

Evaluation of the telephone and clinical NHS urgent dental service in Sheffield

D.J. Worsley¹, Z. Marshman¹, P.G. Robinson¹ and K. Jones²

¹School of Clinical Dentistry, Sheffield, UK; ²Dental Public Health, Public Health England Yorkshire and the Humber, Sheffield, UK

Objective: Evaluate an NHS in- and out-of-hours urgent dental service (UDS) including both a telephone triage provider (TTP) and a sole clinical provider (CP) using a quality framework. **Basic research design:** Analysis of activity and patient experience data. **Main outcome measures:** Ratio of volume of services to activity provided; distance and time travelled; appropriateness of referrals and treatments; equity of utilisation; patient experience; cost per patient. **Results:** Almost all calls (96.6%) to the TTP were answered within 60 seconds and of people referred to the CP 96.0% needed treatment. Proportionately more people from deprived areas used the TTP. Highest utilisation of the TTP was by people aged 20 to 44 years and lowest was by people over 54 years. Cost per patient utilising the TTP was £5.06. Of the available appointments provided by the CP, 90.9% were booked the TTP. Travel time to the CP was less than 30 minutes for 78.0% of patients. Of treatments provided, 77.9% were clinical interventions and 18.1% were prescription only. Proportionately more people from deprived areas attended the CP. Highest utilisation was by people aged 20 to 44 years and lowest by people over 54 years. Nearly half (47.0%) of those attending reported they did not have a dentist. There was a high level of patient satisfaction. Cost per course of treatment at the CP was £67.41. **Conclusion:** Overall the UDS provided a high quality service in line with Maxwell's dimensions of quality. Timely advice and treatment was provided with high levels of patient satisfaction with the CP. Comparison with other urgent dental service models would determine the relative efficiency of the UDS.

Key words: health services, dental care, emergencies, health care quality, service evaluation, England

Introduction

Urgent and emergency oral conditions are those likely to cause deterioration in oral or general health and where timely intervention for relief of oral pain and infection is important to prevent worsening of ill health and reduce complications (SDCEP, 2013). Access to urgent dental care provided by dental practitioners is important because skilled intervention to diagnose and alleviate the condition is often required. In the UK, the social healthcare system, the National Health Service (NHS) provides most dental healthcare and is available to everyone based on clinical need. However, under the NHS (General Dental Services Contracts) Regulations 2005, dentists are only obliged to provide urgent dental care to their patients while undergoing a course of treatment (NHS England, 2005) and those needing urgent dental care may contact the dentist they usually attend during working hours.

For those without a dentist or unable to access their own dentist, there is a recognised need in the UK for the provision of unscheduled NHS dental care both in- and out-of-hours. NHS England has a statutory duty to commission this service (Department of Health, 2005). Access to these services is often telephone-based, with advice, triage and referral for clinical care where needed. While NHS dental care is free for children and some adults, those adults not exempt from payment pay a proportion of the treatment cost and in 2011/12 the cost for urgent dental care was £17.

The socioeconomic gradient in urgent oral conditions mirrors the gradient found in general health with those from

the most deprived communities experiencing the highest and those in the least deprived the lowest prevalence of urgent oral conditions (NHS Information Centre, 2011b). Pain is the main reported reason why people use urgent dental services (Austin *et al.*, 2009; Topping, 2005; Tulip and Palmer, 2008).

Maxwell's (1992) quality dimensions of access, effectiveness, equity, social acceptability, efficiency and relevance, provide a suitable framework to evaluate health services. Maxwell's concept of access, as the degree to which people are able to get service/treatment, is broad but might include availability, the volume of services provided compared to service use and accessibility, measured by travel time and transportation used to get to the services. Effectiveness is the degree to which the service/treatment provided works and where effectiveness data are not available, then appropriateness measures, such as standards of care and adherence to protocols might be surrogates (Maxwell, 1992). Equity refers to whether those with need can benefit from the service and acceptability considers patient experience and satisfaction with care. Efficiency describes the costs of the service. Relevance refers to how well a service relates to the needs of a population.

