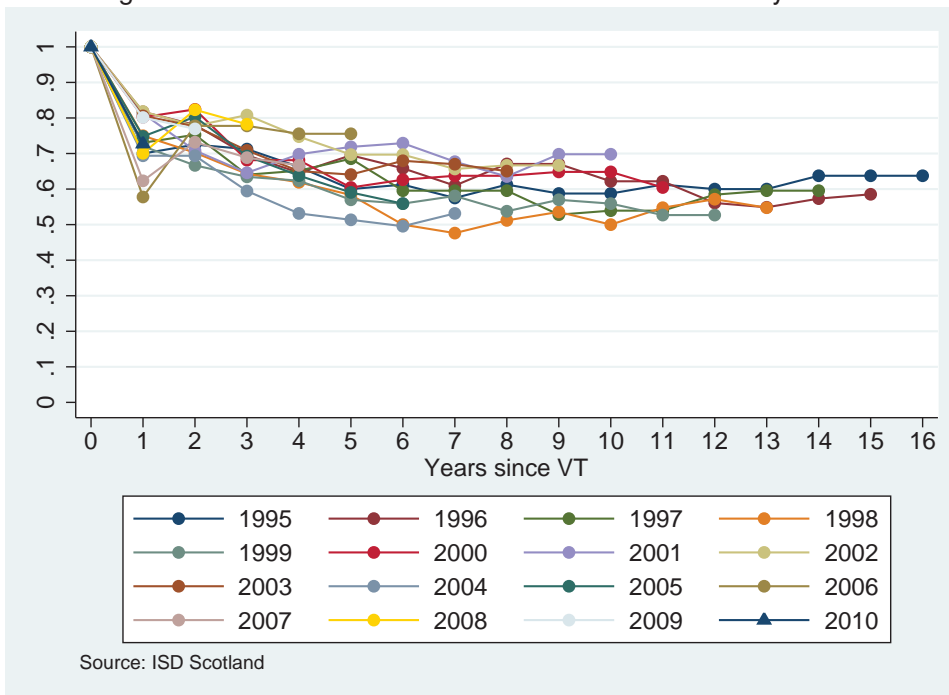


Figure 3.10: Retention rates of VDPs in NHSScotland by cohort



- they are from an EEA Member State (other than the UK) and hold a recognised European diploma;
- they have had a NHS Board or Performer number within the past five years;
- they have practised in primary dental care in the CDS or the Armed Forces for four years full-time, or part-time equivalent, and for not less than four months during the past four years;
- they have completed a course of vocational training under the voluntary scheme; or
- their experience or training during the past five years is equivalent to DVT.

The number of VT numbers issued is therefore a lead indicator of inflow to the GDS in Scotland.

3.8.2 Trends in Vocational Training numbers

Figure 3.11 reports the number of VT numbers issued during each VT year, October 1st to September 30th, and shows a large increase in VT numbers issued by NES to EEA nationals in 2005-06. While about 250 VT numbers were issued each year since 2005-06, the composition of the recipients changed: there were fewer VT numbers issued to EEA nationals and more VT numbers issued to dentists who completed DVT.

Figure 3.12 shows that the country of application of VT number recipients changed between 2000-01 and 2010-11. About 60 dentists from Poland received a VT number in 2005-06, which partly reflected the SG's policy to recruit dentists from Poland to address access issues. In 2010-11, the two countries with the largest number of VT number recipients were Spain and Greece.

3.8.3 The retention of dentists issued with Vocational Training numbers

In order to examine the retention of dentists issued with VT numbers in NHSScotland, the Scottish Dental Vocational Training Equivalence and Certification Committee (SDVTECC) data were linked to the dental workforce data using the GDC number of dentists. Of the 2,285 dentists who were issued with a VT number in 2000-01 to 2010-11, 94% were matched to dentists in the dental workforce data.

The left hand panel of figure 3.13 shows the retention of dentists as a proportion of the total number of dentists issued with a VT number in each VT year. Figure 3.13 shows that between 85% and 95% of dentists issued with a VT number were in the NHSScotland workforce in the year their VT number was issued. Five years after being issued with a VT number, between 60%

Figure 3.11: VT numbers issued by NES

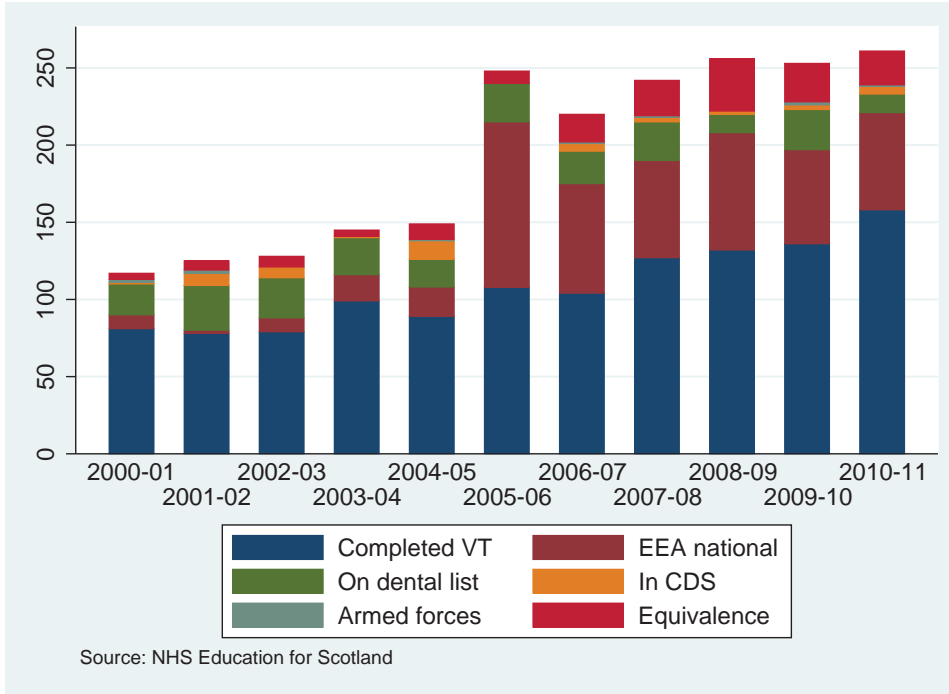
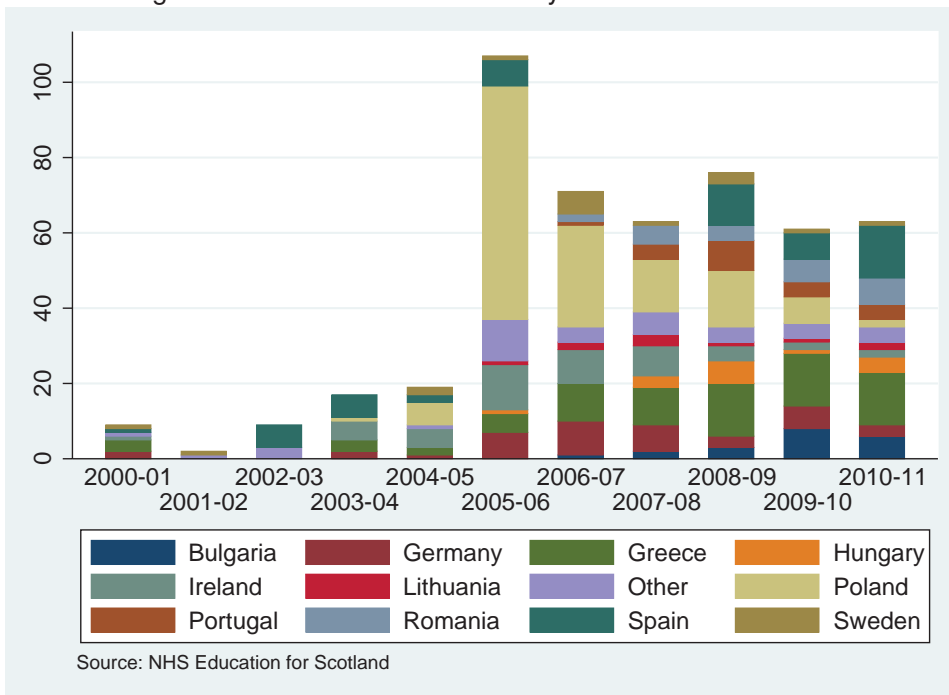
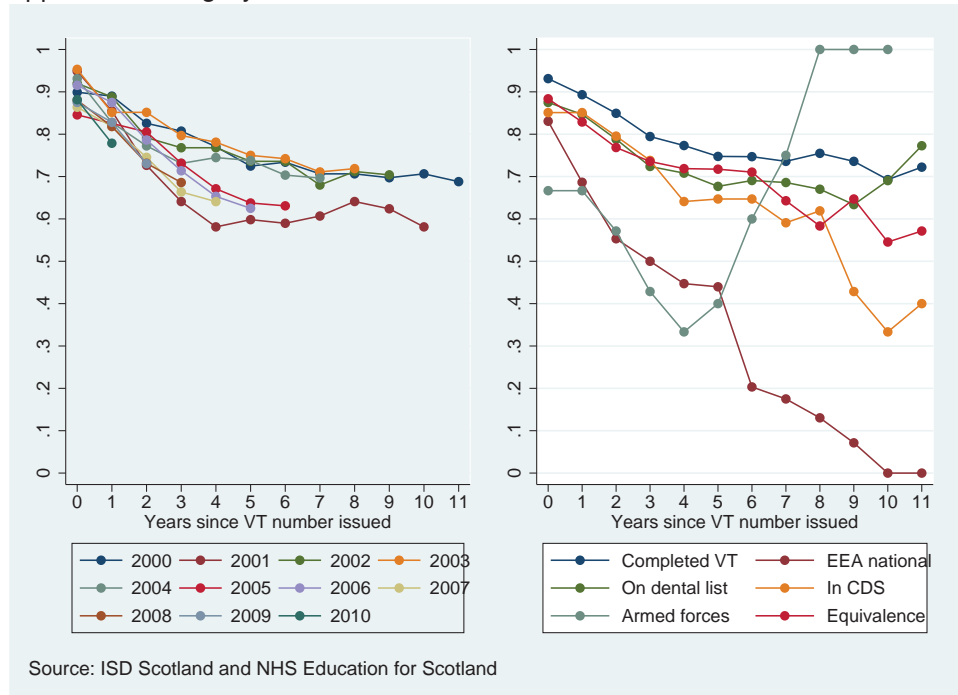


Figure 3.12: VT numbers issued by NES to EEA nationals



and 75% were still in NHSScotland. The right hand panel of figure 3.13 shows considerable variation in the retention rates of dentists between application categories. Five years after being issued with a VT number, about 75% of dentists who completed VT were still in NHSScotland. By contrast, only about 45% of EEA nationals who were issued with a VT number were still in NHSScotland five years later.

Figure 3.13: The retention of dentists issued with VT numbers by VT year and application category



If the number of VDPs remains relatively high, the number of VT numbers issued to dentists who completed VT is also likely to remain relatively high. It is much more difficult to predict the number of VT numbers issued to dentists in the EEA nationals and Equivalence categories. This represents an important avenue for future work.

3.9 Summary

- The capacity to deliver dental services is a function of the number of dentists.
- The number of NHS dentists in general and NHS GDPs in particular increased significantly between the publication of the Dental Action Plan in March 2005 and September 30th 2011.

- Between September 30th 1995 and September 30th 2011 the average age of NHS GPs decreased, the percentage of female NHS GPs increased and the percentage of NHS GPs who qualified outside Scotland increased.
- Data from UCAS showed that:
 - the ratio of applications to accepted places for BDS courses increased between 2008 and 2011.
- Data from HESA showed that:
 - the output from Scottish dental schools increased between academic years 2006-07 and 2010-11;
 - over half of BDS students were female, and a large majority were domiciled in the UK; and
 - in common with Scottish domiciled medical students, a relatively small percentage of BDS students were from the most deprived SIMD quintiles.
- The latest intake targets for academic year 2012-13 mean that the output from Scottish dental schools is fixed until 2017, when the output is expected to be 165.
- The DUBS provides bursaries to undergraduate dental students in return for a commitment to work in NHSScotland after graduation:
 - between academic years 2006-07 and 2011-12 3,283 bursaries were granted to 1,307 students at a total cost of £13.132m yielding an implied commitment of 4,590 dentist years;
 - the mean four-year retention rate of DUBS recipients who entered NHSScotland between 2007 and 2010 was 0.75 and the mean four-year retention rate of non-DUBS recipients who entered NHSScotland between 1996 and 2006 was 0.71.
- On September 30th 2011, there were 200 VDPs, which was more than ever before.
- Data from NES showed that:
 - there were 261 VT numbers issued in VT year 2010-11, which was more than ever before; and
 - the retention rate of dentists who completed DVT in the UK was much higher than the retention rate of EEA dentists.

Chapter 4

Dental Care Professionals

4.1 Introduction

DCPs are a group of healthcare professionals who work with dentists to deliver dental services. This group includes six registered professions: dental nurses, dental hygienists, dental therapists, dental technicians, Orthodontic Therapists (OThs) and Clinical Dental Technicians (CDTs). The Scope of Practice for each of these professions is regulated by the GDC [15]. Since 2008 all individuals who want to practise under any of these titles have had to register with the GDC.

Some DCPs work in the NHS community and hospital sectors but the majority are employed by GDPs, who refer patients to DCPs for treatment as appropriate. The implications of these referral arrangements have recently been highlighted in a report by the Office of Fair Trading (OFT) [16] in which the OFT recommended that the GDC should

review and remove restrictions on direct patient access to DCPs urgently.

