

A comparison of Personal Dental Service (PDS) and General Dental Service (GDS) patients in terms of reported interventions, oral health and dentists' perceptions

KB Hill¹, AJ Morris², DA White³, S McHugh⁴, R Atwal⁵ and FJT Burke⁶

¹ Lecturer in Behavioural Science, The University of Birmingham, School of Dentistry. ² Lecturer in Dental Public Health, The University of Birmingham, School of Dentistry. ³ Senior Lecturer in Dental Public Health, The University of Birmingham, School of Dentistry, ⁴ Research Statistician, University of Glasgow, School of Dentistry. ⁵ General Dental Practitioner, The University of Birmingham. ⁶ Professor of Primary Dental Care, The University of Birmingham, School of Dentistry

Aims: The aim of the study was to investigate the reported working patterns, dentist perceptions and patient oral health for dentists in a Personal Dental Services (PDS) pilot and compare this with that of matched dentists working in the General Dental Services (GDS) arrangements in the same part of England. **Method:** Ten dentists were recruited, five each from PDS and GDS practices in Warwickshire, UK. The number of interventions carried out for adult patients in the year to April 2003 was obtained from the Dental Practice Board (DPB) for the two groups and compared. An Oral Health Index (OHX) (Burke and Wilson, 1995) was used to determine the oral health of a selection of patients from the two groups of dentists in the study. The final stage of the study involved semi-structured interviews with the dentists. **Results:** The average age of dentists was similar, in the early to mid 40's ($p > 0.05$). Both groups were, on average, around 20 years post qualification. The GDS dentists made an average of 3,507 activity reports to the Dental Practice Board in the year examined, compared with 3,441 from the PDS dentists. PDS dentists provided fewer simple periodontal treatments than GDS dentists, but otherwise the pattern of reported activity was similar. Both PDS and GDS dentists suggested that GDS dentists carried out more fillings because of a perverse incentive to provide fillings compared with PDS arrangements. PDS dentists believed that their treatment profiles had not changed significantly since changing to PDS, and suggested that their prescribing was based on clinical need only and was not influenced by the remuneration system. A total of 225 OHX scores were obtained for patients attending PDS dentists and a further 214 from patients attending GDS dentists. Overall, the mean OHX score was lower in the GDS patients than for PDS patients. **Conclusions:** PDS dentists provided fewer simple periodontal treatments than their GDS counterparts. There was no difference in the oral health of patients treated under either system. Although there was some evidence of a difference in attitude between GDS and PDS dentists towards charging and claiming for simple periodontal treatment, there was no uniformity of opinion within either group. There would appear to be a number of complex factors impacting upon decisions to treat or monitor dental conditions.

Key words: Attitudes, dental services, GDS, oral health index, PDS.

Introduction

The potential link between provision of dental care and method of remuneration has been recognised since the 1911 National Insurance Act (Lindsay 1912, Royal Commission on National Health Insurance 1925) and has continued to be a concern to policy-makers ever since. Capitation arrangements are associated with a decrease in restorative treatment, but the impact on the oral health of service users is less clear (Johansson *et al.*, 2007). The NHS arrangements for dentistry, introduced in 1948, were essentially fee-per-item or piecework, where the dentist was rewarded for specific items of care provided. The *Tattershall Report* (Tattershall *et al.*, 1964) was particularly scathing in its analysis of the invidious effect of these arrangements and a desire for change was later significantly expressed in the report of the Dental Strategy Review Group (DHSS 1981). Capitation arrangements for children were piloted in England in the 1980s (Coventry *et al.*, 1989). These raised concerns that, whilst there was no apparent impact

on patient oral health, there might be a temptation to prescribe less treatment than was clinically indicated and that there was little commitment from the profession to the concept of capitation. Capitation arrangements for children only were introduced as part of new national contractual arrangements for General Dental Services (GDS) in 1990. Two reviews of the impact of these arrangements (Blinkhorn *et al.*, 1996, White and Anderson 1996), concluded that there had been a reduction in some interventions, particularly fillings, along with an increase in preventive care. Furthermore, children who were registered under the capitation scheme had better oral health than those who were not registered. The impact on oral health was difficult to ascertain, however, as there were underlying changes in caries prevalence at the time of the study and children who were not registered tended to come from different backgrounds when compared with those who were registered. The extent to which research based on child capitation is applicable to adult care is questionable.

