RESEARCH

IN BRIEF

- The majority of primary dental care continues to be provided under NHS arrangements by practitioners working in partnership/group practices.
- Hygienists support is more likely to be found in insurance-based practices.
- Practitioners attend on average five or more postgraduate courses a year.
- Few practitioners are currently using on-line CPD.
- A minority of practitioners routinely use magnification.

Contemporary dental practice in the UK: demographic data and practising arrangements

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Objectives: To investigate, by questionnaire, various aspects of primary dental care provision in the North West of England and Scotland. **Method:** A questionnaire containing 79 questions was sent to 1,000 practitioners, selected at random, in the North West of England and Scotland. Non-responders were sent another questionnaire after a period of 4 weeks had elapsed.

Results: Overall a response rate of 70% was achieved. The majority of practitioners were practice principals (65%), working in a group NHS practice (80%) located in a city or town centre (49%). On average 10-20 patients were treated each session with fewer patients treated per session under private arrangements. Many practitioners were found to lack hygienist support (44%) and to employ unqualified dental nurses (82%). Younger practitioners were more likely than senior colleagues to have access to up-to-date computers whilst 37% and 74% of respondents never used CAL programmes or magnification respectively. Contemporary cross-infection control standards were used by the majority of practitioners, although 3% of practitioners reported only autoclaving their handpiece once a day.

Conclusions: The majority of practitioners, involved in this study, worked under National Health Service (NHS) regulations as principals in a group practice where the workload was greater than the private/independent sector. Contemporary cross-infection procedures were used routinely. In contrast computer-aided learning programmes and magnification were not used routinely. The practitioners in this study employed significant numbers of unqualified dental nurses.

INTRODUCTION

Patterns of dental disease have changed dramatically over the past quarter of a century, public awareness of the benefits of good oral health has increased and the impact of developments, includ-

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Refereed Paper doi: 10.1038/sj.bdj.4811956 Received 23.05.03; Accepted 20.01.04 © British Dental Journal 2005; 198: 39–43 ing fluoride in toothpaste, is being realised.¹ Along with these changes, patients' expectations from dental treatment have increased. In addition, patients have a greater awareness of dental aesthetics and increasingly expect to remain at least partially dentate throughout life. The growth of consumerism, in which the patient plays an active part in their treatment decisions, may also have changed the attitudes of dental healthcare workers. Against this backdrop of change, there is a paucity of data on existing practising arrangements, let alone information on the use of materials, techniques and related technologies. It would therefore appear timely to establish a mechanism to map the features of general dental practice in the UK. It is the purpose of this paper to report the results of an initial survey that could form the basis of a future process to provide a profile of contemporary general dental practice in the UK. Two other papers report the results in relation to directly placed and indirectly placed restorations.^{2,3}

MATERIALS AND METHODS

A questionnaire was designed to determine practising arrangements of UK general dental practitioners. The questions were based, in part, on those used in an annual survey of dentists in the USA by the Clinical Research Associates.⁴ The questionnaire, which comprised 18 sections, contained a total of 79 questions. This was piloted by 10 dentists in the Manchester area, whose feedback led to a small number of changes to the questionnaire.

The names and addresses of 500 practising dentists in Scotland and 500 practising dentists in North-West (NW) England were selected at random from databases of practitioners so that the practitioners were evenly distributed across the two geographical areas being investigated. The questionnaire was distributed during 2000, together with a covering letter and a stamped, addressed return envelope. A second questionnaire was sent to non-responders after 4 weeks. The data contained in the returned questionnaires were computerised and analysed using *SPSS* for Windows version 10.⁵ Summary statistics including cross-tabulation tables were carried out, and, where appropriate, non-parametric tests including Mann-Whitney and Kruskal Wallis were performed.

RESULTS

General demographic data

Seven hundred and one useable replies were received, of which 345 (69%) were from NW England and 356 (71%) from Scotland,

giving an overall response rate of 70%. Of the respondents, 73% (n = 514) were male, 65% (n = 450) were practice principals, 33% (n = 227) were associates, 2% (n = 12) assistants and 1% (n = 8) vocational dental practitioners. A majority worked in a partner-ship/group practice arrangement, with 80% (n = 553) practising in a group practice. Practices with more than one dentist had two (28%, n = 195), three (27%, n = 186) or four (14%, n = 99) dentists.