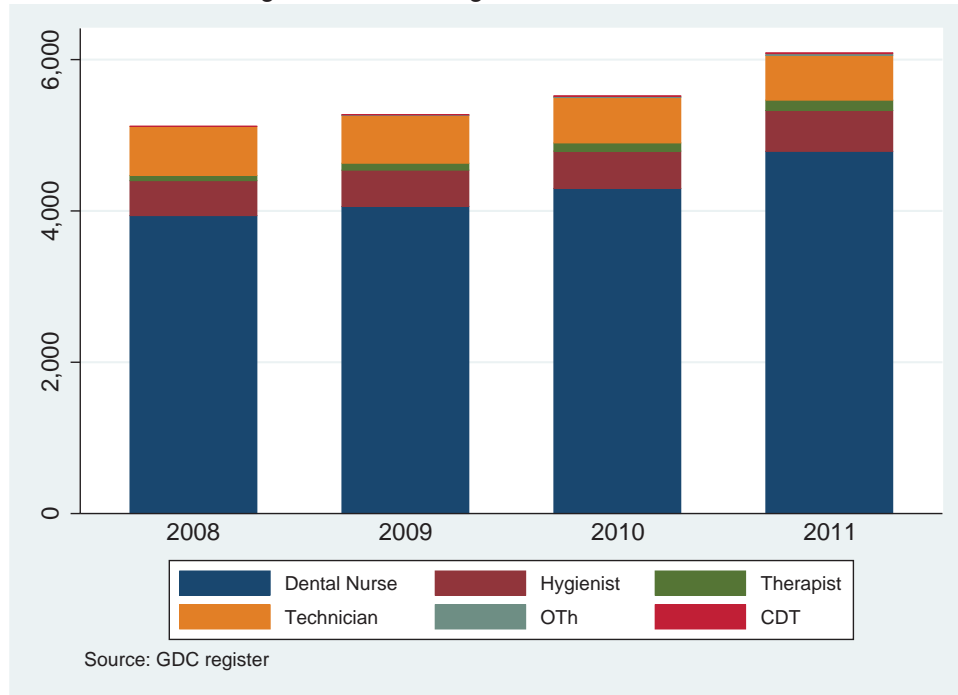
4.2 Registered Dental Care Professionals

Figure 4.1 reports the number of DCP registrations in Scotland, and therefore provides an indication of the pool of qualified DCPs available to support the delivery of dental services. Between 2008 and 2011 the number of registered DCPs increased by 17%. While the number of registered dental nurses increased by 22%, the number of registered dental technicians decreased by 9%.

An increasing number of individuals were registered in more than one DCP group, with the most common dual registration in Hygiene and Therapy. This indicates that a small but increasing number of DCPs have extended their Scope

of Practice, which increases the flexibility of the DCP workforce and allows DCPs to respond quickly to changes in the demand for dental services.

Figure 4.1: DCP registrations in Scotland



The majority of DCPs in Scotland are female but this varies markedly between the professions. For example, while over 93% of Dental Nurses, Hygienists and Therapists are female only 17% of Technicians are female.

4.3 The training market for Dental Care Professionals

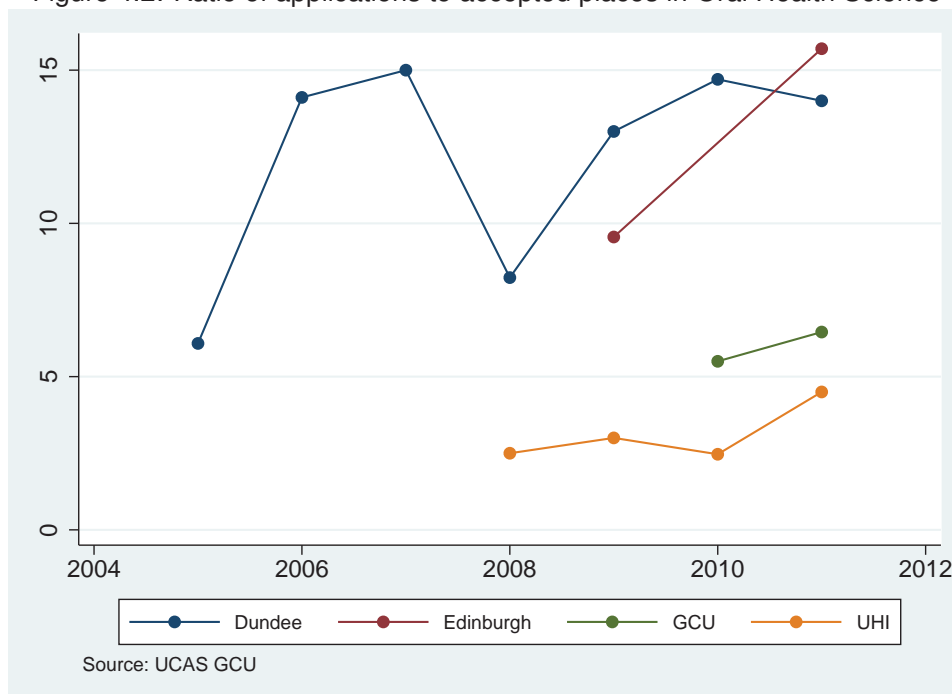
4.3.1 Oral Health Science training

While the University of Dundee has provided OHS training for several years, other HEIs have only started providing training relatively recently: the Edinburgh Dental Institute has a biennial intake that began in academic year 2009-10; the University of the Highlands and Islands (UHI) has an annual intake that began in academic year 2008-09; and Glasgow Caledonian University (GCU) had its first intake in academic year 2010-11.

Figure 4.2 reports the ratio of applications to accepted places in OHS and shows that the ratio of applications to accepted places for all training providers increased between 2008 and 2011.

Figure 4.3 shows the total number of OHS students reported as either active or completed successfully at the end of each academic year. In academic year

Figure 4.2: Ratio of applications to accepted places in Oral Health Science



2009-10 12 students completed successfully. In academic year 2010-11 the number of students who completed successfully increased to 19.

The number of active students reported in figure 4.3 suggests that the number of OHS graduates is likely to continue to increase during the next few years.

Characteristics of Oral Health Science students

The percentage of female students in the 2010-11 intake to OHS varied between providers from 67% to 97%.

The mean age of students on entry varied by provider from 19 to 27.

HESA data contain information on the postcodes of students on entry to each HEI. The postcodes of Scottish domiciled OHS students were matched to the SNS, which were used to identify the SIMD quintile of each student. Figure 4.4 shows the distribution of students by SIMD quintile. The percentage of students from the two most deprived SIMD quintiles, SIMD 1 and SIMD 2, was 37%. By contrast, chapter 3 shows that the percentage of BDS students in the two most deprived quintiles was 14%.

4.3.2 Dental nurse training

Based on information from a subset of training providers that agreed to share data for this report, about 500 trainees entered pre-registration dental nurse

Figure 4.3: Oral Health Science students

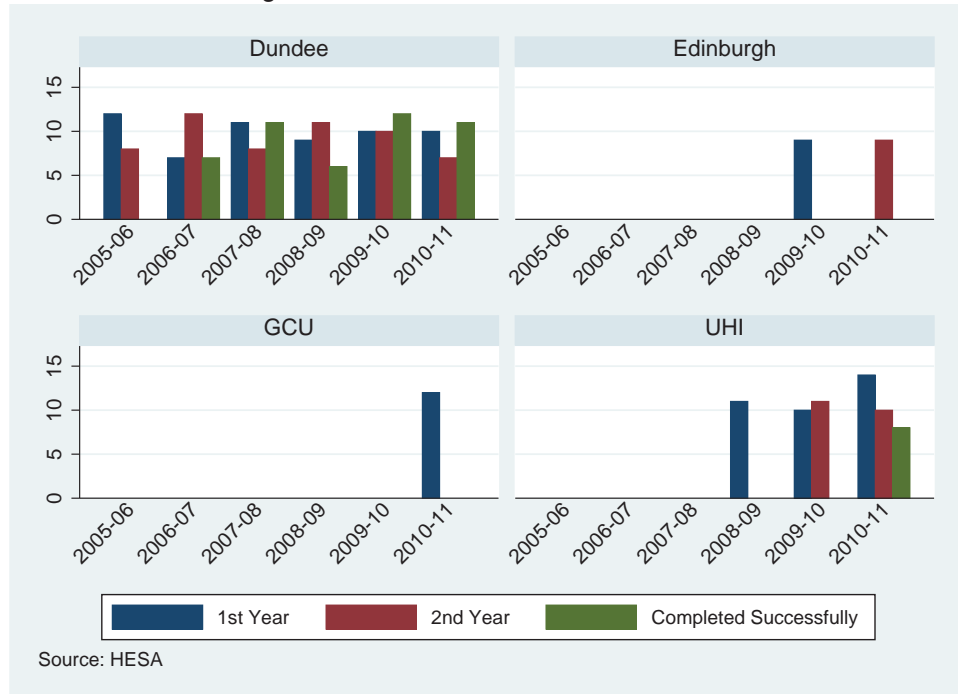
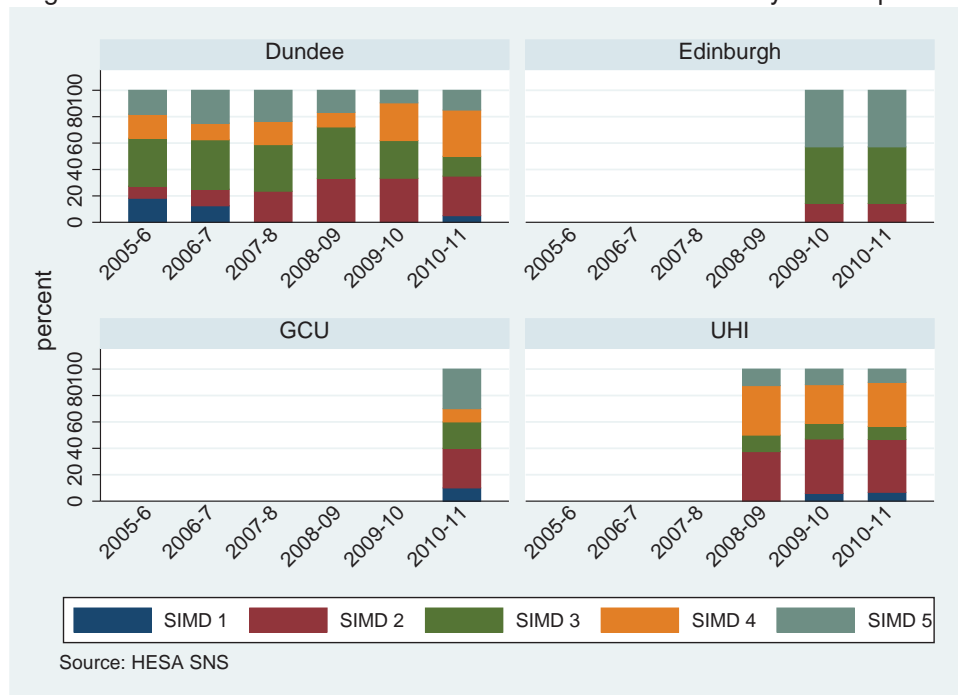


Figure 4.4: The distribution of Oral Health Science students by SIMD quintile



training in Scotland in each 12-month period from August 2010 and August 2011. While information on the number of trainees who completed pre-registration dental nurse training was not available from all training providers, up to 14% of trainees who started a course before August 2011 had left by early 2012.

In the 18 months from August 2010 NES provided 300 Dental Nurse Inductions and over 1,000 Childsmile courses, which develop skills to target specific aspects of children’s oral health

4.3.3 Dental technician training

Data from the SQA showed that the number of certified dental technicians increased from 22 in 2008 to 65 in 2011, all of whom studied at Telford College. Half of the certified students in each year were female, and their mean age was about 27.

4.4 The labour market for Dental Care Professionals

4.4.1 Dental Care Professionals employed by NHSScotland

While most DCPs are not directly employed by NHSScotland, table 4.1 reports that the number of those that were employed by NHSScotland increased by over 80% between September 30th 2007 and September 30th 2011. This increase in the number of DCPs was mostly due to relatively large inflows of Other Joiners ie, DCPs who had not previously worked in NHSScotland.

The Whole Time Equivalent (WTE) number of DCPs also increased during this period by 76%. Even between the peak of NHSScotland employment on September 30th 2009 and September 30th 2011, the WTE number of DCPs increased by 7.5%. By contrast, WTE employment in NHSScotland decreased by 3.3% during the same period.

About 90% of all DCP posts in NHSScotland were held by dental nurses.

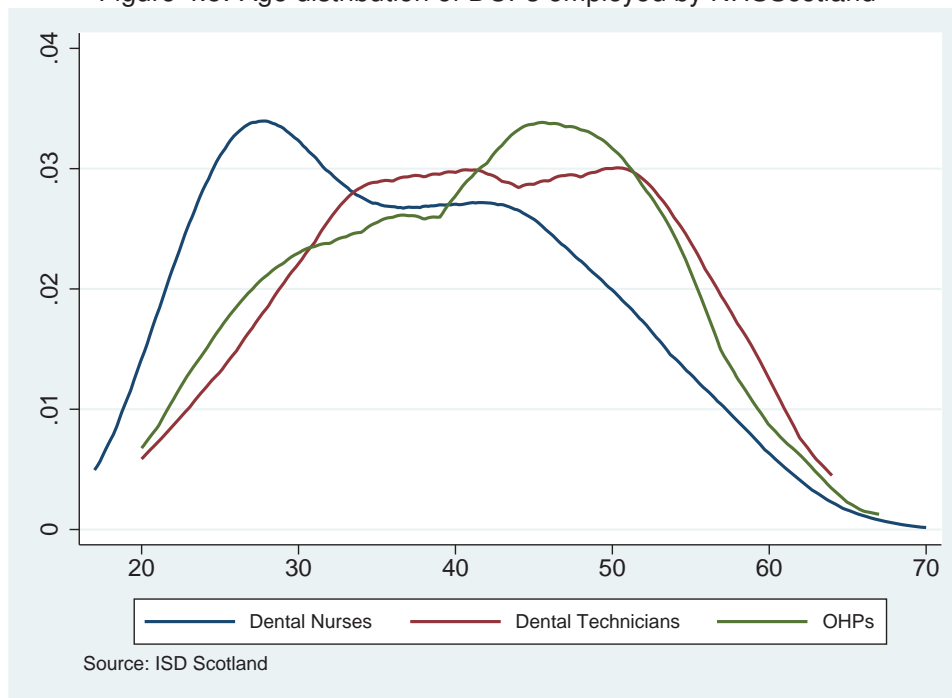
Table 4.1: NHSScotland workforce trends as at September 30th

Year	Stock	Outflow	Inflow	
			Returners	Other joiners
2007	1074	108		
2008	1511	127		545
2009	1769	158	6	379
2010	1916	185	12	293
2011	1952	0	12	209

Figure 4.5 shows the age distribution of DCPs employed in NHSScotland as at September 30th 2011. Dental nurses tend to be younger than dental

technicians and Oral Health Practitioners (OHPs).¹

Figure 4.5: Age distribution of DCPs employed by NHSScotland



4.4.2 Dental nurses

Figure 4.6 reports the median gross hourly earnings of dental nurses and four other occupations within the same three-digit Standard Occupational Classification (SOC) of Healthcare and Related Personal Services. Between 2009 and 2011 median gross hourly pay of dental nurses decreased relative to three of the four other occupations and in 2011 was lower than all the other occupations within the same three-digit SOC.

Figure 4.7 shows the reported number of National Job Centre Vacancies for dental nurses, and JA claimants who noted dental nursing as their sought occupation in Scotland during the past six years.

While these data are unlikely to reflect all dental nurse vacancies and unemployment, the increase in the number of unemployed dental nurses relative to the number of vacancies since 2009 is likely to explain the reduction in average hourly pay for dental nurses since 2009.

¹The term OHPs indicates a group which includes dually qualified hygienist-therapists.