The Personal Dental Services (PDS) initiative, introduced in England in October 1998, allowed for the establishment of pilot schemes to test alternative forms of remuneration for independent contractor dentists working within the NHS. Participation in the arrangements was voluntary; dentists negotiating a contract with the local commissioner of dental services rather than being remunerated through national General Dental Services (GDS) arrangements. It was anticipated that the PDS initiative would not only pilot alternative methods of delivering dental care, but also examine whether changing the method of remuneration would affect the care provided. A number of pilot practices used forms of capitation as a method of remuneration for adult care, compared with the essentially fee-per-item method under GDS arrangements (Goodwin *et al.*, 2003, McLeod and Morris 2003).

The Rugby Personal Dental Service scheme piloted a capitation method of remuneration to cover all routine adult dental care (Goodwin *et al.*, 2003). Whilst a capitation fee covered routine care, more advanced treatment, particularly that associated with laboratory charges such as crowns and dentures, was remunerated at the contemporary NHS GDS fee-per-item level. Patients who had not been previously registered under GDS arrangements with the dentists were rendered 'dentally fit' and the dentist was paid through a fee-per-item arrangement at contemporary GDS prices for this initial course of treatment only. Children continued to be treated under NHS GDS arrangements. Routine probity and quality checks were carried out by the Dental Reference Service as would be undertaken for dentists working under GDS arrangements.

The aim of this study was to investigate the reported working patterns, dentist perceptions and patient oral health for dentists in a Personal Dental Services (PDS) pilot and compare this with that of matched dentists working in the General Dental Services (GDS) arrangements in the same part of England.

The objectives of this study were:

- (i) to examine the reported working patterns through analysis of the number of clinical interventions reported by dentists in the PDS scheme and compare this with the number of clinical interventions reported by comparable dentists in GDS practices;
- (ii) to compare the oral health of patients treated under these arrangements by means of the Oral Health Index (OHX), and
- (iii) to assess the views of participating dentists on working within the PDS and GDS arrangements.

Methods

Dentists (n=8) working in the three practices which formed the pilot PDS scheme were contacted by letter and asked if they would be prepared to be involved in the study. The letter contained details of what would be involved.

Standard treatment profiles for dentists operating under GDS arrangements in the Rugby area were obtained from the Dental Practice Board (DPB) for England and Wales and comparable GDS dentists were identified from

their patient profiles, which included details of the patients registered and patient characteristics from activity reports submitted on FP17 forms or their electronic equivalent. List and activity characteristics to determine the participating dentists included age, list size, gender and claims for exempt and fee-paying patients. The total number of interventions for adult patients in the year to April 2003 was obtained from the DPB for the selected groups of PDS and GDS groups and these were compared.

An Oral Health Index (OHX) (Burke and Wilson 1995, Delargy *et al.*, 2003) was used to determine the oral health of a selection of patients from the two groups of patients in the study. This index provides a numerical measure of oral health, with component assessments of restoration adequacy, caries, periodontal disease, presence of calculus, adequacy of occlusion, mucosal health and patient comfort. All participating dentists undertook a three-hour instructional course on the use of the index.

A power calculation determined that 223 PDS patients and 223 GDS patients should be examined. Accordingly, each dentist who agreed to take part in the study (5 PDS and 5 GDS) was requested to use the OHX proforma while examining 50 consecutive patients who attended for their routine dental examination during the months of August and September 2003.

Summary statistics of the OHX scores, both for each dentist and each group, were calculated. To assess whether there were differences between the two groups in terms of the periodontal components (i.e. BPE score and presence of calculus), ordinal logistic regression was used to enable the inclusion of a dentist effect, as well as examining for a group effect.