Published evaluations of urgent dental services have found that telephone triage increased the efficiency of services (Topping, 2005) and reduced attendance at emergency departments for urgent dental care (McCormick *et al.*, 2013). Generally satisfaction with care was high (Anderson *et al.*, 2005; Austin *et al.*, 2009).

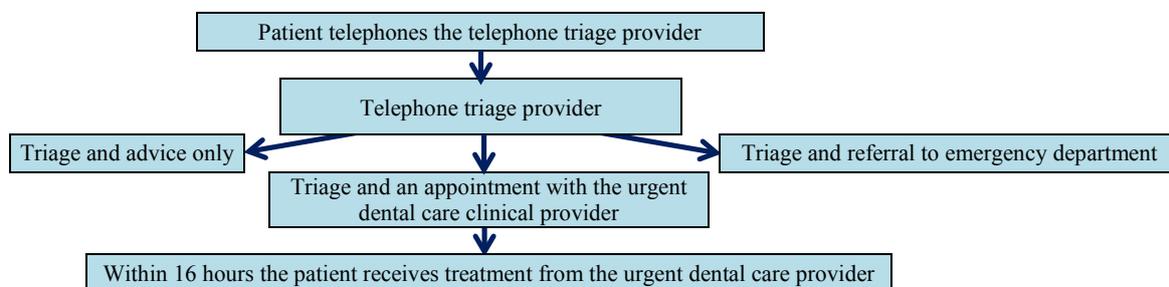


Figure 1. Service model of the Sheffield urgent dental service

During the period of this evaluation NHS urgent dental services (UDS) were commissioned, in- and out-of-hours, 366 days of the year (the period included a leap year) and included: a telephone triage provider (TTP) available 24 hours a day staffed by nurses or dental nurses with calls going straight through to triage, and a sole clinical provider (CP), a large dental practice located within 1½ miles (2½km) of Sheffield city centre, staffed by permanent staff providing appointments in- and out-of-hours (Figure 1). The service was available to a population of over half a million local residents and visitors to the area. The overriding aims in commissioning were for a high quality service that was fair, available for all, effective and personalised with fast access to urgent treatment (NHS Sheffield, 2010). At the period of the evaluation, access to NHS general dental services in Sheffield was better than nationally and a health equity audit for NHS dental care provision for routine care in Sheffield found service provision was slightly higher in more deprived areas (Dyer *et al.*, 2010).

The aim of this study was to evaluate the Sheffield UDS using a quality framework with the purpose of informing future commissioning of the service.

Method

Indicators from Maxwell’s quality dimensions were selected against which the service would be evaluated (Table 1). Data sources included service activity data from the TTP and CP and a patient experience survey of a consecutive sample of people who attended the CP.

Anonymised patient activity data from the TTP and the CP for the period 1 April 2011 to 31 March 2012 (2011/12) included age, gender, ethnicity, postcode, attendance at CP, reason for attendance at CP and whether they had a dentist or not. GeoConvert was used to convert patient postcodes into Index of Multiple Deprivation (IMD) 2010 scores (DCLG, 2010). Comparisons with other demographic variables were made using 2011 Census data (ONS, 2011). Data were analysed in SPSS v.20. The TTP cost per contact was the contract cost divided by the number of calls received. The CP cost per course of treatment was the contract cost divided by the number of courses of treatment provided.

Table 1. Dimensions of quality (Maxwell, 1992) of the Sheffield urgent dental service and their indicators