Figure 4.6: Median hourly gross pay in Scotland

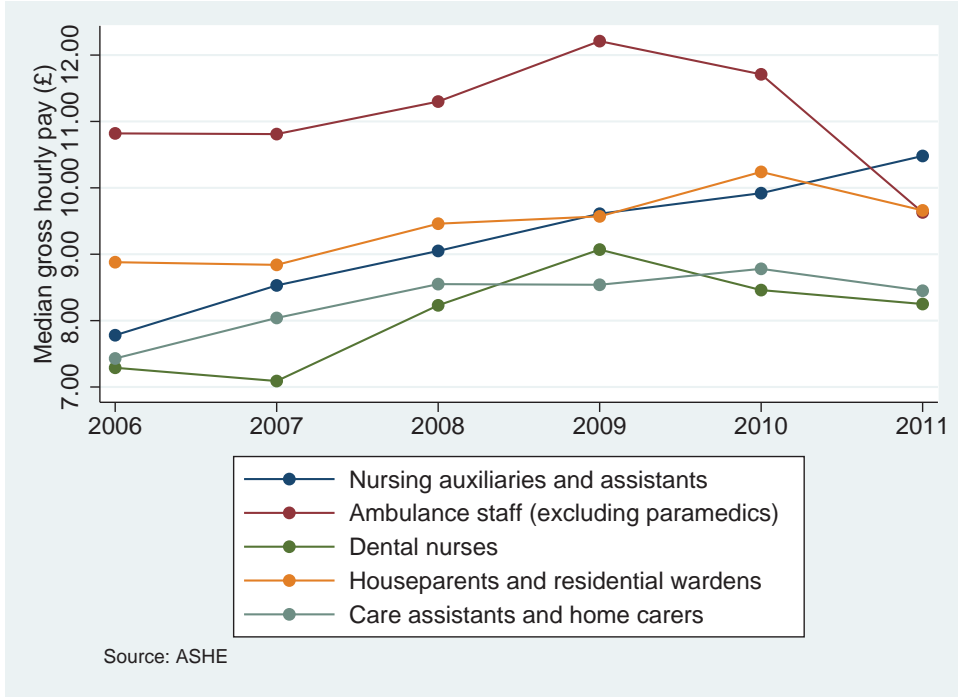
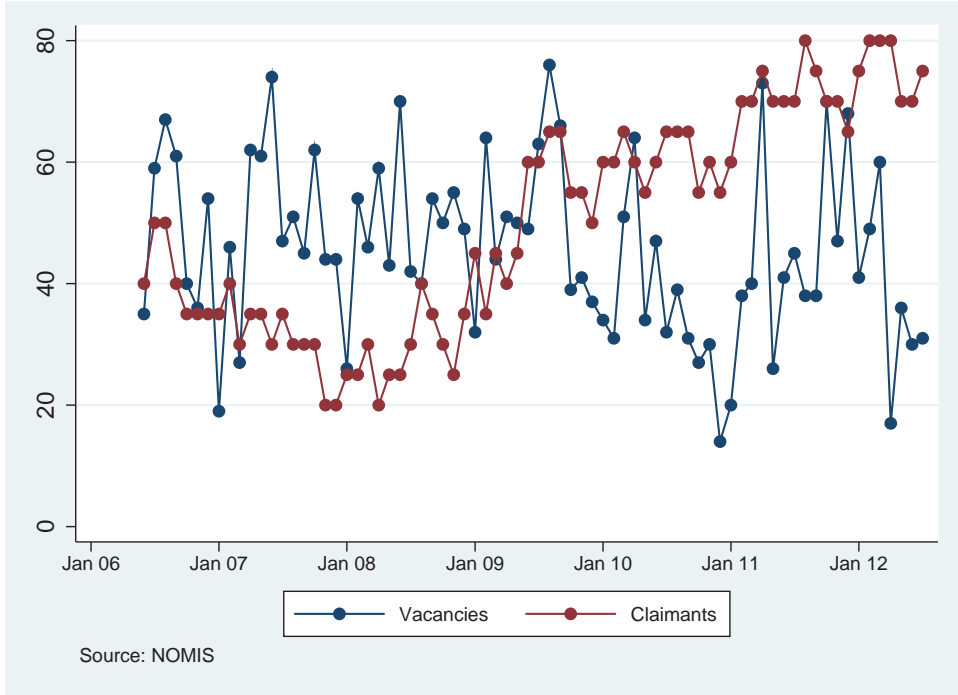


Figure 4.7: Dental nurse vacancies and Jobseeker's Allowance claimants in Scotland



4.5 Summary

- DCPs are a group of healthcare professionals who work with dentists to deliver dental services.
- DCPs continue to play an important role in the provision of oral health care in Scotland, including the delivery of Childsmile services, which target inequalities in the oral health of children.
- Data from the GDC register showed that:
 - the number of registered DCPs in Scotland increased overall between 2008 and 2011, which consisted of a 22% increase in the number of registered dental nurses and a nine percent decrease in the number of registered dental technicians; and
 - the number of individuals registered in more than one profession has increased, which indicates that the DCP workforce is increasingly able to respond to changes in the demand for dental services.
- Data from UCAS showed that:
 - between 2005 and 2011 the ratio of applications to accepted places for OHS training was relatively high, indicating significant demand to train as a dental therapist.
- Data from SQA showed that:
 - Between 2008 and 2011 the number of certified dental technicians increased by 181.
- Data from HESA showed that:
 - the number of students graduating from OHS courses in Scotland and therefore able to register as a dental therapist is likely to increase during the next few years.
- Data from NOMIS and ASHE provided evidence of a deterioration in the labour market outcomes for dental nurses:
 - the number of dental nurses claiming JA increased relative to the number of dental nurse vacancies since 2009; and
 - the average hourly pay of dental nurses decreased between 2009 and 2011.
- The number of DCPs employed by NHSScotland increased by over 80% between 2007 and 2011.

- The proposed removal of restrictions on direct access to DCPs is likely to have a significant impact upon the market for dental services.
- Very little is known about the number or activity of the majority of DCPs who work in the GDS.

Chapter 5

The utilisation of dental services

5.1 Introduction

The utilisation of dental services is a function of the supply of dental services and the demand for dental services. This chapter examines recent trends in several measures of the utilisation of public and private sector dental services in Scotland.

Section 5.2 examines trends in GDS registration rates. Section 5.3 examines trends in GDS treatment data. Section 5.4 calculates the proximity of patients to the GDS practices where they are registered and examines the extent to which this measure of access is a function of the remoteness and deprivation of areas. Section 5.5 examines trends in the utilisation of public and private sector dental services using data from SHeS and Denplan.

5.2 General Dental Service registration rates

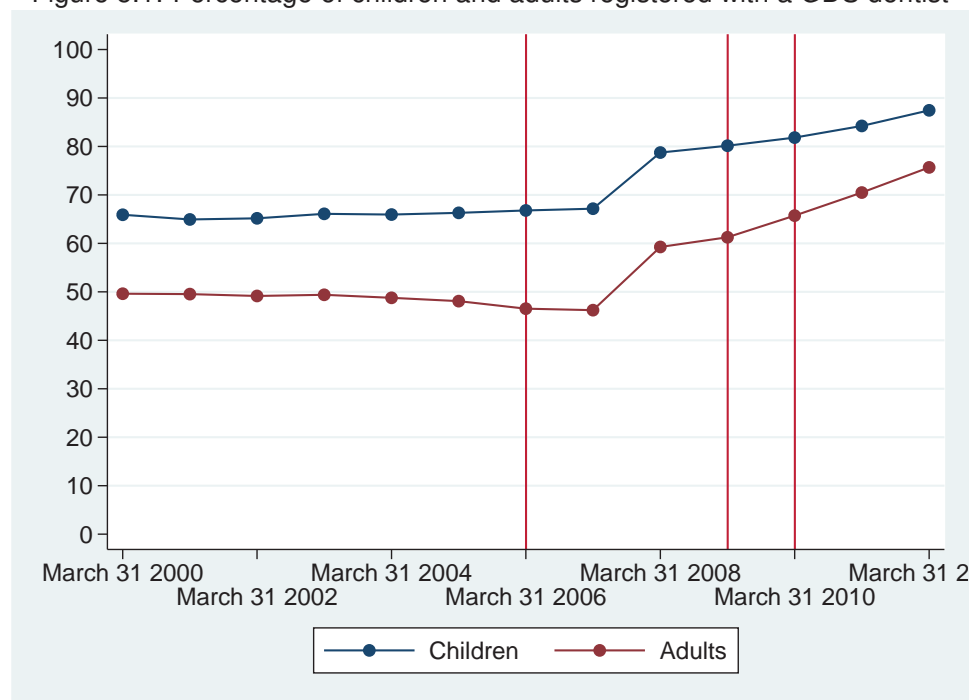
Registration with an NHS GDP entitles patients to the full range of dental treatment available under the GDS. Registration rates therefore provide one measure of access to the GDS.

Figure 5.1 illustrates the trend in GDS registration rates from March 31st 2000 to March 31st 2012. There was a sharp increase in the registration rates of both children and adults on March 31st 2008. The registration period ie, the period during which patients are entitled to receive the full range of dental treatment available under the GDS, was extended from 15 to 36 months from April 1st 2006. The registration period was extended from 36 to 48 months for all patients registered with a dentist from April 1st 2009 [17] and has since been further extended to non-time-limited registration for all patients registered at April 1st 2010 [18]. These extensions to the registration period, which are

indicated on figure 5.1, are likely to have had, and will continue to have, an impact on registration rates.

There are several other points of access to NHS dental care that are not captured by registration data such as treatment provided by the Community Dental Service (CDS), specialist primary care dental services, Emergency Dental Services, Teach and Treat Centres, dental schools, the Hospital Dental Service (HDS) and Occasional Treatment arrangements. Therefore, the actual utilisation of NHS dental services is likely to be greater than the registration rates reported in figure 5.1.

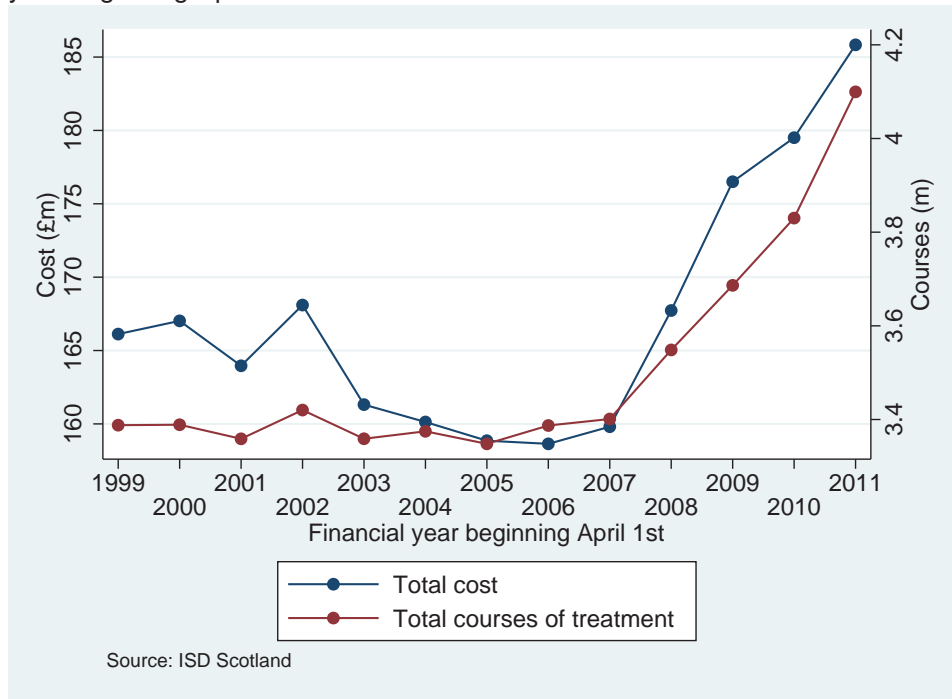
Figure 5.1: Percentage of children and adults registered with a GDS dentist



5.3 General Dental Service treatment data

This section reports trends in the total cost and the number of courses of GDS treatment. Total cost is defined as the sum of salaried and non-salaried GDS treatment fees and is expressed in 2011-12 prices by using the Gross Domestic Product deflator, which is a measure of general inflation in the domestic economy. Figure 5.2 shows that the total cost of GDS treatment increased from just over £165m in the financial year beginning April 1st 2007 to over £185m in the financial year beginning April 1st 2011. This increase in the total cost of treatment reflects an increase in the total number of courses of treatment from 3.4m to 4.1m during the same period.

Figure 5.2: Total cost and number of courses of GDS treatment in each financial year beginning April 1st



Each GDS treatment was classified into one of five categories: the assessment and diagnostic category includes treatments like examinations and radiographs; the core category includes treatments that can be performed by dentists, dental hygienists and dental therapists such as fillings; the complex category includes treatments that are more advanced than core treatments and can only be performed by dentists such as root canal treatment or crown and bridge work; the orthodontic category includes orthodontic treatments; and the not elsewhere classified category includes all other treatments.

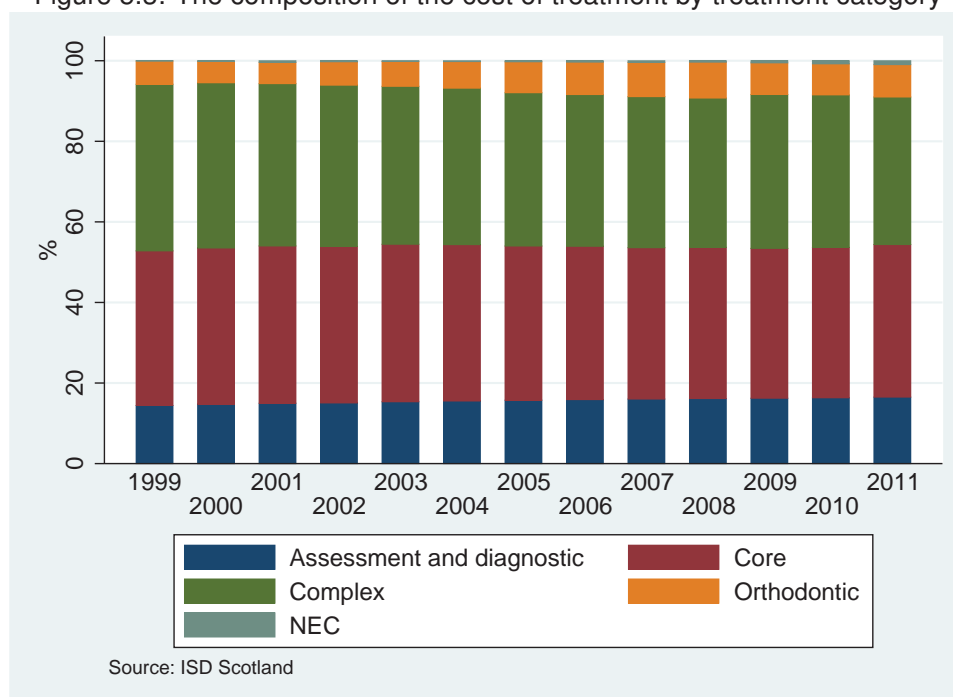
Figure 5.3 shows the percentage of the total cost of GDS treatment accounted for by each category. For example, assessment and diagnostic treatments accounted for about 14% of the total cost of GDS treatment in financial year 1999-2000. Figure 5.3 shows that there was very little variation in the composition of the cost of treatment between financial years 2005-06 and 2011-12.