The qualitative methodology used semi-structured interviews. A topic guide was developed to guide the interviewer which covered the following topics: dentists' experience of, and their feelings about, working under GDS or PDS arrangements; results from the quantitative section of the study and their views on the introduction of proposed new commissioning arrangements for primary care dentistry in England. Interviews were conducted either in a quiet area within the dental surgery or at the University of Birmingham, School of Dentistry. These were audio recorded and fully transcribed.

A framework approach to data analysis was adopted in the manner suggested by Pope *et al.*, (1999). A preliminary framework, based on the research questions was developed. The transcripts were then read and, following familiarisation with the data, the initial framework was expanded to reflect themes emerging from the interviews. The data were next indexed according to the framework and further refined. To guard against bias, the transcripts were analysed independently by another researcher. Subsequently, consensus was achieved on emergent themes and issues. The emergent themes included: advantages and disadvantages of working under either GDS or PDS arrangements, recall intervals, clinical interventions and the future of NHS dentistry.

Ethical approval was not required for this study, as no patients were identified in the data and patients only received the treatment for which they had attended their dentist

Results

Seven of the PDS dentists agreed to participate, but two had treated only small numbers of patients. The PDS group therefore contained five dentists, three men and two women.

The GDS group, defined as above, contained five men. All agreed to participate in the study.

The average age of the two groups was similar, in the early to mid 40's (mean for PDS dentists 45.35yr, GDS dentists 42.21yr, $p>0.05$). The mean number of years of both groups post-qualification was similar (20 years) and dentists had been at their present practice for a mean of 13 years. The adult list sizes were similar (PDS range 472 to 2,595; GDS range 1,655 to 2,266), as was the age composition of adult patients and rate of growth over the year to April 2003. The fees earned for NHS work were comparable and, though the proportion of fees earned through patient charges was lower in the PDS group, the difference was not statistically significant. Both groups of dentists were practicing in localities with similar levels of deprivation and both were covered by water fluoridation schemes with consequent relatively low prevalence of dental caries among children and young adults.

The number of interventions reported for the year to April 2003 was expressed using the average number of patients registered in that year as a denominator (Table 1). The GDS dentists made an average of 3,507 claims to the Dental Practice Board in that year compared with 3,441 from the PDS dentists. There were, in general, no statistically significant differences between the two groups. On average, the GDS dentists tended to make fewer claims per registered patient than the PDS dentists, treat fewer individual patients, undertake fewer examinations and extract slightly fewer teeth. The GDS dentists tended to undertake more simple periodontal treatments and provide more fillings. There was no measurable difference in the number of advanced restorations provided. The magnitude of the differences, where present, tended to be small, with the exception of simple periodontal treatments where the rate of provision by PDS dentists was less than half that of the GDS dentists. This is the only difference that was statistically significant ($p<0.05$).

A total of 225 OHX scores were obtained for patients in the PDS practices and a further 214 patients in the GDS practices. Overall, the mean OHX scores of the two groups were similar ($p<0.05$ Table 2).

Given the statistically significant difference between the PDS and GDS dentists in terms of number of scaling and polishing interventions provided for their patients, it was decided to examine the periodontal components in the OHX (namely, BPE scores per sextant, and sextants with/without sub-gingival calculus) and assess whether there were differences in these between the PDS and GDS patients. There was marked variability between dentists for overall periodontal BPE scoring of sextants but no statistically significant difference between PDS and GDS patients ($p>0.05$, Chi Squared test, estimated using Monte-Carlo methods). For the presence of calculus, there was a statistically significant difference ($p<0.05$). Given the significant dentist effect, the data were re-analysed using ordinal logistic regression, which produced a significant difference in BPE scoring of

sextants between PDS and GDS patients. However this seemed to be driven by a GDS dentist who reported a high proportion of patients with a BPE score of 3 or 4 in 4 or more sextants and a PDS dentist who scored very few patients as having a BPE score of 3 or 4 in any sextant. For presence of calculus, ordinal logistic regression produced no significant difference between PDS and GDS patients ($p>0.05$).