Regarding the location of the practice, 49% (n = 341) were in a city or town centre, 43% (n = 296) in a suburban location and 8% (n = 55) in a rural location. A majority of dentists (86%, n = 600) treated patients within the National Health Service (NHS) arrangements, 9% (n = 59) opting to treat patients under private/independent arrangements or insurance-based arrangements (2%, n = 14) and 3% (n = 24) of respondents treated patients under other, non-specified, contractual arrangements. No statistically significant differences were noted in the funding arrangements for treatment between dentists practising in Scotland and those in NW England. Nor were there any significant differences between male and female dentists with respect to practice location.

Postgraduate education

Regarding attendance at postgraduate meetings, 5% of respondents (n = 34) said they attended no courses in a calendar year, while 27% (n = 187) attended one or two courses, 27% (n = 190) attended three or four courses, and 41% (n = 287) attended five or more courses. No significant differences were found in respect of courses attended between single-handed and partnership practices, in relation to practice location (urban/suburban/rural), or between practices in Scotland and NW England. There were no significant differences between number of courses attended by NHS and non-NHS practitioners.

umber of patients per session	Number (%)	of respondents
15	200	(29)
20	119	(17)
12	90	(13)
10	70	(10)
25	28	(4)
18	25	(4)
16	21	(3)

Practice workload

The number of patients treated in a typical session is shown in Table 1, with 83% (n = 572) of the respondents treating 10 to 20 patients per session. Using the Kruskal Wallis test, it was found that there was a highly significant difference (P < 0.0001) between type of practice and the number of patients seen in each session. The results suggest that NHS dentists see significantly more patients in a session than other types of practitioners (medians: NHS = 15, insurance based = 12 and private = 10). The dentists in NW England were found to be likely to treat more patients per session than the dentists in Scotland. This difference was highly significant (P < 0.0001) using the Mann-Whitney U test.

Hygienist support

The numbers of hygienists in the practices surveyed and the number of hygienist sessions each week are shown in Tables 2 and 3. The hygienists typically treated 10 to 12 patients each session, although a small number (n = 5) saw 2 patients per session. A highly significant difference was noted (P < 0.0001) between the type of practice and the number of hygienists employed, with

Table 2	Number	of dental	hygienists	in respondents'	practices
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Number of hygienists	Number (%) of respondents	
0	310 (44)	
1	256 (37)	
2	89 (13)	
3	24 (3)	
4	14 (2)	
5 or more	8 (1)	
Total	701 (100)	

Table 3 Number of hygienist sessions per week

Number of hygienist sessions	Number (%) of respondents
0	311 (44)
1	47 (7)
2	61 (9)
3	36 (5)
4	54 (8)
5	26 (4)
6	41 (6)
7	18 (3)
8	25 (4)
9	12 (2)
10	31 (4)
11 or more	39 (4)
Total	701 (100)
Total	701 (100)

the insurance-based practices having the greatest number of hygienists and the NHS practices the least.

Nursing support

The numbers of qualified and unqualified dental nurses employed in the practices are shown in Tables 4 and 5. The number of practices that employed qualified dental nurses was greater than the number that employed unqualified dental nurses, however, there was no statistical difference between type of practice and the employment of qualified and unqualified dental nurses.

Methods for pain control

Local anaesthesia was the most commonly used method of pain control, with 97% (n = 679) of respondents employing this technique. Intravenous sedation was used by 21% (*n* = 149), nitrous oxide/relative analgesia by 9% (n = 65), hypnosis by 6% (n = 42) and TENS (transcutaneous electrical nerve stimulation) by 1% (n = 4) of the respondents. One practitioner used acupuncture. Hospital or community-based general anaesthesia was used by 56% (n = 394) of respondents. Regarding the use of communitybased general anaesthesia and intravenous sedation, there was no statistical difference between the practitioners based in NW England or Scotland. However, there was a statistically significant difference in the provision of nitrous oxide/relative analgesia and whether the practice was in NW England or Scotland. Sixty-eight per cent of practitioners in NW England (n = 235) answered 'yes' in respect of the provision of nitrous oxide/relative analgesia, compared with 32% (n = 114) of practitioners in Scotland (P = 0.003).