5.4 Spatial analysis of General Dental Service data

5.4.1 Introduction

Access to GDS may also be measured by the proximity of patients to the GDS practices they are registered with. This section reports the variation in the

Figure 5.3: The composition of the cost of treatment by treatment category



measures access between SIMD categories, Scottish Government Urban Rural (SGUR) categories and NHS Boards.

5.4.2 Data

The postcodes of active dentists and their registered patients as at 30 June 2011 were extracted from the Management Information and Dental Accounting System (MIDAS). These postcodes were associated with grid references, which allowed the locations to be mapped, and datazones, which allowed the locations to be categorised by SIMD or SGUR category.¹

5.4.3 Methods

ArcGIS Network Analyst (Environmental Systems Research Institute, Inc) was used to calculate the distance along road networks from the postcode of a patient to the postcode of the GDS practice they were registered with.

¹The grid references of postcodes were obtained from the Ordnance Survey (OS) postcode directory. The SIMD and SGUR categories were available at the datazone level and were obtained from SNS. The geographical data, including datazone boundaries, and OS Integrated Network Road Links were obtained from EDINA (JISC-funded National Data Centre based at the University of Edinburgh).

5.4.4 Results

The travel distance and time surfaces are presented in figure 5.4. Road distances were grouped into five categories: less than five kilometres, five to nine kilometres, 10km to 29km, 30km to 59km and more than 59km. Figure 5.4 shows that residents in north and west Highland were the furthest away from their GDS practice. Residents in the central belt of Scotland had the shortest travel distances.

Table 5.1 reports the distribution of road distances by SIMD quintile. Residents in the most deprived quintile, SIMD 1, had the shortest mean travel distance (5.3km), while residents in SIMD 3 had the longest mean travel distance (12.9km). Around 20% of patients in the most deprived SIMD quintile were registered with a GDS practice within 1km of their residence while 10.4% were registered with a GDS practice 10km from their residence.

Table 5.1: The distribution of road distances by SIMD quintile (km)

	Mean	<1.0	1.0-1.9	2.0-4.9	5.0-10.0	10+
SIMD 1 Most deprived	5.3	20.1	25.1	33.5	10.9	10.4
SIMD 2	8.3	17.7	21.6	29.6	13.9	17.2
SIMD 3	12.9	14.0	16.3	25.1	16.1	28.5
SIMD 4	11.8	11.6	15.0	23.5	18.1	31.7
SIMD 5 Least deprived	8.2	11.4	19.3	31.1	18.8	19.4

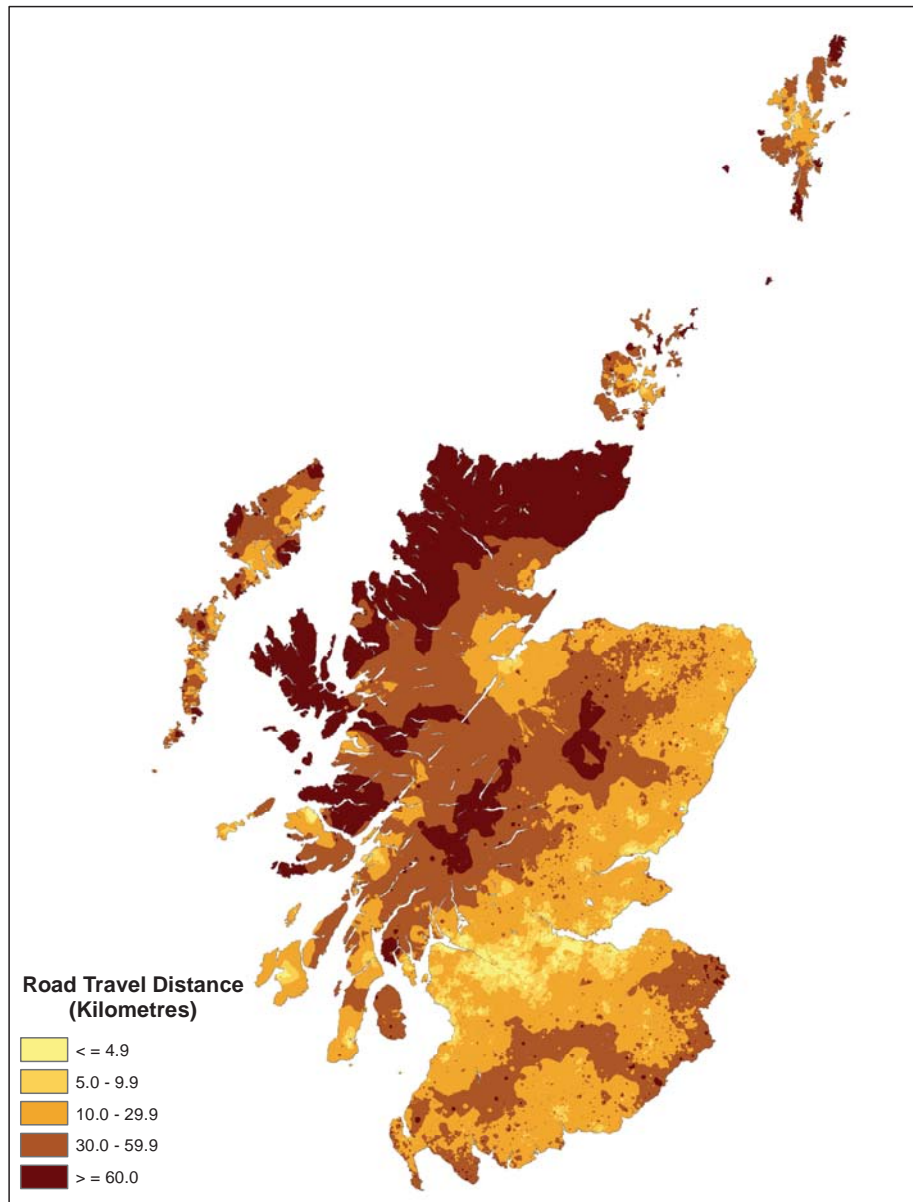
Table 5.2 reports the distribution of road distances by urban rural index. The distance between a patient's home and their GDS practice increased along the urban rural spectrum. In 2011, the mean road distance was 5.3km for patients from Large Urban areas while the mean road distance was 35.9km for patients from Remote Rural areas. About three quarters of dental patients from Remote Rural areas lived at least 10km away from the practice they were registered with, while only 8% of patients from Large Urban areas lived at least 10km away from their practice.

Table 5.2: The distribution of road distances by urban rural index (km)

	Mean	<1.0	1.0-1.9	2.0-4.9	5.0-10.0	10+
Large Urban Areas	5.3	19.0	23.6	34.4	15.4	7.6
Other Urban Areas	6.4	13.3	23.3	35.9	12.8	14.7
Accessible Small Towns	9.4	21.7	16.6	13.1	17.6	31.0
Remote Small Towns	23.8	22.4	26.0	10.7	2.0	38.9
Accessible Rural	14.8	3.0	2.4	15.0	28.4	51.2
Remote Rural	35.3	5.4	3.9	5.6	10.2	74.8

Table 5.3 shows that the mean travel distance was relatively long for pa-

Figure 5.4: Distance to a patient's GDS practice, 2011



tients who lived in a relatively rural or an Island NHS Board. By contrast, the mean travel distance was relatively short for patients who lived in a relatively urban NHS Board.

Table 5.3: The distribution of road distances by NHS Board (km)

	Mean	<1.0	1.0-1.9	2.0-4.9	5.0-10.0	10+
Ayrshire & Arran	8.6	13.0	16.9	31.4	13.8	24.8
Borders	20.0	9.6	16.7	12.3	8.5	52.9
Dumfries & Galloway	15.8	14.2	16.6	16.5	10.0	42.7
Fife	9.9	11.6	15.1	26.6	17.2	29.6
Forth Valley	7.8	11.0	19.3	29.6	20.4	19.6
Grampian	14.1	9.2	13.1	21.6	18.1	38.0
Greater Glasgow & Clyde	4.8	20.3	24.4	31.7	14.5	9.0
Highland	32.5	8.9	11.6	17.2	12.0	50.3
Lanarkshire	5.4	13.8	23.2	33.9	15.5	13.7
Lothian	6.7	17.3	19.2	30.0	18.4	15.1
Orkney	30.1	11.5	20.5	4.0	4.9	59.0
Shetland	38.4	4.1	4.9	2.9	5.1	82.9
Tayside	9.6	14.1	18.4	30.5	14.6	22.3
Western Isles	32.1	11.5	10.9	11.9	13.0	52.7

5.5 Trends in the use of public and private sector dental services

5.5.1 Introduction

While sections 5.2 and 5.4 reported two measures of access to the GDS, there are several other points of access to dental services that are not captured by GDS registration data. This section is an attempt to capture trends in those other points of access.

5.5.2 Scottish Health Survey

Each SHeS questionnaire consists of a core module of questions that are asked every year and a rotating module of questions that are asked every two years. The core module includes questions about oral health, which are reported in chapter 2. The rotating module includes questions on the duration since the respondent's last visit to a dentist and whether the treatment was provided by the public or private sector.

Figure 5.5 shows the duration since a respondent's last visit to a dentist. Less than 1% of the population in each age group had never been to a dentist.

Younger people visited the dentist more frequently than older people: almost 78% of 16- to 24-year-olds visited the dentist less than a year ago but less than 53% of people aged over 75 visited less than a year ago.

Figure 5.5: Duration since last visit to a dentist by age group

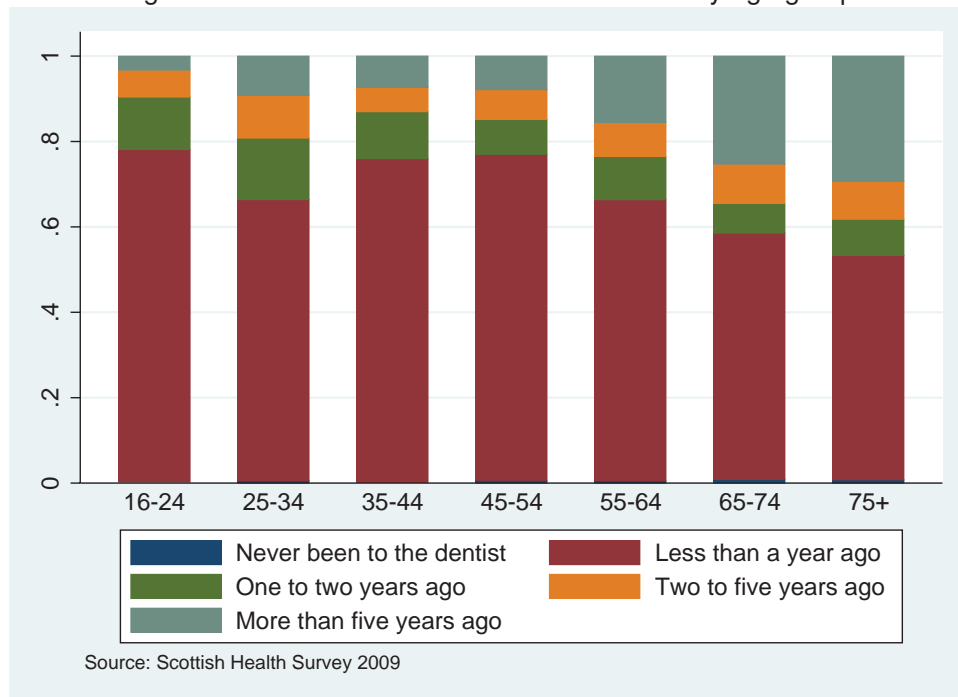


Table 5.4 uses data from SHes 2009 to report the percentage of the population that visited a dentist during the previous 12 months and, if so, the provider of treatment: almost 31% of the population did not visit a dentist during the previous 12 months; just over 51% visited the dentist and had treatment provided by the NHS; just over 17% visited the dentist and had treatment provided by the private sector; just over 1% visited the dentist and had treatment provided by both the NHS and private sector; and less than 1% visited a dentist and didn't know whether their treatment was provided by NHS or private sector.

Despite being from different surveys, the percentages reported in table 5.4 are similar to the data from the British Household Panel Survey (BHPS) reported in the last dental workforce report [5], which showed that the percentage of the population who reported having a dental check-up increased between 1999 and 2008 from 56% to 67%.²

²Since the last dental workforce report [5], the BHPS was replaced by a much larger household survey called Understanding Society. Unfortunately, Understanding Society does not include questions about dental check-ups.