In general, the dentists working under PDS arrangements felt that the main advantage had been the reliability of income that the block contract offered.

"The main advantage that I see is financial, in that, and this is not particular to me, it gives you continuity of income, which is not of benefit to patients particularly, but it gives you a degree of security" (PDS dentist)

They also felt that their clinical work had not been greatly affected by the change to a new system, other than some minor changes to the frequency of examination and scaling and polishing. The introduction of clinical guidelines, along with the new payment system, did not appear to have made any great impact; one dentist said that they did not take much notice of these when deciding what was best for a patient.

".....to be perfectly honest I don't feel any different about how I treat people or, I know we are supposed to do under PDS there are criteria for doing endodontics and all the rest of it but in reality if somebody wanted doing then it gets done and I don't really take much notice what the criteria were" (PDS dentist)

"....I think after 5 years I don't really feel that we are any better off, certainly not financially and under just as much pressure as we were under GDS." (PDS dentist)

By contrast the GDS dentists generally felt that the PDS arrangements had allowed substantial changes to how the dentists worked, both in terms of the intensity of workload, type of patients accepted for care and treatment provided.

".....an easier environment basically, you have not got the stresses of seeing lots and lots of patients throughout the day....."

".....if you you're going to get paid monthly then chances are you're not going to do more of the complex stuff, you may have a decrease in I mean they haven't worked out the laboratory fees part yet and if this is taken out of your monthly income then you won't have the incentive to do those things on the NHS.." (GDS dentist)

The PDS dentists generally felt that they were working more closely with the local NHS as a result of the new arrangements, but expressed dissatisfaction with some of the administrative arrangements, particularly around obtaining new contract numbers.

One of the interesting findings in the quantitative study was that PDS dentists were providing more examinations than GDS dentists, although this result was not statistically significant. GDS and PDS dentists both found

Table 1. Reported Intervention Rates 2002/3

<i>Dentist</i>	<i>Average pa- tients regis- tered 2002/3</i>		<i>Courses of treatment</i>		<i>Patients treated</i>		<i>Examination</i>		<i>Intra-oral & pano- ramic radiographs</i>		<i>Simple periodontal treatment</i>		<i>Teeth Filled</i>		<i>Teeth Extracted</i>		<i>Teeth inlayed or crowned</i>		
	<i>n</i>	<i>per patient/ year</i>	<i>n</i>	<i>per patient/ year</i>	<i>n</i>	<i>per patient/ year</i>	<i>n</i>	<i>per patient/ year</i>	<i>n</i>	<i>per patient/ year</i>	<i>n</i>	<i>per patient/ year</i>	<i>n</i>	<i>per patient/ year</i>	<i>n</i>	<i>per patient/ year</i>	<i>n</i>	<i>per patient/ year</i>	
GDS																			
ALL	9,929	17,535	1.77	1.17	13,999	1.41	4,453	0.45	10,578	1.07	5,952	0.60	1,276	0.13	595	0.06			
Range	1,655-2,266	2,629-4,019	1.59-1.83	1.03-1.32	2,101-3,294	1.27-1.45	367-1,736	0.19-1.05	1,033-3,016	0.55-1.33	688-1,638	0.34-0.91	167-464	0.08-0.28	15-241	0.01-0.15			
Mean	1,986	3,507	1.76	1.17	2,800	1.40	891	0.47	2,116	1.05	1,190	0.61	255	0.13	119	0.06			
95% CI +/-	200	475	0.09	0.09	388	0.07	479	0.30	640	0.26	370	0.20	110	0.07	70	0.04			
PDS																			
ALL	10,973	20,647	1.88	1.53	16,819	1.53	3,590	0.33	5,101	0.46	5,733	0.52	1,513	0.14	615	0.06			
Range	472-2,595	932-5,851	1.65-2.26	1.00-1.94	674-4,816	1.27-1.86	109-1,435	0.12-0.55	338-1,223	0.24-0.72	232-1,529	0.41-0.63	125-399	0.07-0.32	51-142	0.04-0.11			
Mean	1,829	3,441	1.87	1.49	2,803	1.50	598	0.31	850	0.51	956	0.52	252	0.16	103	0.06			
95% CI +/-	618	1,368	0.19	0.25	1,137	0.16	377	0.13	275	0.14	339	0.07	81	0.07	27	0.02			