<i>Dimensions of Quality</i>	<i>Telephone Triage Provider</i>	<i>Clinical Provider</i>
Access: availability	Number of calls answered within 60 seconds	Proportions of available appointments booked, attended, cancelled or not attended
Access: accessibility		Travel time and transportation used
Appropriateness of care	Proportion of patients referred to the clinical provider Proportion of patients attending CP who required treatment Proportion of patients where the TTP description was in line with the clinical diagnosis by the CP	Proportion of clinical interventions (such as extractions, restorations, pulp extirpation etc.) Proportion of prescription only Proportion where no treatment was needed Re-attendance of patients within three months
Equity	Demographic variables of callers compared to the population and compared to perceived oral health needs	Demographic variables of attendees compared to the population and compared to perceived oral health needs Proportion of attendees recorded as not having a dentist
Acceptability		Patient experience questionnaire
Efficiency	Cost per call to the TTP	Cost per course of treatment provided
Relevance	How well the TTP met the needs of callers	How well the CP met the needs of attendees

A patient experience questionnaire (PEQ), adapted from the Dental Practice Assessment Questionnaire (Mus-sard *et al.*, 2008) was developed for people attending the CP. It enquired about travel time, mode of transport and satisfaction with reception staff. It also included modified questions from the Dental Visit Satisfaction Scale (DVSS) (Corah *et al.*, 1983), which enquired about care received, such as, information and communication and understanding and acceptance, measured on a 5-point Likert scale from 'very good' to 'very poor'. Patients' ratings of the technical competence of the dentists enquired whether they thought the dentist knew what they were doing, the thoroughness of the procedure, being satisfied with the treatment and being treated gently and were measured on a 5-point Likert scale from 'strongly agree' to 'strongly disagree'. Overall satisfaction was assessed with the question, 'All things considered how satisfied are you with your experience of treatment and care at the CP today' answered on a 7-point Likert scale from 'completely satisfied' to 'completely dissatisfied'. An open question was also included to capture any additional comments. After piloting the PEQs with 20 people two questions were slightly amended to improve clarity.

A quota sample of 201 consecutive patients attending the CP between October and December 2011, was asked by staff at the CP if they would participate. The questionnaires were completed at the dental clinic, sealed in envelopes and returned to reception staff. Written comments on the PEQs were grouped into themes and analysed.

NHS Sheffield Research Governance confirmed the study as a service evaluation, thus ethical approval was not required. Permission was given by the service commissioner.

Results

Of the 17,455 callers to the Telephone Triage Provider during 2011/12, 96.6% calls were answered within 60 seconds and 2.3% of calls were answered after 60 seconds. Calls abandoned after 30 seconds were 1.0%. During 2011/12 the cost per call to the TTP was £5.06.

Most (60.8%) callers received advice and triage only, 36.5% were referred to the Clinical Provider for urgent treatment, 0.4% were referred to a hospital emergency department. Almost all people referred to the CP required treatments (96.0%) and the description of the problem was in line with the clinical diagnosis for 97.7%.

The deprivation levels, gender, age and ethnicity of TTP users were compared with the Sheffield population profile (ONS, 2011). Proportionately more people from the most deprived areas used the TTP (Figure 2). Proportionately more adults aged 20 to 44 years and markedly fewer aged over 54 years and children under 15 years utilised the TTP (Figure 3). Slightly more men (50.7%), compared to the population of Sheffield (49.3%), contacted the TTP than women. Of the five ethnic groups, the Asian ethnic group was over represented and the White ethnic group under-represented in those contacting the TTP, however 18.3% did not specify their ethnicity (Table 2).