Table 5.4: The percentage of the population receiving dental treatment by provider

	%
None	30.58
NHS	51.09
Private	17.16
Both	1.05
Don't know	0.12

5.5.3 Denplan

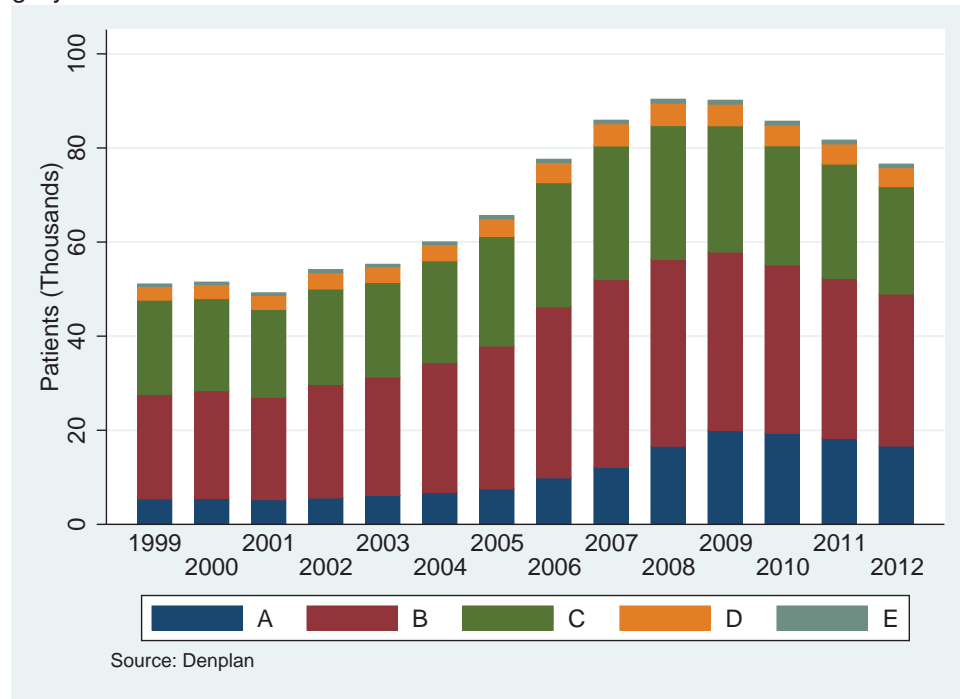
Unlike many other datasets, the data provided by Denplan give an indication of the oral health of its registered patients. After a patient registers with Denplan, a dentist conducts a detailed assessment of their oral health to establish their Denplan category (A, B, C, D or E). The Denplan category is mainly determined by the oral health and estimated future dental care needs of the patient: category A corresponds to relatively good oral health and low future dental care needs; and category E corresponds to relatively poor oral health and high future dental care needs. Figure 5.6 reports the number of patients in each Denplan category between April 1999 and April 2012. Between April 2001 and April 2008, the number of patients registered with Denplan increased by 76% overall and by 206%, 78%, 42%, 63% and 64% for each Denplan category A to E, respectively. Between 2008 and 2012 the number of patients registered with Denplan decreased by 15%. While the number of patients registered with Denplan in categories B to E decreased by 19%, 20%, 16% and 6% respectively, the number of patients registered by Denplan category A increased by 0.3%.

In April 2012, the number of patients registered by Denplan in Scotland accounted for 1.46% of the mid-2011 population estimate for Scotland.

5.6 Summary

- The utilisation of dental services is a function of the supply of dental services and the demand for dental services.
- Data on GDS registration rates showed that:
 - the registration rates of both children and adults continued to increase during the past two years with more than 87% of children and 75% of adults registered at the end of March 2012.
- Data on GDS treatments between financial years 1999-2000 and 2011-12 showed that:

Figure 5.6: The number of patients registered with Denplan by Denplan category



- the total cost of treatment increased;
 - the total number of courses of treatment increased; and
 - there was very little variation in the composition of the cost of treatment between financial years 2005-06 and 2011-12.
- An analysis of the proximity of GDS dentists and their registered patients found that:
 - patients who lived in the most deprived areas were closer to their practice than patients in the least deprived areas;
 - patients who lived in remote areas were further away from their practice than patients who lived in urban or accessible areas; and
 - patients who lived in relatively rural or Island NHS Boards were further away from their practice than patients who lived in relatively urban NHS Boards.
 - Data from the 2009 SHeS showed that:
 - during the previous 12 months, 51% of people aged 16 and over received NHS dental treatment, 17% received private dental treatment and 31% received no dental treatment; and

- less than one percent of people aged 16 and over had never been to a dentist.
- Data from Denplan showed that:
 - Between April 2008 and April 2012 the number of patients registered with Denplan decreased by 15%.

Chapter 6

Forecasting the dental workforce

6.1 Introduction

This chapter calculates and compares forecasts of the supply of and demand for NHS GPs. Section 6.2 reports two different forecasts of the supply of NHS GPs. Section 6.3 reports four forecasts of the demand for NHS GPs, which are driven by changes in the projected size and composition of the population. Section 6.4 compares the supply and demand forecasts.

6.2 Supply

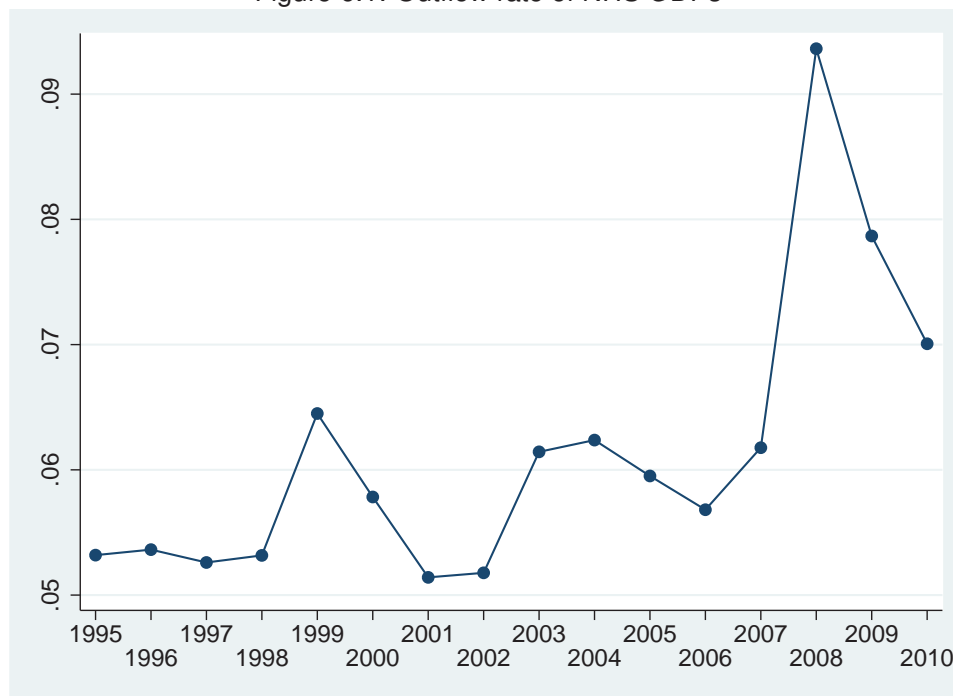
The objective of the dental workforce supply forecast model is to forecast the number of NHS GPs, which requires estimates of the future inflow and outflow of dentists.

6.2.1 Trends in the GDS outflow rate

Figure 6.1 reports the outflow rate from the GDS. The outflow rate during the past three years was higher than in previous years. In 2008 this was because of a change in the data collection process, which classified many of the dentists who would have previously been classified as salaried NHS GPs as CDS dentists. In September 2010 these dentists were reclassified as salaried NHS GPs, which increased the GDS inflow.

Section B.2 in appendix B shows that NHS GPs who were younger than 30 and older than 54 were more likely to leave than NHS GPs in other age categories. NHS GPs who qualified in Scotland were much less likely to leave than NHS GPs who qualified elsewhere, particularly during the past three years.

Figure 6.1: Outflow rate of NHS GDPs



6.2.2 Trends in GDS inflows

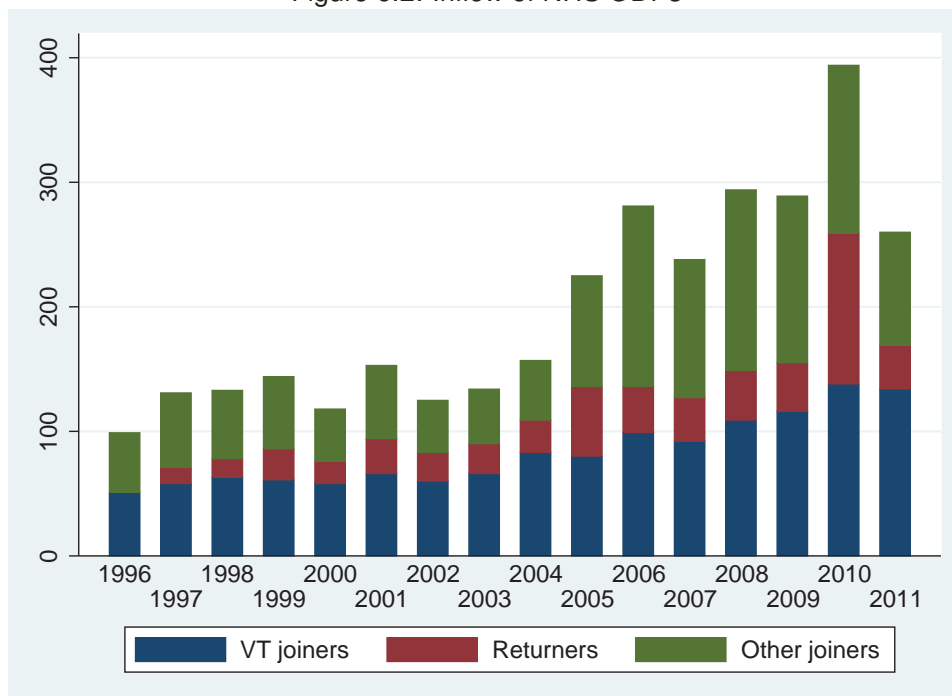
Figure 6.2 shows the inflow into the GDS from VT, Returners and Other Joiners.

The inflow from VT increased between 2005 and 2011. Section B.3.1 in appendix B shows that most VT joiners were younger than 30 and qualified in Scotland.

Dentists who were in the dental workforce, left and subsequently returned are called Returners. Section B.3.1 in appendix B shows that while there is very little variation between years, female dentists were more likely to return than male dentists, dentists who qualified in Scotland were more likely to return than dentists who qualified in other countries and younger dentists were more likely to return than older dentists.

Other Joiners are dentists who had not previously worked in the GDS. The number of Other Joiners is closely related to the number of VT numbers issued by NES and reported in figure 3.11. Section B.3.3 in appendix B shows that most Other Joiners were aged less than 40 and, since 2005, qualified from the EEA and the Rest of the World.

Figure 6.2: Inflow of NHS GDPs



6.2.3 Supply forecasts

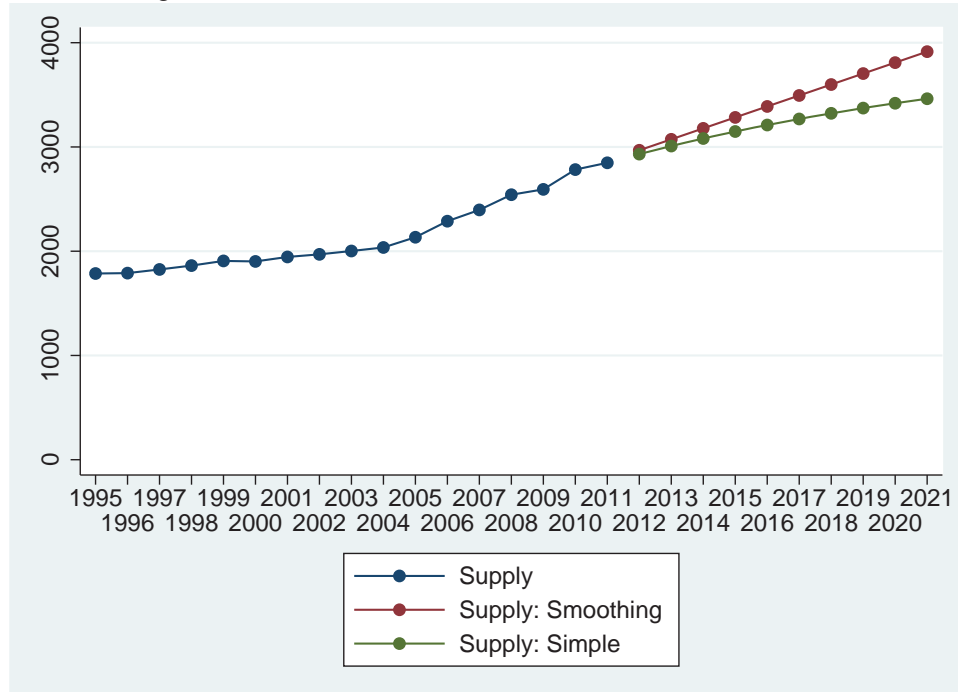
Figure 6.3 illustrates two forecasts for the number of NHS GDPs.¹ The Smoothing forecast uses a Holt-Winters approach to smooth the annual NHS GDP series [19]. The simple forecast uses the mean annual outflow rate and the mean annual inflow from 2005 onwards to generate the forecast. Both forecasts indicate the number of NHS GDPs is likely to increase during the forecast period.

6.3 Demand

This section reports four forecasts of the demand for NHS GDPs. All four forecasts are driven by changes in the size and composition of the projected population.

¹Previous dental workforce reports also included a more complex forecast, which used information on the relationship between inflows and outflows and the age, sex and country of qualification of NHS GDPs. This report has simplified that forecast but reports the relationships between GDS flows and the characteristics of NHS GDPs in appendix B.

Figure 6.3: The actual and forecast number of NHS GDPs



6.3.1 Population forecast

Figure 6.4 uses the latest population projections from the General Register Office for Scotland (GROS) to illustrate the changes in the projected size and composition of the population during the 10-year forecast period. The population of Scotland is projected to increase because of a positive inflow of migrants and because the birth rate is expected to exceed the death rate. There is projected to be a relatively large increase in the number of people aged over 60.

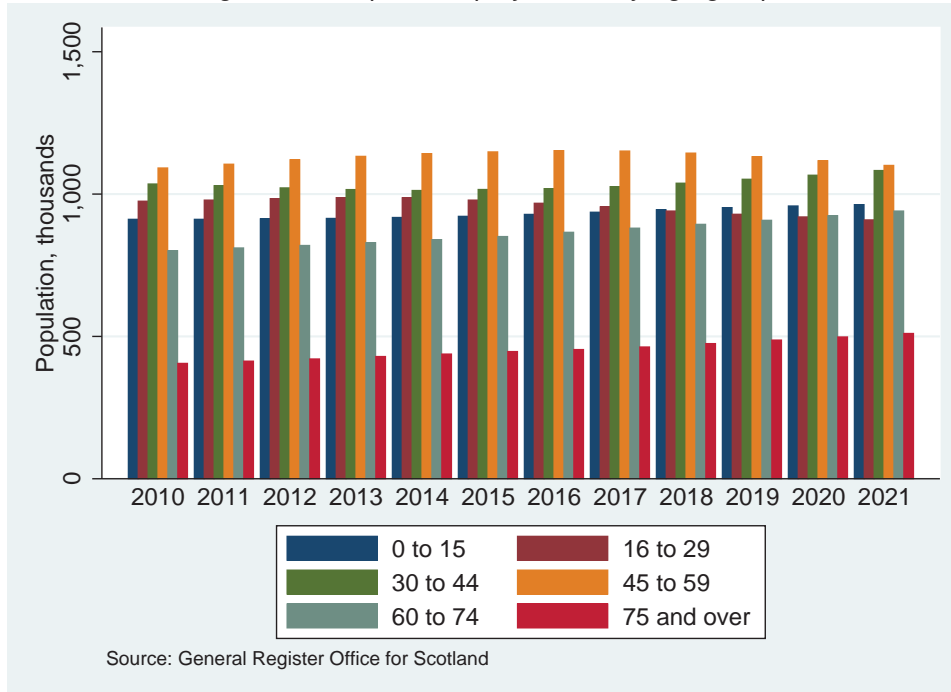
6.3.2 The demand for NHS GDPs

Figure 6.5 reports four NHS GDP demand forecasts, each corresponding to a different potential objective.