Table 2. Mean OHX scores for the GDS and PDS dentists

	<i>Number of GDS patients examined</i>	<i>GDS dentists' Mean OHX%</i>	<i>Number of PDS patients examined</i>	<i>PDS dentists' Mean OHX%</i>
Dentist 1	34	80.5	45	84.2
Dentist 2	45	83.3	45	87.0
Dentist 3	45	91.8	45	87.7
Dentist 4	45	90.1	45	92.7
Dentist 5	45	91.0	45	95.1

this result surprising. All commented that it should be the other way around, as they perceived there to be a financial incentive for GDS dentists to see patients every six months and it was felt that this incentive did not exist under the PDS arrangements. The only explanation that GDS dentists could suggest was that PDS dentists may be seeing more new patients or that patients were using PDS practices as an access centre. *'Might be patients who are dropping in, so it is more drop in type patients and maybe they are doing more types of examination'* (GDS dentist).

PDS and GDS dentists both expressed concern that the recall intervals were going to increase with the planned transition to local commissioning for all NHS primary care dental services. PDS dentists who had been trying to change the recall intervals reported that patients were often unwilling to change, with patients expressing concern that this could be detrimental to their oral health.

A further finding from the quantitative study, although again not statistically significant, was that GDS dentists reported providing more fillings than PDS dentists. Both PDS and GDS dentists suggested that the reason for this was that there was an incentive to treat in the GDS compared with the PDS system. GDS dentists also suggested that PDS dentists might monitor more teeth than GDS.

'The system's geared towards the GDS providing more fillings because that's the way they are paidYeah I would possibly expect there to be that way. It's just the mindset. I think PDS might watch lesions more than a GDS dentist would' (GDS dentist).

However, PDS dentists believed that their treatment profiles had not changed significantly since changing to PDS. They suggested that interventions depended on the patient's needs. If a patient was new to the practice they reported that they were more likely to restore teeth than if a patient attended regularly. Other suggestions for the difference was the age of the dentist, with older dentists reporting that they were more conservative now compared to when they were newly qualified.

'I think it's linked to age more than PDS and I notice as I get older I have become more conservative. It's not related to PDS, it's related to me – if you see teeth that are broken which are caries free, you think we'll leave it, and you left it for 10 years and nothing has happened to it, well you think why crown it why put the patient

through the cost and experience of the crown - so I have become much more conservative' (PDS dentist).

Scaling and polishing

The only statistically significant finding from the quantitative study was that GDS dentists were providing more simple periodontal treatment compared with PDS dentists, despite the oral health of the patients being similar in both groups. GDS dentists suggested *'that's just because exam scale and polish is where basically most GDS bread and butter is, that is what they see, most patients come in and have a exam, scale and polish.... Gives you a decent examination fee sometimes'* (GDS dentist). Both the GDS and PDS dentists suggested that patients generally requested a scale and polish with their examination and that if patients request it they are more likely to charge the patients for it. *'I think a lot of patients like the idea of having their teeth polished....but you know that it might not be totally justified clinically'* (PDS dentist). They also identified some difficulty with increasing recall intervals because patients wanted frequent scaling and polishing. One PDS dentist identified the lack of an evidence base to support decision making on how often a particular patient should have their teeth scaled and polished.

A majority of dentists who were interviewed suggested that the evidence for carrying out a scale and polish every six months was poor, they did not know if it benefited the patients or not. Most GDS dentists felt that the introduction of the new payment system for dentists would reduce the number of scale and polishes carried out.

Future of NHS dentistry

Both GDS and PDS dentists expressed major concerns over the introduction of the new payment system for dentists and all seemed to be unsure as to the future of NHS dentistry. The dentists were worried that they still did not know the details of the new system.