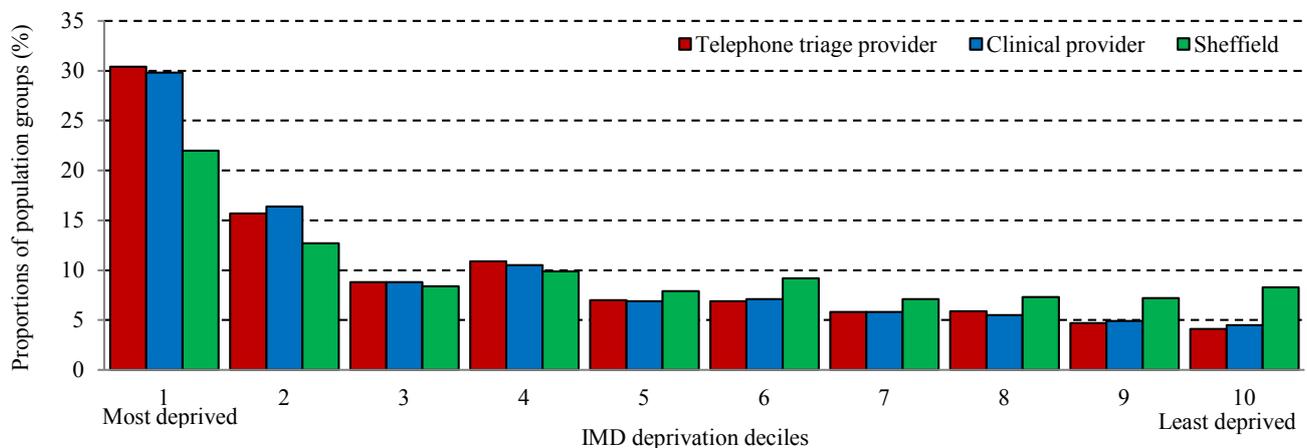


Figure 2. Use of the Sheffield urgent dental service by deprivation decile in 2011/12

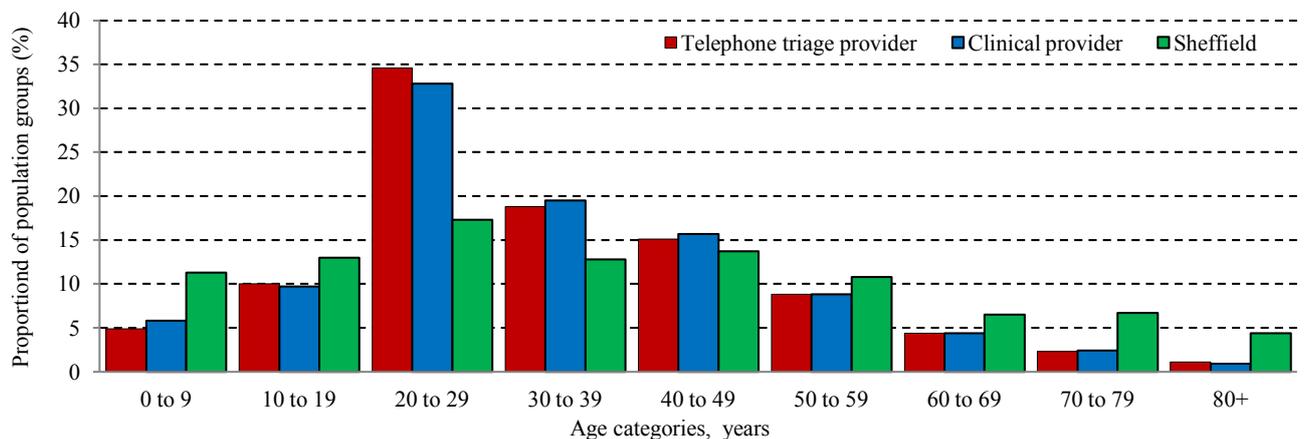


Figure 3. Use of the Sheffield urgent dental service by age group in 2011/12

Table 2. Use of urgent dental service by ethnic group 2011/12

Ethnic group	Population of Sheffield, % ¹	Calls to TTP, %	Attendance at CP, %
White	83.7	63.5	77.4
Asian	6.7	9.9	4.7
Black	3.6	3.4	1.6
Mixed/Multiple	2.4	2.0	4.6
Other	3.5	2.9	3.2
Not specified	-	18.3	8.5

¹ Source: Office of National Statistics, 2011

Turning to the evaluation of the CP, during 2011/12, 7,003 appointments were made available at the CP for people referred by the TTP for urgent dental care. During 2011/12 the mean cost per course of treatment provided at the CP was £67.41. On average 20 appointments were provided each week day and 16 each Saturday and Sunday. There was greater variability in availability during national holidays. The TTP referred 6,367 people to the CP resulting in the booking of 90.9% of the available appointments. Of the referrals, 5,365 people attended leaving 15.7% who did not attend or cancelled their appointments. The busiest times were the holiday periods during which eight of the fourteen days were fully booked. Weekends and Mondays were the busiest days and Fridays the least busy (Figure 4).