Use of practice-based computers

When asked about the computer system used by the practice, 65% (n = 458) responded. Twenty-three per cent (n = 162) of these respondents used a Pentium II computer, with 11% (n = 74) using a Pentium III. A variety of systems were used by the other respon-

 Table 4 Numbers of qualified dental nurses employed by the respondents' practices

Number of qualified nurses	Number (%) of respondents	
0	99 (14)	
1	156 (22)	
2	168 (24)	
3	127 (18)	
4	73 (10)	
5	40 (6)	
Other	38 (6)	
Total	701 (100)	

Table 5	Number	of unqualified	dental ı	nurses	employed by	the
respond	lents' pra	ctices				

Number of unqualified nurses	Number (%) of respondents
0	124 (18)
1	178 (25)
2	190 (27)
3	98 (14)
4	54 (8)
Other	57 (8)
Total	701 (100)

dents. Of the total number of respondents, 31% (*n* = 219) had internet access and 30% (*n* = 209) used their computer routinely for transmitting payment claims, while 30% (n = 211) never used computer transmission for payment claims. There was a highly significant difference (P < 0.0001) in the use of computers for data transmission in NW England and Scotland, with dentists in NW England being more likely to use computers for the transmission of payment claims than those in Scotland. Of the respondents in NW England, 74% (n = 195) were found to use computer transmission of payment data. Further analysis indicated that there was no difference between single-handed and group practices and their use of a computer system. However, when type of computer system was compared with number of years graduated using a Kruskal Wallis test, a statistically significant difference was noted (P = 0.011), with recently graduated dentists having been more likely to have a Pentium III computer or equivalent system compared with those graduated for a longer time who tended to have a Pentium I or 486.

When asked if they used CAL (computer-aided learning) programmes, 37% (n = 261) of respondents replied 'never', 26% (n = 179) stated that they used such programmes occasionally and 2% (n = 13) replied that they used such programmes routinely. Further analysis indicated that there was no difference between single-handed and group practices in respect of their use of CAL.

Equipment used

Regarding the type of dental unit used by the respondents, 65% (n = 448) used a cart style of delivery, 23% (n = 162) used an 'over the patient' delivery system and 12% (n = 82) used 'other' types of delivery systems. Concerning contamination of the unit's compressed air, 46% of respondents (n = 321) stated that they had experienced no contamination, 22% (n = 154) responded 'don't know', 21% (n = 149) had noted water contamination and 9% (n = 61) had noted oil contamination.

When asked about the number of high-speed handpieces in routine use in their surgery, responses varied from zero (n = 2) to 30 (n = 1). The majority of respondents had three (38%, n = 268) or four (24%, n = 167) high-speed handpieces available for use.

Regarding handpiece serviceability, 26% (n = 180) of respondents stated that their handpieces required replacement within 2 years and 10% (n = 69) at between 3 and 4 years. When repair was required, 59% (n = 412) of respondents opted for repair by a handpiece repair business, while 35% (n = 246) returned the handpiece to the manufacturer.

Regarding use of magnification aids, 74% (n = 515) of respondents stated that they never used magnification aids, 8% (n = 58) used them more than 50% of their operating time, 3% (n = 22) used them for 20% – 50%, and 13% (n = 93) for less than 20% of their operating time. A Kruskal Wallis test was carried out to test for differences between use of magnification aids and years since graduation. A highly significant difference (P > 0.0001) was noted, with older graduates using magnification more frequently. Regarding the type of magnification aid used, the majority of users (79%, n = 137) used loupes. No respondents used an operating microscope.

One hundred and forty-eight respondents (21%) stated that they owned an intra-oral camera, and, of these, 40% used it routinely. The types of intra-oral camera owned by respondents are shown in Table 6.

Infection control

A high proportion of respondents (87%, n = 611) decontaminated and sterilised their high-speed handpieces between patients. However, 3% (n = 23) sterilised their high-speed handpieces only at the end of the working day, and 1% (n = 5) only after treatment of a high-risk patient. The data for the decontamination and sterilisation of slowspeed handpieces were similar. Regarding the use of disposable threein-one syringe tips, 44% (n = 307) of respondents stated that they used these. Ninety-two per cent (n = 645) of respondents stated that they wore gloves for all operative procedures. Of those who did not wear gloves for all operative procedures, 43% wore gloves for more than 50% of their operating time. One respondent never wore gloves. Of the glove wearers, the majority (54%, n = 377) wore powder-free latex gloves, 33% (n = 229) powdered latex, 7% (n = 51) powderfree/latex-free and 3% (n = 20) powdered latex-free gloves. A statistical difference was noted between gender and type of gloves used (P =0.028). Of the male dentists, 54% (n = 270) used powder-free latex gloves, 36% (n = 181) wore powdered latex, 6% (n = 32) powder-free non-latex gloves and 2% (n = 8) powdered latex-free gloves. By comparison, amongst the female dentists, 59% (n = 106) wore powderfree latex gloves, 27% (n = 48) powdered latex, 11% (n = 19) powderfree non-latex and 4% (n = 7) powdered latex-free gloves.