DAP Registration illustrates the demand for NHS GDPs implied by the registration rates from the Dental Action Plan (DAP) Monitoring Forms for NHS Boards: 85% of children aged 0-17; 65% of adults aged 18-64; and 50% of adults aged 65 and over.

All children registered illustrates the demand for NHS GDPs implied by a registration rate of: 100% for children aged 0-17; 65% for adults aged 18-64; and 50% for adults aged 65 and over.

Figure 6.4: Population projections by age group



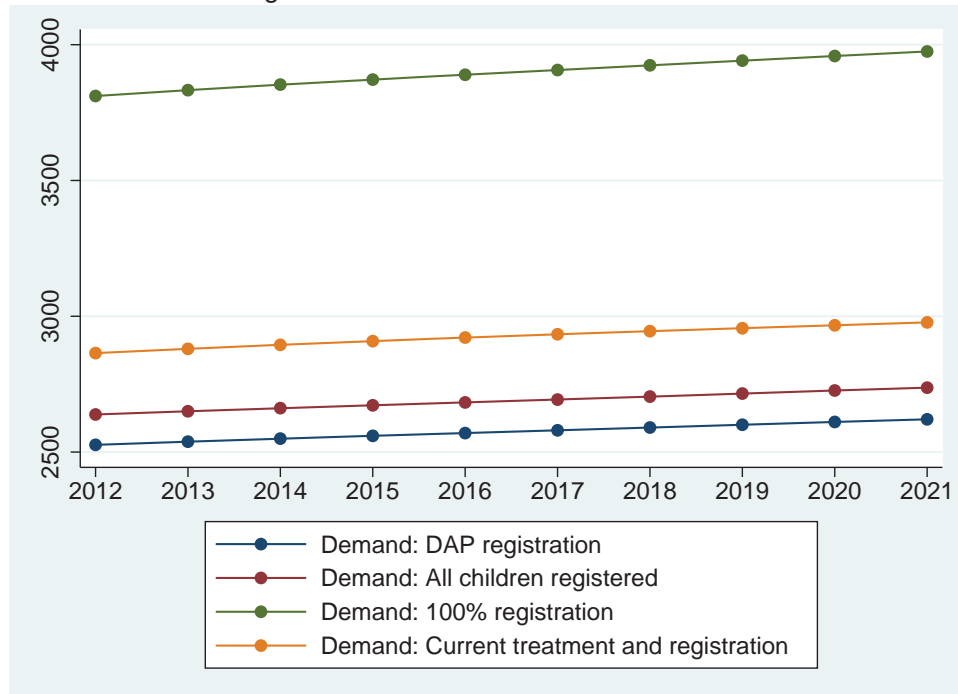
100% registered illustrates the demand for NHS GDPs implied by a registration rate of 100% for children and adults.

Current treatment and registration illustrates the number of NHS GDPs required to produce the same amount of treatment as in the financial year 2011-12 or the registration rates at September 30th 2011. Trends in the real value of treatments provided in the GDS between financial years 1999-2000 and 2011-12 are reported in appendix C.

6.3.3 The demand for NHS GDPs accounting for dental therapists

Several sources of information report that dental therapists can provide about 40% of the treatment provided by NHS GDPs [5, 20, 21]. The current GDC Scope of Practice states that dental therapists are only allowed to carry out certain items of dental treatment under prescription from a dentist. If the restrictions on direct access to DCPs are removed, as recommended by the OFT, then the demand for NHS GDPs is likely to decrease relative to the demand for dental therapists.

Figure 6.5: NHS GDP demand forecasts



6.4 A comparison of the supply and demand forecasts

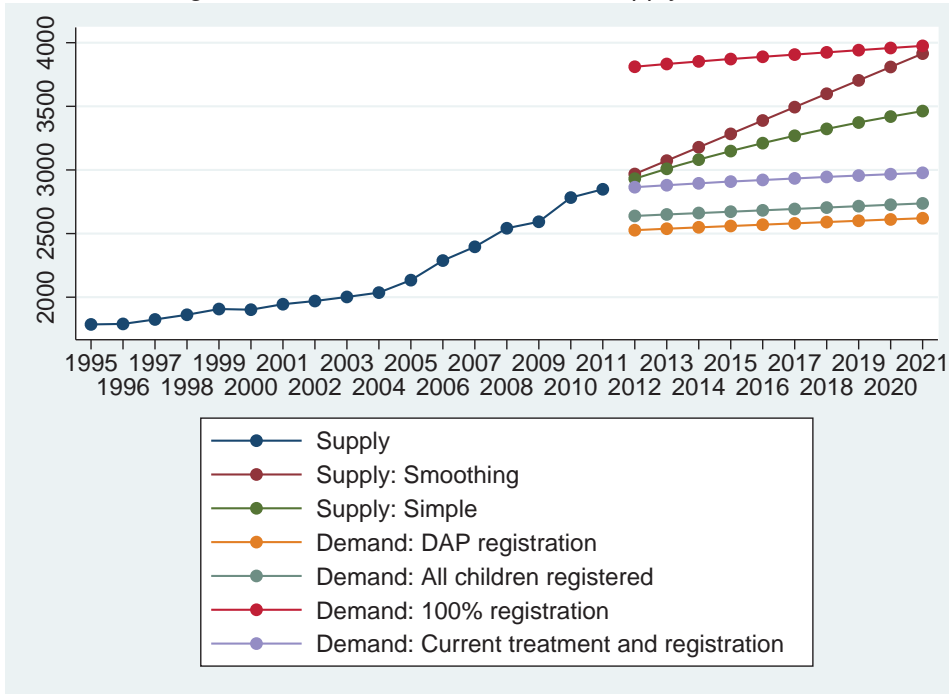
Figure 6.6 compares the supply and demand forecasts. The number of NHS GDPs at September 30th 2011 was greater than two of the demand forecasts. The number of NHS GDPs at September 30th 2012 is forecast to be greater than the current treatment and registration demand forecast. Figure 6.6 therefore provides some evidence of an excess supply of NHS GDPs, which increases during the forecast period.

Moreover, the forecast excess supply of NHS GDPs may be an underestimate because the forecast demand for NHS GDPs does not account for the potential contribution of dental therapists with or without the removal of restrictions on direct access.

6.5 Summary

- If recent trends continue, there is forecast to be a relatively large increase in the supply of NHS GDPs during the next 10 years.
- The projected changes in the size and composition of the population are forecast to increase the demand for NHS GDPs during the next 10 years.

Figure 6.6: NHS GDP demand and supply forecasts



- Compared to most demand forecasts, there is forecast to be an excess supply of NHS GDPs, which increases during the forecast period.
- The forecast excess supply of NHS GDPs is likely to be an underestimate because the forecast demand for NHS GDPs does not account for the potential contribution of dental therapists with or without the removal of restrictions on direct access.

Chapter 7

Avenues for future work

This reports suggests several avenues for future work.

While an increasing amount of information is available on the providers of dental services in Scotland, there is still very little routinely collected data on the activity and labour market outcomes of DCPs in general and dental therapists in particular. Information on activity and labour market outcomes will be essential to assess the impact of the removal of restrictions on direct access to DCPs recommended by the OFT.

Many dentists are trained in countries outside Scotland and many dentists leave Scotland to practise in other countries. An important area of future work is therefore to examine the interaction between the training and labour markets for dentists in other countries and those in Scotland.

There are several recruitment and retention allowances available to support the provision of dental services in Scotland [22]. The historically high number of dentists and the pressure on public sector finances, raises questions about the impact of these recruitment and retention incentives on outcomes such as access to dental services in relatively deprived and relatively remote areas of Scotland.

While the overall amount of dental services provided in Scotland has increased during recent years, there may have been some substitution between the private and public sectors. Questions about more recent use of public and private sector dental services and the extent of any substitution between the two will be asked in the 2011 SHeS and reported in the next dental workforce report.

Although there have been significant improvements in oral health in Scotland during the past few years, there is evidence of persisting inequality. Policy initiatives like Childsmile, for children, and the National Oral Health Improvement Strategy for Priority Groups [23], for adults, are attempts to reduce this variation. The implications of these initiatives for the dental workforce will need to be assessed.

The increase in the incidence of oral cancer in the Scottish population has

implications for dentists, hygienists and therapists all of whom are trained to screen for the disease, with an extended role for dentists in its diagnosis. Further work on the skill mix and integration of the workforce around detection, diagnosis and referral for treatment of this disease may be required.

Appendix A

Quality assuring the dental workforce data

A.1 Data sources

The dental workforce data are combined from four sources:

1. Scottish Workforce Information Standard System (SWISS) provides information on Hospital, Community and Public Health Services (HCHS) dental staff and dentists;
2. MIDAS provides information on salaried and non-salaried GDS dentists;
3. NHS Board collections provide information on salaried GDS dentists; and
4. NES provides information on VDPs.

A.2 GDC numbers

The Dental Workforce project uses five fields to produce many of the figures and tables used in this report: GDC number, age, sex, country of qualification and sector. The key field is the GDC number, which is a unique identifier for each dentist. This allows the stock of dentists to be calculated correctly at September 30th each year and the flows to be calculated correctly between years.

Unfortunately, not all dentists captured from SWISS have a GDC number reported. In these cases, a SWISS-specific unique identifier, the SWISS ID, is used instead.

The additional quality assurance work conducted by the Dental Workforce Project is an attempt to replace these SWISS IDs with GDC numbers. This additional quality assurance means that the number of dentists reported in table 3.1 differs from the National Statistics reported by ISD.

In an attempt to replace SWISS IDs with GDC numbers, the details of dentists were checked against the dental workforce data, the SDVTECC data and the GDC register. The details of the remaining dentists were sent to the GDC to be checked manually.

A.3 Country of qualification, year of qualification, year of registration

Once the GDC number was quality assured, additional information from the GDC register was linked. This included country of qualification, year of qualification and year of registration.

A.4 Internal consistency

Occasionally, either the date of birth or sex or both of dentists may vary between years. These fields are made consistent during the sample period by replacing each observation with the modal observation for each dentist.

A.5 Generic salaried dentists

GDC numbers that were not associated with individual dentists were excluded.

Appendix B

NHS GDP outflows and inflows and the characteristics of NHS GDPs who leave and join

B.1 Introduction

B.2 NHS GDP outflows

Figure B.1 shows that the number of NHS GDPs leaving the workforce increased since 1995.

The top left panel of figure B.2 shows that about 40% of the outflow of NHS GDPs in 2010 was accounted for by NHS GDPs aged under 35. The top right panel shows that while NHS GDPs who qualified in Scotland accounted for the largest percentage of outflow, an increasing percentage of outflow was accounted for by NHS GDPs who qualified in non-UK countries in the EEA and countries in the rest of the world. The bottom left panel shows that about 60% of the outflow from the GDS in each year was accounted for by males.

Figure B.1: NHS GDP outflows

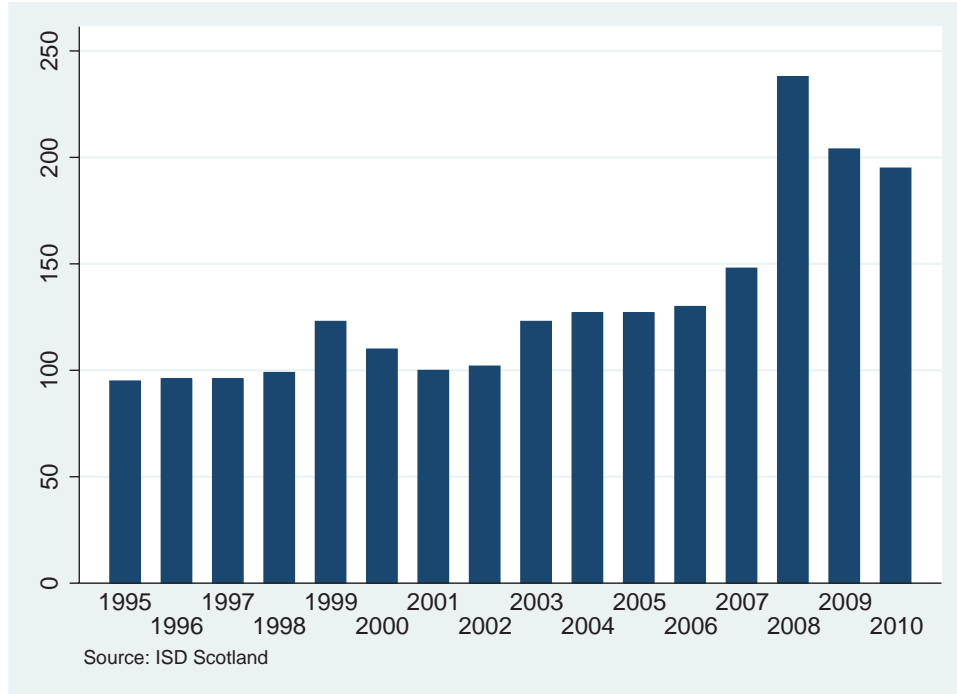
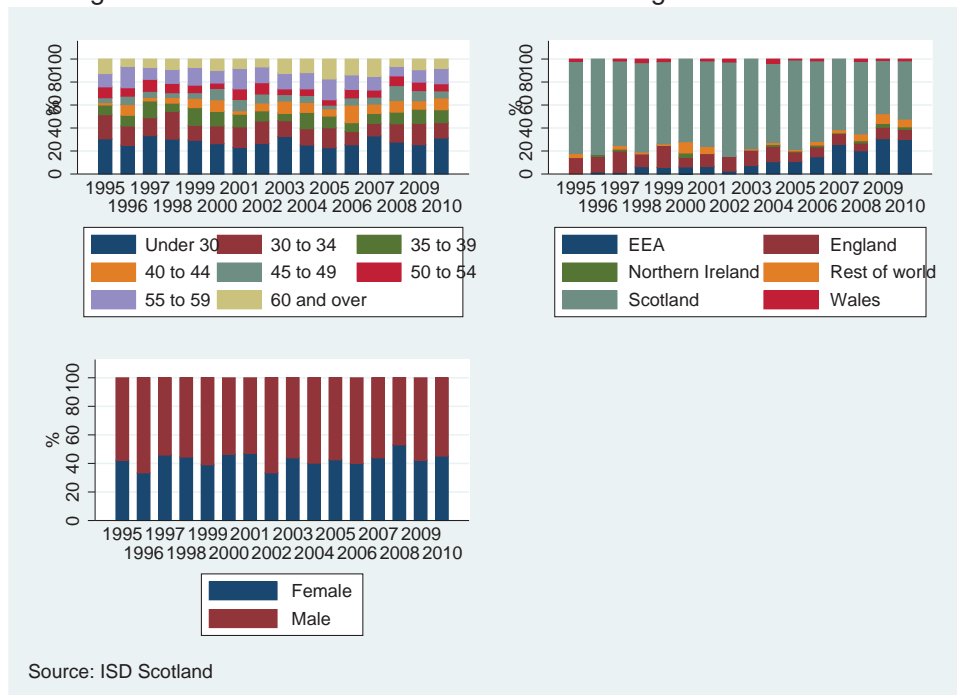


Figure B.2: Characteristics of NHS GDPs leaving the GDS workforce



B.3 NHS GDP inflows

Figure B.3 shows that the inflow from DVT increased from 51 in 1996 to 134 in 2011.