PDS dentists suggested that the transfer to the new system would not be as problematic for them as for GDS dentists, because they had experience of negotiating with Primary Care Trusts (PCT). One commented

'I don't know the new contract as yet but the bulk of the bits that have been bandied about, I don't honestly believe that practising-wise it will make any difference

other than if the PCT proved to be obnoxious then we might not have any option other than step completely out of the NHS'.

One GDS dentist said that although he wished the GDS well, he felt that

'the framework proposals represent a woolly vision of a dental Utopia which leave the general practitioner with no basis for optimism in their present form.'

This dentist was concerned about the management of the new system and suggested that

'the present system with all its faults and minutiae which are often not understood by even close outsiders, has evolved until it actually works and has acceptable management overheads. Unless a clearer concept is proposed, I foresee a flawed service with downgraded practices, GDPs struggling to ensure that they do not acquire charitable status and a flourishing enhanced bureaucracy'.

Other comments about the contract were that it could increase the inequalities in dental health because if remuneration was changed dentists may want to only take on patients who were healthy.

'Who is going to see the really grotty patients? I don't know if we are going to be forced to take on people like a doctor. You see a chronically sick patient who has got everything wrong with him then you know you've going to be seeing them every other week. Somebody who is reasonably fit and healthy, or younger patients will need less work.' (GDS dentist).

Discussion

This study compared the treatment characteristics of two small groups of dentists operating under different payment regimes, the number of participating dentists being necessarily limited by the small number of dentists working in the PDS pilot being studied. This pilot had unique features that prevented pooling of data with other PDS pilots for this study. The dentists in the two groups were matched for dentist age and patient age, these being factors, which were considered to be significant in terms of dentist clinical behaviour (Lucarotti PSK Personal communication, January 2003). The patient oral health data was collected by the dentists responsible for their care and consequently there is the possibility that the data were biased, both in terms of patients selected for examination and the measures themselves. An independent, blinded assessor carrying out the examinations would have provided a more robust set of data, but this was not possible because of financial and time constraints and the disruption involved in requiring patients to attend at specific times to be examined. Since the OHX scores of GDS and PDS patients were similar, it could be considered that there was no evidence of gross neglect of patients treated under PDS arrangements, though an independent review of patients treated under the different arrangements for a longer period of time would be more robust.

The small numbers of participating dentists makes statistical comparison of reported interventions difficult, but there is a suggestion that the GDS dentists provide, or at least report, more fillings and more simple periodontal treatment than the PDS dentists and that the PDS dentists provide more examinations than the GDS dentists. Apart from the difference in provision of simple periodontal treatment however, these differences were not statistically significant. Nevertheless, these data may suggest that the PDS dentists provide a service that involves more monitoring than intervention. The absence of statistically significant differences for other interventions may result from inadequate power through sample size. The nature of patients accessing care from the dentists, in terms of their dental needs and demand, may have also masked differences between the two groups of dentists. Assumptions were made that since the dentists were practising in similar areas, with a similar degree of personal NHS commitment and profile of claims and registrations, then the nature of the patients they were treating would also be similar. This might not have been so and an examination of a series of patient record cards, selected at random, might have made this assumption more robust.

An important factor in considering such data are the differing incentives to submit data; PDS dentists would not see a drop in their income if they failed to submit data, for example, if they did not claim for simple scaling and polishing. GDS dentists, on the other hand, have an incentive to submit data on all procedures undertaken, no matter how minor, and to levy the associated patient charge.

With regard to the data on treatment involving laboratory work, there was no difference in the payments system between PDS and GDS. When combined with a capitation payment covering other restorative care there was, if anything, a potential perverse incentive to over-prescribe indirect restorations under this PDS arrangement at the expense of direct restorations.

Although not specifically part of this project, the interviews also provided valuable insight into the views of the participating dentists on other matters, such as recall intervals and the future of NHS dentistry. There appeared to be widespread confusion regarding recall intervals, with interviewees implying that new intervals would be imposed upon them, rather than the view that recall intervals should be left for the dentist and patient to decide, through this had never been the stated policy of government or NICE at the time of the study (NICE, 2003).