Type of camera	Number (%) of respondents
35mm	54 (38)
Digital	37 (26)
Video	38 (26)
Other types	19 (10)
Total	148 (100)

Health of dentists

Regarding days absent per annum from work due to illness, 52% of respondents (n = 360) stated that they had had no days away from work, 12% (n = 85) one day off, 11% (n = 74) two days off, 6% (n = 44) three days off, and the remaining having had lengthier periods of absence. The types of illness, which caused the respondents' absence from work, are shown in Table 7.

DISCUSSION

This investigation provides a profile of contemporary dental practice in two different UK regions – Scotland and the North-West of England. It is acknowledged that a different profile may be found

Type of illness	Number of respondents reporting days off due to illness	% of respondents who had one or more
Influenza	133	39
Common cold	90	27
Gastro-intestinal disruptio	n 85	25
Neck and back problems	52	15
Other	50	15
Respiratory track infection	s 27	8
Headache	24	7
Surgery	20	6

for dentists in other parts of the UK, notably South-East England. Nevertheless, the survey represents the reported behaviour of one in twenty-five UK general dental practitioners. Such profiles provide valuable insight into the characteristics of dental services, and, if repeated, could provide an objective basis for observing trends in practice arrangements. Data in this and other papers in this series may point to priorities in primary dental care research.

The response rate (70%) was higher than in many surveys of dentists' attitudes and behaviour. Such a response could be considered to enhance the value of the findings.⁶ It is difficult to test the validity of the sample, but its male/female ratio is similar to the male/female ratio in the *Dentists Register*, possibly giving some support to the view that the sample is representative of the population investigated.⁷ The proportion of VDPs (1%), was less than the proportion in the profession overall.

The results indicated that a large proportion of dental treatment in the regions investigated was still carried out within the NHS regulations, despite recent data from a team of business analysts and a publication showing the increasing trend towards private dentistry.⁸⁻⁹

A small proportion of respondents (5%, n = 34) had not undertaken any postgraduate education in the year. It is possible that this proportion will have changed with the introduction, from January 2002, of compulsory continuing postgraduate development (CPD) in the UK.¹⁰ Finally, the results indicated that relatively few dentists were using on-line CPD at the time of the survey. It could be considered that this is a form of lifelong learning, which is likely to expand. However, practitioners who own older computers may be unable to run available programmes. Further research is indicated in respect of this important and growing aspect of professional life.

The results have provided insight into the number of patients treated in a typical session – a subject on which there is scant data throughout the world. Dentists operating within the NHS arrangements treated a significantly greater number of patients each session than those in private practice. It could be considered that this contributes to the cost effectiveness of the NHS system, but the results of a recent cross-sectional survey have indicated that restorations placed within the NHS funding arrangements are replaced sooner than restorations placed within private funding arrangements or in the armed forces.¹¹⁻¹² This study also reported that dentists in the armed forces treated an average of 11 patients per day, which is substantially less than the number of patients treated by the respondents in the present study, most of whom were working within the NHS arrangements.

Data were also obtained on the numbers of hygienists employed, and their working patterns. The data indicate the substantial contribution made by this group of professionals complementary to dentistry (PCDs), given that the hygienists typically treated 10 to 12 patients per session. It was interesting to note that there was a highly significant difference between the type of practice and the number of hygienists employed, with the insurancebased practices having been found to have a larger number of hygienists than NHS practices. The employment of staff primarily in a principally preventive role must surely be commended.

A large number of unqualified dental nurses were employed by the practitioners who responded to this survey. This may have been a cost economy or lack of availability of suitably trained staff. However, the data indicates the scale of the problem, which may face the profession with the introduction of the registration of dental nurses. The survey did not examine attitudes to the role of therapists in general dental practice, as this was not permitted at the time of the survey.