B.3.1 VT Joiners

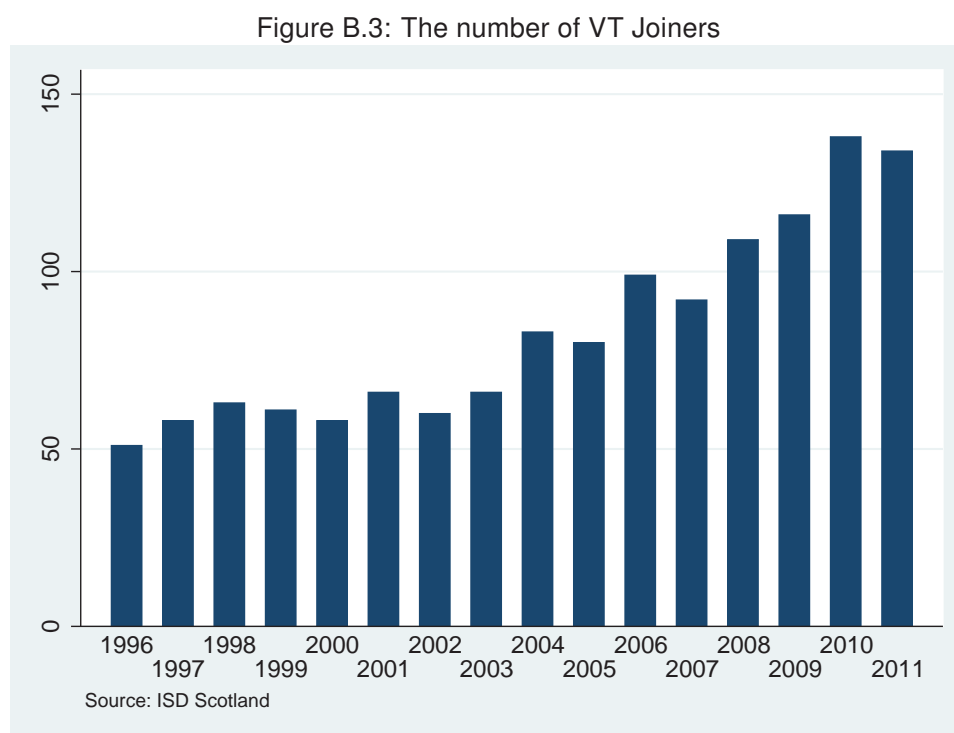
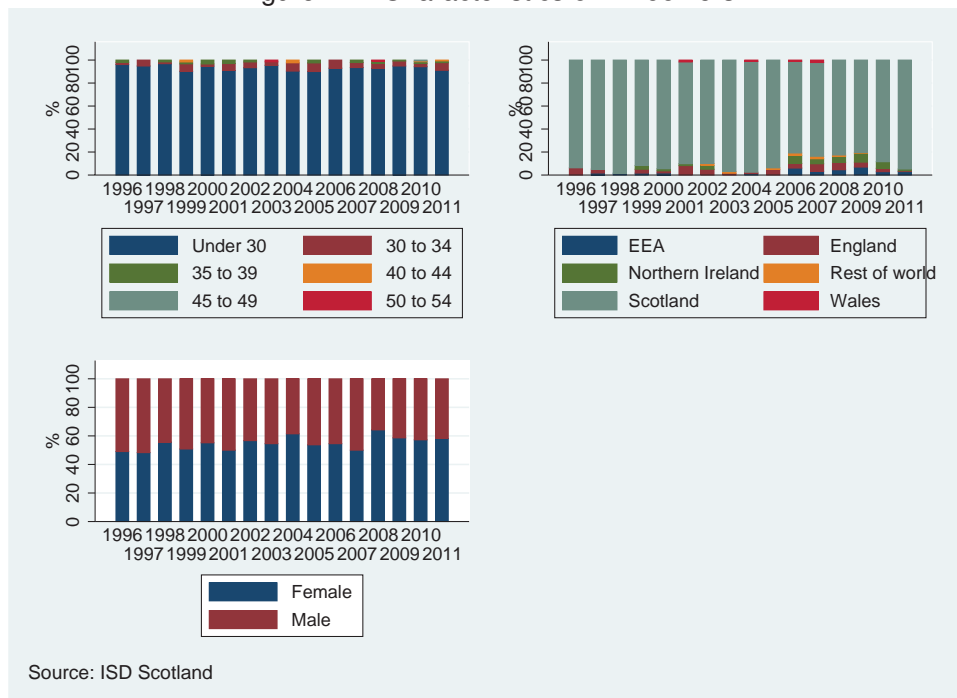


Figure B.4 shows that the vast majority of the inflow from DVT was from dentists aged under 30 who qualified in Scotland. Between 1996 and 2011 the percentage of female dentists joining from DVT increased from about 49% to 58%.

Figure B.4: Characteristics of VT Joiners



B.3.2 Returners

Figure B.5 shows that, apart from 2005 and 2010, the number of returners each year was less than 50. The increase in 2005 may have been the result of initiatives arising from the Dental Action Plan [13]. The large increase in 2010 reflects the reclassification of salaried dentists as NHS GPs.

Figure B.5: The number of Returners

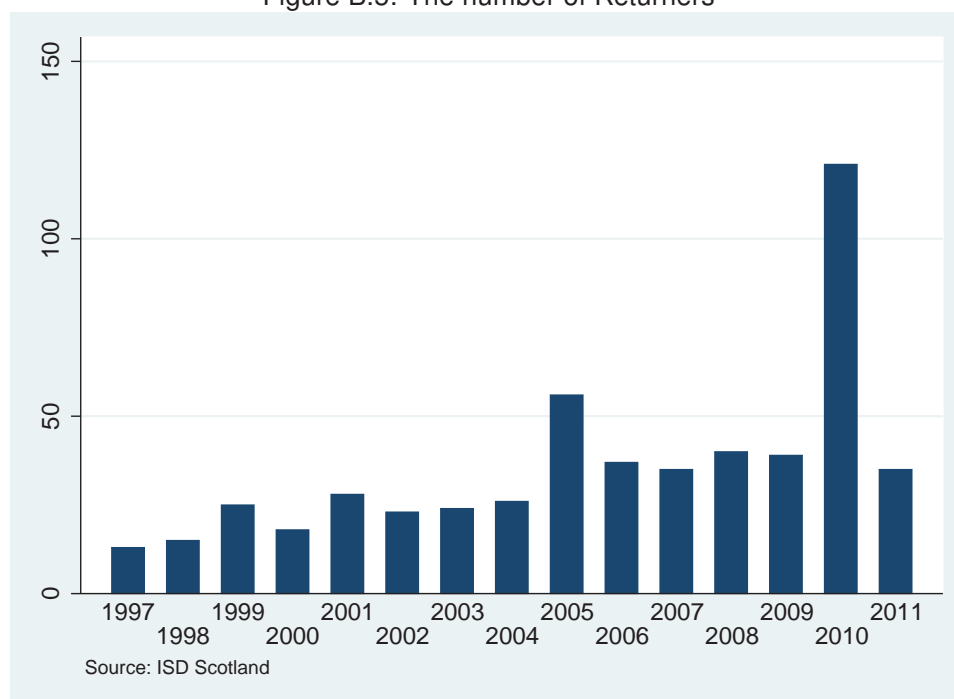
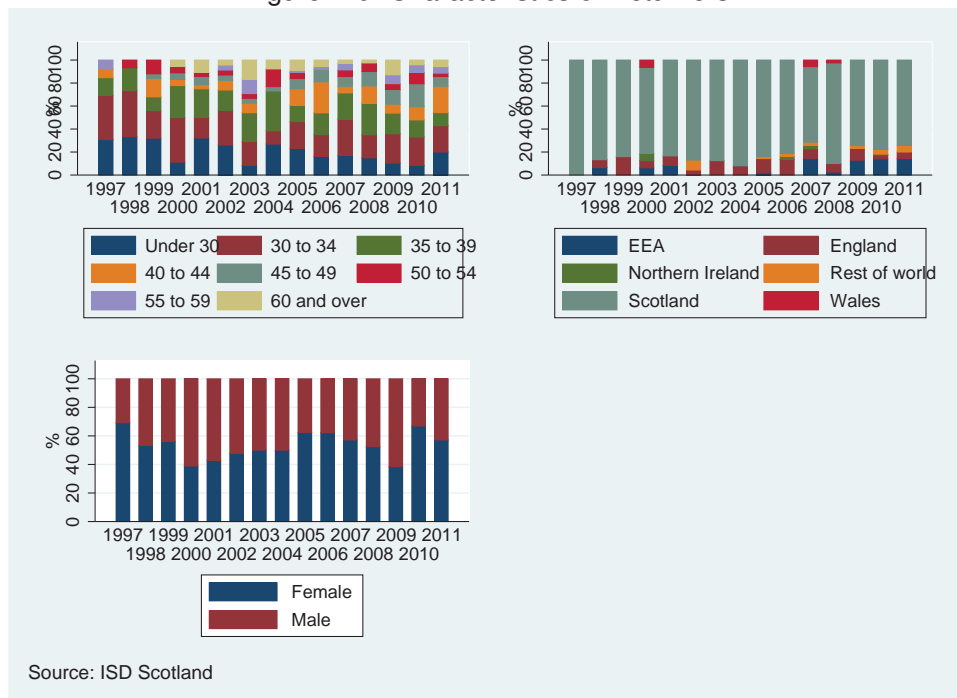


Figure B.6 shows that almost 80% of returners in 2011 were younger than 45 and qualified in Scotland. In 2011 almost 60% of the GDS Returners were female.

Figure B.6: Characteristics of Returners



B.3.3 Other Joiners

Figure B.7 shows that since 2005 the number of Other Joiners was more than 80 each year.

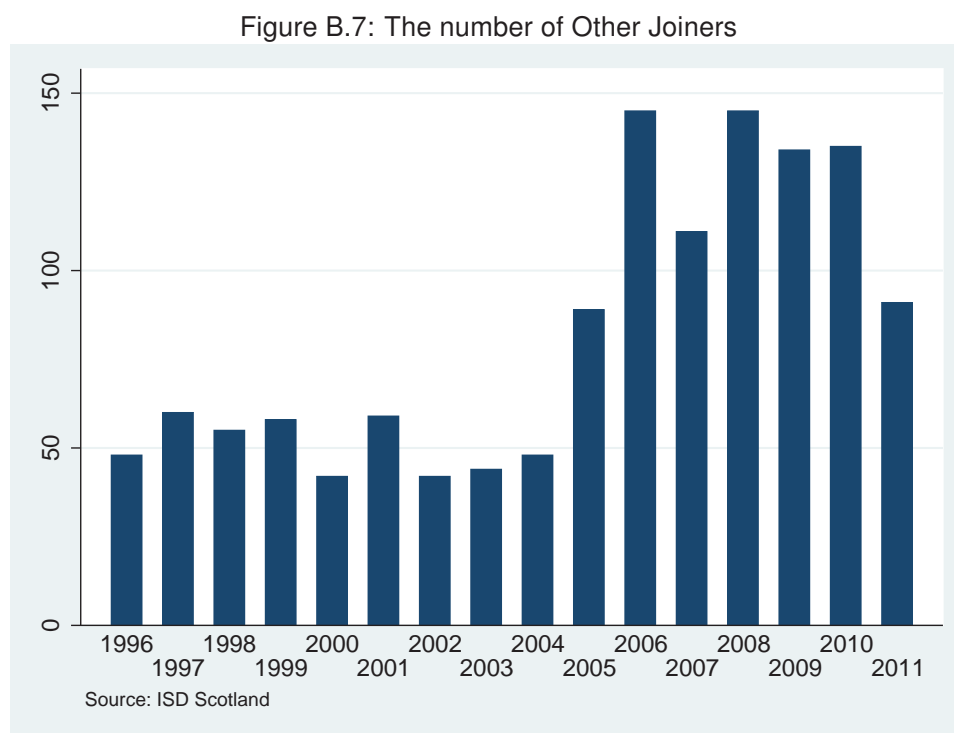
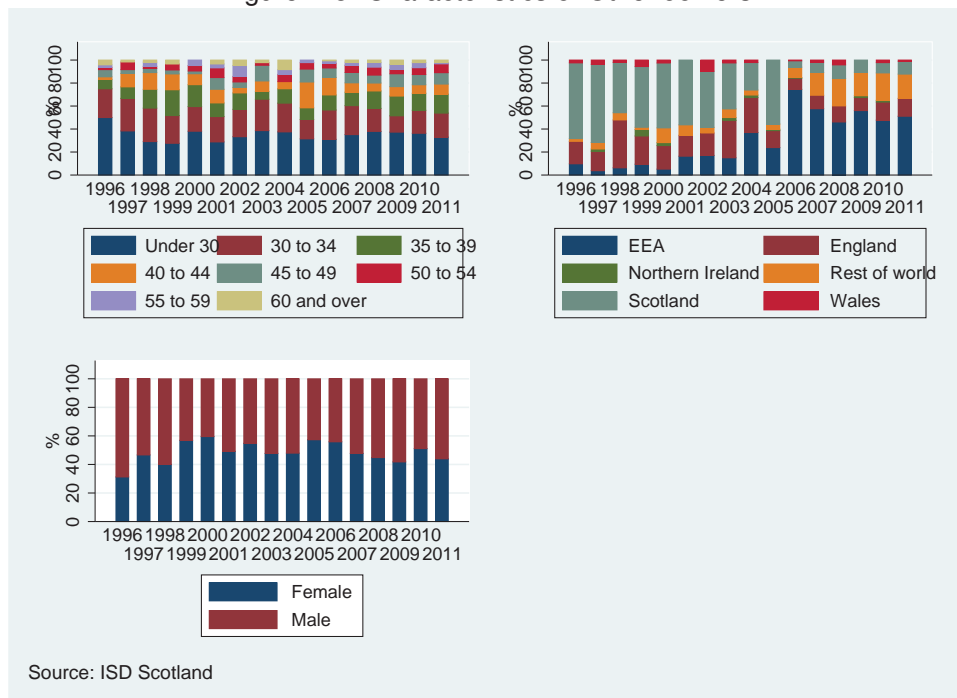


Figure B.8 shows that, rather like the Returners, almost 80% of Other Joiners were younger than 45. Since 2005 an increasing percentage of Other Joiners was accounted for by dentists who qualified in countries from the EEA and the rest of the world. Almost 60% of Other Joiners in 2011 were male.