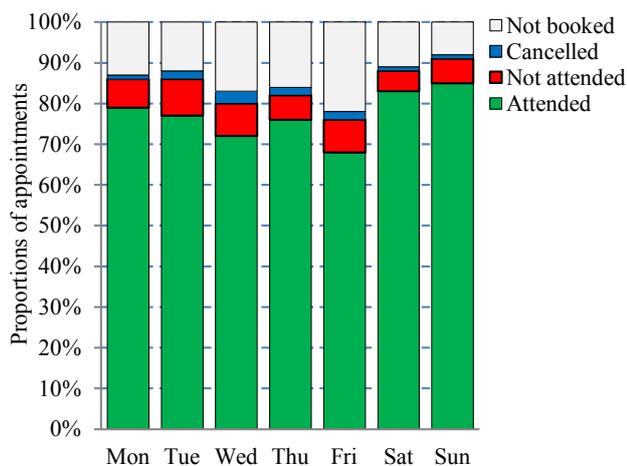


Figure 4. Proportions of attended, not attended, cancelled and unbooked appointments by day of the week in 2011/12

Most patients travelled to the CP by private vehicle (62.0%), 16.3% by bus, 11.4% on foot and the remainder by taxi, tram or bicycle. Travel time was less than one hour for 97.3% of patients, with 78.2% travelling for 30 minutes or less.

Reasons recorded for attendance at the CP were pain (70.4%), swelling (18.8%) and trauma (9.0%). Bleeding accounted for 0.3% and 1.5% were recorded as 'other'. Most treatments (77.9%) were clinical interventions, 18.1% were prescription only and 4.0% did not need treatment. Three percent of patients re-attended within three months.

The 5,365 CP users were compared with Sheffield's demographic profile (ONS, 2011). Proportionately more

people living in the most deprived areas used the CP (Figure 2). Proportionally more people aged 20 to 49 years and fewer aged over 54 years or children utilised the service relative to the population (Figure 3). Slightly more men attended the CP (52.1%) than women. The Mixed/Multiple ethnic group was over represented and the White, Asian and Black ethnic groups underrepresented in those attending the CP, however 8.5% did not specify their ethnicity (Table 2). Of attendees, 47% reported not having a dentist. Data were not available to establish the demographics of people who did not attend or cancelled their appointments.

Acceptability was assessed using the PEQ. In total, 188 PEQs (94%) were returned. The modal age category was 25 to 34 years (36.7%). Most participants were from the White ethnic group (85.0%).

Almost all patients (97.4%) found the reception staff very good or good and 88.7% to 96.2% thought the care was good or very good for each aspect of care measured. Only 0.6% to 2.5% thought care was poor or very poor. Most patients agreed or strongly agreed (93.0% to 96.8 %) that the dentist was competent, whereas 2.5% to 7.0% were uncertain or disagreed.

Overall, 92.3% of patients were completely satisfied or very satisfied with the care they received, 5.8% fairly satisfied, 1.3% neutral and 0.6% fairly dissatisfied. No patients were very or completely dissatisfied.

Thirty-one PEQs (16.4%) had written comments, which were content analysed into themes of quality (excellence, satisfaction, prompt and efficient), affective behaviour (friendliness, helpfulness, kind, and understanding) and complaints. Most comments (21) were about the quality of the service and twelve on affective behaviour. There were four complaints which included, two concerning the difficulty getting appointments, one concerned with parking facilities and one related to when to complete section B of the questionnaire.

Discussion

This was the first evaluation of Sheffield's urgent dental service. During 2011/12, 3.1% of the population contacted the TTP and 1.0% attended the CP for urgent dental care. The vast majority of calls to the TTP were answered promptly with the TTP referring about a third to the CP. Most of those referred needed treatment, three quarters of which were clinical interventions and one fifth prescription only. There was equity of utilisation of the service by deprivation, age and gender. There was high patient satisfaction with the CP.