The results contained few surprises in relation to pain control, except possibly the extent that hypnosis was used as an adjunct to treatment 6%, (n = 42) of respondents, and for the substantially lower use/application of relative analgesia (RA) in Scotland. The latter finding may indicate a need for the provision of courses on such techniques in Scotland, which could be considered appropriate in view of the high incidence of dental caries in Scotland reported in the *1998 Adult Dental Health Survey*.¹ This is especially relevant to general dental practice today, given the ban on the administration of general anaesthesia in general dental practices, and that a number of cases previously treated under GA could be considered suitable for treatment with RA.

The results indicated that a substantial number of dental practices were using a computer, although only 10% (n = 74) of practitioners were found to be using state-of-the-art hardware. Dentists in NW England were more likely to be using older hardware than dentists in Scotland, which is likely to indicate that these practitioners had been using a practice computer system for some time. This could be explained by the fact that transmission of payment data to the Dental Practice Board for England and Wales has been available on-line for approximately a decade at the time of the survey, whereas this has only recently become available in Scotland. The recent introduction of on-line payment in Scotland could therefore have been the incentive for practitioners to purchase a computer system, whereas this stage was reached in England some time ago, hence the older hardware in England. It was also interesting to note that recent graduates, compared with more established practitioners, were significantly more likely to own a state-ofthe-art system, which may suggest that new graduates come to practice expecting to use a computer – as they have been required to do at many dental schools.

Regarding contemporary techniques, it was surprising to learn that only 26% (n = 173) of respondents used magnification and that few used it routinely. It may be that GDPs are reluctant to adopt magnification because of the relatively high cost of some systems. Similarly, only a small proportion of practitioners appeared to have realised the potential benefits of intra-oral photography. It would seem appropriate to increase the number of postgraduate courses on the use of magnification and intra-oral photography in clinical practice.

Cross-infection control in general dental practice is a complex issue. As a consequence not all aspects could be investigated. It could be considered disturbing that 3% of respondents did not sterilise their handpiece between patients, given the potential for micro-organisms to be drawn into the lumen of the handpiece. The concept of universal precautions requires all patients to be treated similarly, given that some patients' medical histories may be incomplete: all instruments used on patients should either be decontaminated and sterilised or disposed of.¹³ Dentists not fulfilling these requirements are possibly endangering the lives of patients who may be treated using contaminated instruments. Similarly, failure to wear gloves for all procedures cannot be justified. Regarding glove use, the results of the present survey indicate a trend away from powdered gloves, when compared with a study carried out a decade ago.¹⁴ The results also indicated a trend away from latex gloves, with 10% of respondents wearing latex-free types. This could be due to the incidence of skin problems associated with glove wearing, skin sensitisation to latex among dental healthcare workers and patients or the recent availability of nitride glove types with good user acceptability.¹⁵⁻¹⁶

The respondents appear to be a healthy group, with only a small number of days away from work per annum because of ill health. Further research is required into this aspect of dental practice, given the finding in the Report of the Government Actuary that dentists retire prematurely due to ill health four times as frequently as medical practitioners at age 42 years.¹⁶ It may be that the illnesses quoted in the questionnaire were primarily of a transient variety, and that the present study did not investigate more long-term illnesses such as coronary artery disease, stress and depression, musculoskeletal diseases and tumours.

Finally, when the results of the present study are compared with comparable data from the US, a number of interesting points emerge: more US dentists (60%) provide nitrous oxide analgesia for their patients, more (32%) used an intra-oral camera routinely, more (74%) used magnification but glove-wearing patterns were similar between US dentists and the UK dentists surveyed in this investigation.⁴

Subsequent papers in this series will report findings in respect of materials and techniques used in general dental practice for direct and indirect restorations.

CONCLUSIONS

For the practitioners included in the present study, the following conclusions may be drawn:

- The majority of practitioners worked under National Health Service (NHS) regulations as principals in a group practice
- Patient workload was found to be greater in NHS practices and practitioners were less likely to be supported by a hygienist than colleagues working in private/independent practice

- Significant numbers of unqualified dental nurses were currently employed
- Contemporary cross-infection procedures were used routinely by the majority of practitioners
- In contrast, computer-aided learning programmes and magnification were not used routinely.

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