Figure B.8: Characteristics of Other Joiners



Appendix C

Treatment demand forecast

C.1 Introduction

The treatment demand forecast uses the GROS population projections reported in chapter 5 and the cost of GDS treatment to calculate the cost of treatment required by the future population of Scotland. Total cost is defined as the sum of salaried and non-salaried GDS treatment fees and is expressed in 2011-12 prices by using the Gross Domestic Product deflator, which is a measure of general inflation in the domestic economy.

C.2 Trends in the cost per course of treatment

Figures C.1 to C.5 illustrate recent trends in the cost per course of treatment by age category of patients, their sex and the type of treatment they received [2].

Figure C.1 shows that the cost of Assessment and Diagnostic treatments per course decreased in 2010-11 and 2011-12 in almost all age categories for both females and males. The cost of Assessment and Diagnostic treatments per course was lower for people aged 60 and over than for people in almost every other age category.

Figure C.2 shows that the cost of Core treatments per course decreased slightly in 2010-11 and 2011-12. The cost of Core treatments per course was lower for people aged 60 and over than for people in almost every other age category.

Figure C.3 shows that the cost of Complex treatments per course decreased in 2010-11 and 2011-12. The cost of Complex treatments per course was higher for people aged 60 and over than for people in almost every other age category.

Figure C.4 shows that the cost of Orthodontic treatments per course decreased for children aged 0 to 15 in 2010-11 and 2011-12. The cost of Orthodontic treatments per course for people aged 16 to 29 in 2010-11 and 2011-12 was about the same as in 2009-10.

Figure C.1: Assessment and Diagnostic treatments

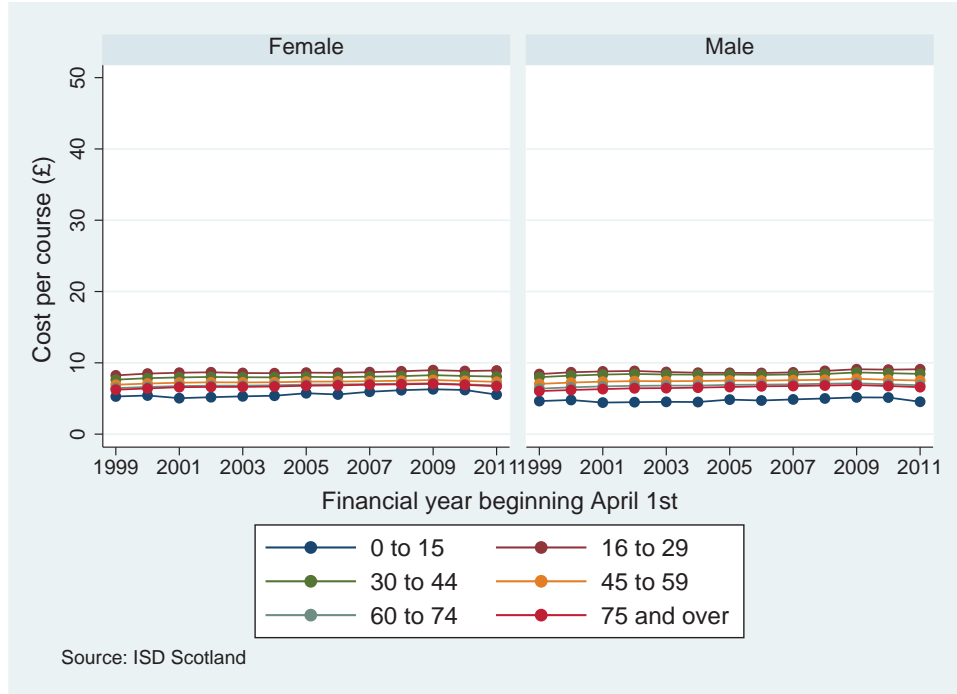


Figure C.2: Core treatments

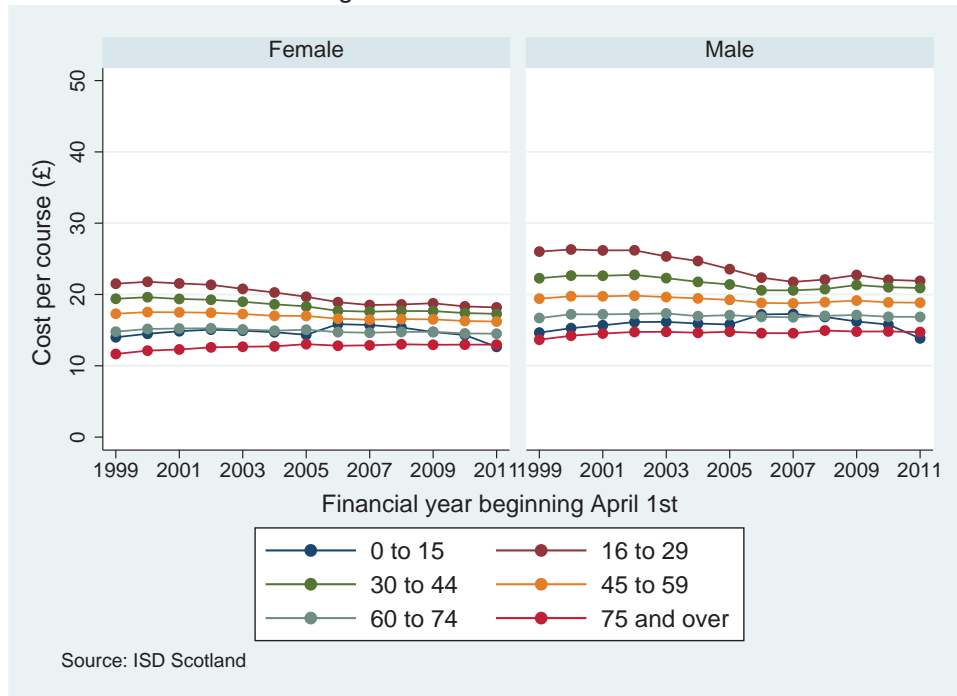


Figure C.3: Complex treatments

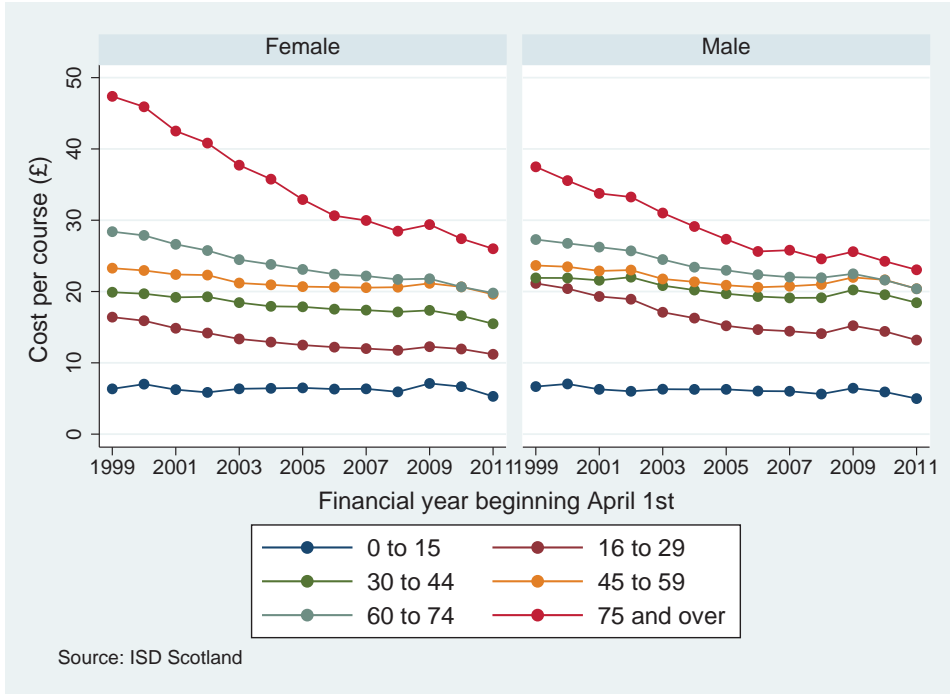


Figure C.4: Orthodontic treatments

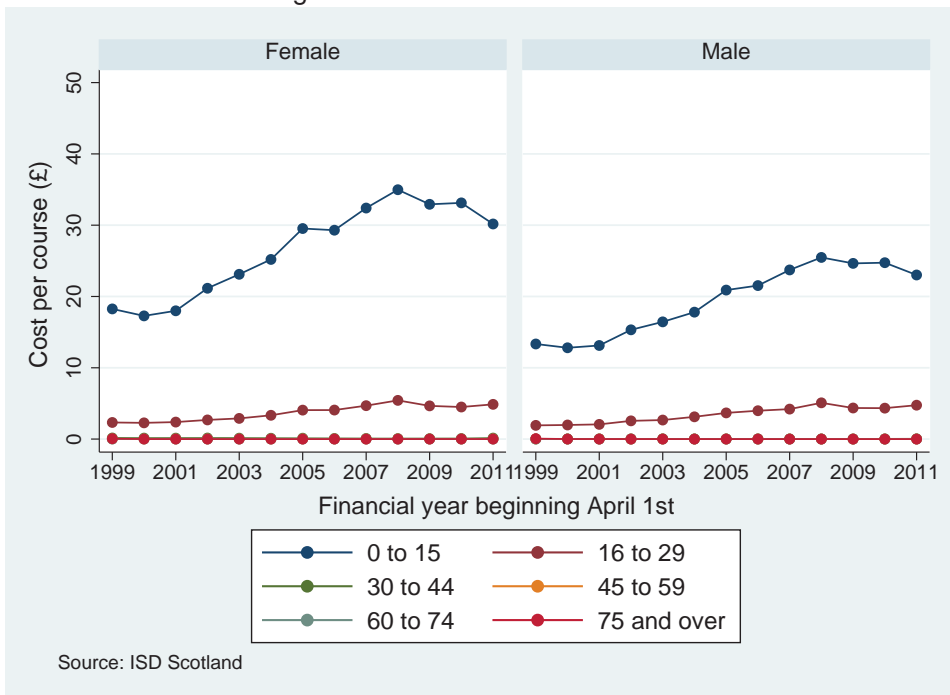
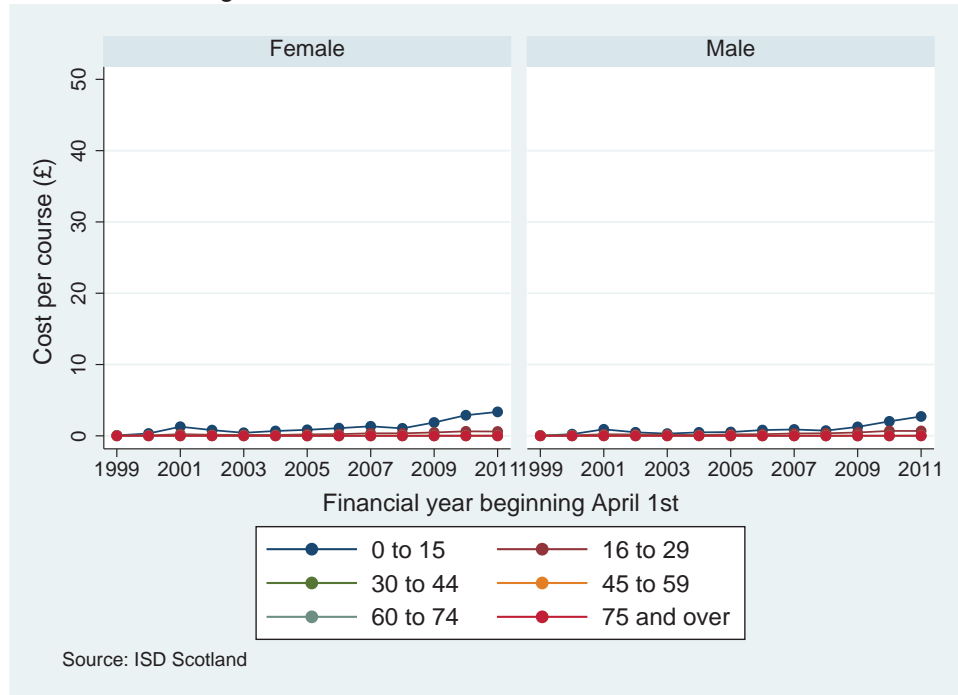


Figure C.5 shows that the cost of treatments Not Elsewhere Classified per course increased in 2010-11 and 2011-12.

Figure C.5: Treatments not elsewhere classified



Appendix D

Dental Workforce Project team

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Acronyms

ASHE Annual Survey of Hours and Earnings.

BDS Bachelor of Dental Surgery.

BHPS British Household Panel Survey.

CDS Community Dental Service.

CDT Clinical Dental Technician.

DAP Dental Action Plan.

DCP Dental Care Professional.

DUBS Dental Undergraduate Bursary Scheme.

DVT Dental Vocational Training.

EEA European Economic Area.

GCU Glasgow Caledonian University.

GDC General Dental Council.

GDP General Dental Practitioner.

GDS General Dental Service.

GROS General Register Office for Scotland.

HCHS Hospital, Community and Public Health Services.

HDS Hospital Dental Service.

HEI Higher Education Institution.

HESA Higher Education Statistics Agency.

ISD Information Services Division.

JA Jobseeker's Allowance.

MIDAS Management Information and Dental Accounting System.

NDIP National Dental Inspection Programme.

NES NHS Education for Scotland.

NSS NHS National Services Scotland.

OFT Office of Fair Trading.

OHP Oral Health Practitioner.

OHS Oral Health Science.

OS Ordnance Survey.

OTh Orthodontic Therapist.

P1 Primary 1.

P7 Primary 7.

SDVTECC Scottish Dental Vocational Training Equivalence and Certification Committee.

SFC Scottish Funding Council.

SG Scottish Government.

SGUR Scottish Government Urban Rural.

SHBDEP Scottish Health Boards Dental Epidemiological Programme.

SHeS Scottish Health Survey.

SIMD Scottish Index of Multiple Deprivation.

SNS Scottish Neighbourhood Statistics.

SOC Standard Occupational Classification.

SQA Scottish Qualifications Authority.

SWISS Scottish Workforce Information Standard System.

UCAS University and College Admission Service.

UHI University of the Highlands and Islands.

VDP Vocational Dental Practitioner.

VT Vocational Training.

WTE Whole Time Equivalent.