Telephone triage services facilitate advice, triage and negotiation about the seriousness of the problem (Anderson, 2003) and encourage the efficient use of resources and this was found with the TTP which dealt with two thirds of callers with only one third being referred to the CP or other services. The cost per contact was less than the reported costs of a pilot of a national urgent medical helpline of £8.00 per contact (Turner *et al.*, 2012) and less than that of a piloted triage line in Scotland of £7.16 per contact (Topping, 2005). Overall sufficient activity was contracted with the CP however, the higher attendance rates during holiday periods and weekends has implications for the level of activity and

attendance rates at these times should be monitored to ensure those needing urgent dental care are able to access it. A considerable proportion of booked appointments were unattended, impacting on the efficiency of the service and reasons for this should be explored. The degree to which the service reduced attendance at other services such as hospitals or general medical practitioners over the same period was not ascertained.

A small proportion of service users attending the CP required either self-help or no treatment (4.0%). An evaluation of call handler training and of the algorithms used may potentially reduce referral of people not needing treatments. Evaluation of patient outcomes following dental triage only would also inform the effectiveness of the triage process. Current guidelines require most urgent dental conditions to be treated by clinical intervention (SDCEP, 2013). In this evaluation over three quarters of patients received clinical intervention, a higher proportion than found by Tulip and Palmer (2008). However, nearly one fifth of patients received prescriptions only. With increasing concerns about antimicrobial resistance and guidance from NICE on the need for promoting the judicious use of antimicrobials (NICE, 2015) a review of prescription only visits may further ensure best practice regarding antibiotic prescribing for urgent dental conditions (Palmer *et al.*, 2001).

Oral health follows a social gradient with people living in the most deprived areas experiencing the poorest oral health (NHS Information Centre, 2011a). People with poorer oral health are more likely to need urgent dental care (NHS Information Centre 2011b). These findings were reflected in the use of the UDS (Figure 2). The high utilisation of the UDS by people aged 20 to 34 years reflected the dental caries burden found in the Adult Dental Health Survey (ADHS)(NHS Information Centre, 2011a). However, Sheffield's large student population may in part account for use of the UDS by this age cohort as they are more likely to attend only when experiencing dental problems, attending their dental practice at home for regular care. Lower use of UDS by older patients may be explained by their greater use of regular care (NHS Information Centre, 2011c). The high use by young adults and low use by older adults requires further investigation. Patterns of service use by level of deprivation, age and gender reflected need for urgent care as reported in the 2009 ADHS (NHS Information Centre, 2011b) therefore the UDS was found to provide an equitable service in regard to deprivation, age and gender.

Equity by ethnicity could not be determined due to the proportion of users not specifying their ethnicity and the lack of available data on need for urgent care by ethnic group.

The provision of the urgent dental service also facilitated access to urgent dental care for those (47.0%) who said they did not have a dentist, which may indicate either personal choice or difficulty accessing routine care, which needs further investigation. The higher use of the urgent dental service by people living in deprived areas and who did not have a dentist indicates that there is access to public sector urgent dental services by people who need them the most.

There was high acceptability of the CP despite the additional hurdle of negotiating telephone triage, similar to other services (Anderson *et al.*, 2005; Topping, 2005). The experience of those who contacted the TTP but were not referred to the CP was not determined. While studies have found some people are content with advice alone (Anderson *et al.*, 2005), others have found lower levels of satisfaction (Topping, 2005). A patient survey of the TTP may help determine patient satisfaction for those receiving advice alone. The cost to NHS Sheffield per course of treatment at the CP (£67.41) was greater than the tariff for a dental visit to the emergency department (£52 in 2011/12). However, attendance at emergency departments is rarely appropriate for urgent dental care as patients are unlikely to receive clinical interventions. Research of the extent to which all urgent dental services mitigate the inappropriate use of urgent and emergency medical services would help in establishing how to reduce increasing demands on those services (NHS England, 2013). Comparison with other urgent dental services would help establish the efficiency of different service models and their appropriateness to different population groups.