Conclusions

Other than for simple periodontal treatment, the reported working patterns of PDS and GDS dentists were similar. The rate of provision of simple periodontal treatment by PDS dentists was less than half that of the GDS dentists.

The oral health of two groups of patients treated under the differing remuneration systems of GDS and a PDS capitation pilot was found to be similar.

Dentists working under PDS arrangements felt that reliability of income was an important advantage and that their clinical work had not been greatly affected. There was some dissatisfaction with certain administra-

tive arrangements. PDS dentists who have been trying to change their patients' recall intervals reported that patients were not always willing to change. Dentists working under GDS arrangements however felt that there was likely to have been a significant impact upon the working patterns of PDS dentists. There was evidence of different attitudes between GDS and PDS dentists towards charging and claiming for treatment but their views were by no means general. Both groups expressed concerns about the introduction of new commissioning arrangements in the future but the PDS dentists felt better prepared for this.

There would appear to be a number of complex issues impacting upon decisions to treat or monitor and on the reporting or otherwise of activity that merit further exploration. There is no evidence from the quantitative research to suggest a systematic neglect of patients under the capitation system in this PDS pilot.

Acknowledgment

The financial support of the National Audit Office, London, is acknowledged.

References

- Blinkhorn A.S., Hassall D.C., Holloway P.J., Mellor A.C., Worthington H.V. (1996). An assessment of capitation in the new General Dental Service contract. *Community Dental Health* **13** (Suppl 1), 3-20.
- Burke F.J.T., Wilson N.H.F. (1995). Measuring oral health: an historical view and details of a contemporary oral health index (OHX). *International Dental Journal* **45**: 358-370.
- Coventry P., Holloway P.J., Lennon M.A., Mellor M.C., Worthington H.V. (1989) A trial of a capitation system of payment for the treatment of children in the General Dental Service. Final Report. *Community Dental Health* **6**: (Supplement 1)
- Dental Strategy Review Group (1981). Towards Better Dental Health – guidelines for the future. London: Department of Health and Social Security.
- Delargy S., McHugh S., Hall A.C., Burke F.J.T. (2003). Reproducibility of an Index of Oral Health among general dental practitioners. *PEF IADR Abstracts*. No.416.
- Goodwin N., Morris A.J., Hill K.B., McLeod H.S., Burke F.J.T., Hall A.C. (2003) National evaluation of personal dental services (PDS) pilots: Main findings and policy implications. *British Dental Journal* **195**: 640-643
- Johansson V., Axtelius B., Söderfeldt B., Sampogna F., Lanerud M., Sondell K. (2007) Financial systems' impact on dental care; a review of fee-for-service and capitation systems. *Community Dental Health* **24**: 12-20
- Lindsay R (1912). The Insurance Act and the Dental Profession. *British Dental Journal* **33**: 1079-1086
- McLeod H.S.T., Morris A.J. (2003) Evaluation of personal dental services (PDS) first wave pilots: the alternative to general dental services (GDS) offered by the capitation-based pilots. *British Dental Journal* **195**: 644-650
- National Institute for Clinical Excellence (2003): Dental Recall Scope. <http://www.nice.org.uk/>
- Pope C., Ziebland S. and Mays N. (1999) Analysing Qualitative Data. In C Pope and N May (Eds), *Qualitative Research in Health Care* (2nd ed) London: BMJ Books.
- Royal Commission on National Health Insurance (1925). Appendix: Memorandum submitted by the United Women's Insurance Society (U.W.I.S.) on the first 9½ years' experience of the Society's dental scheme. London, HMSO. Public Records Office MR 62/90
- Tattershall W. Albert D., Brackenridge J., *et al.*, (1964) Report of the ad hoc sub-committee on methods of remuneration. *British Dental Journal* **117**: 331-346
- White, D.A. and Anderson, R.J. (1996) Children's dental health under the capitation scheme. *Community Dental Health* **13** (Suppl 1), 21-48.