A possible shortcoming of this evaluation was in determining the acceptability of the service. The aim was for a consecutive sample of patients but, reliance was on reception staff to administer the PEQ in a busy practice. Thus, the possibility of sampling bias cannot be excluded and highlights the difficulty of evaluating primary care services. Satisfaction with the TTP was not investigated, which might be addressed in future evaluations. Further qualitative exploration with patients about acceptability may overcome the limitations of patient satisfaction surveys (Dyer *et al.*, 2013).

Other urgent dental care providers such as the local dental hospital and general dental practitioners were not included in this evaluation. Including these services in future evaluations would provide a more complete picture of the extent to which urgent dental services in Sheffield meet local needs.

Conclusion

Overall the UDS provided a high quality service in line with Maxwell's dimensions of quality. The Sheffield UDS provided a service relevant to the population of Sheffield by facilitating access to timely advice and urgent dental care for people both in- and out-of-hours. Higher service use during holiday periods have implications for the level of activity commissioned and monitoring of service use should ensure demand is met over busy periods. Timely advice and treatment were provided with high levels of patient satisfaction with the CP however patient satisfaction with the TTP was not determined. An evaluation of the triage algorithms and an audit of prescription only visits are recommended. The service was apparently equitable with higher use by those with greatest need although variation in utilisation by age requires further investigation. Comparison with other urgent dental care models would determine the relative efficiency of the UDS.

Acknowledgements

We would like to acknowledge the staff at Taptonville House Dental for their assistance and insights into the urgent dental services, the patients who participated in the questionnaire, Primecare and the NHS Business Services Authority for data.

References

- Anderson, R. (2003): 'Toothache stories': a qualitative investigation of why and how people seek emergency dental care. *Community Dental Health* **20**, 106-111.
- Anderson, R., Thomas, D. W. and Phillips, C.J. (2005): The effectiveness of out-of-hours dental services: II. Patient satisfaction. *British Dental Journal* **198**, 151-156.
- Austin, R., Jones, K., Wright, D., Donaldson, N. and Gallagher, J.E. (2009): Use of out-of-hours emergency dental service at two south-east London hospitals. *BMC Oral Health* **9**, 19.
- Corah, N.L., O'Shea, R.M., Pace, L.F. and Seyrek, S. K. (1984): Development of a patient measure of satisfaction with the dentist: The Dental Visit Satisfaction Scale. *Journal of Behavioural Medicine* **7**, 367-373.
- Department for Communities and Local Government, DCLG (2010): *English Indices of Deprivation 2010*. <http://data.gov.uk/dataset/index-of-multiple-deprivation>
- Department of Health, DH (2005): *Factsheet 7: Commissioning out-of-hours services*. Gateway Ref:5917. London: DH.
- Dyer, T. (2013): A five year evaluation of an NHS dental practice-based specialist minor oral surgery service. *Community Dental Health* **30**, 4, 219-226.
- Dyer, T.A., Skinner, J., Canning, D. and Green, J.R. (2010): A health equity methodology for auditing oral health and NHS General Dental Services in Sheffield, England. *Community Dental Health* **27**, 68-73.
- Maxwell, R.J. (1992): Dimensions of quality revisited: from thought to action. *Quality in Health Care* **1**, 171-177.
- McCormick, A.P., Abubaker, A.O., Laskin, D.M., Gonzales, M.S. and Garland, S. (2013): Reducing the burden of dental patients on the busy hospital emergency department. *Journal of Oral Maxillofacial Surgery* **71**, 475-478.
- Mussard, J., Ashley, F.A., Newton, J.T., Kendall, N. and Crayford, T.J.B. (2008): What do you think of your dentist? A dental practice assessment questionnaire. *Journal of Evaluation in Clinical Practice* **14**, 181-184.
- National Health Service, England, NHS England (2005): *The National Health Service (General Dental Services Contracts) Regulations 2005*. London: The Stationery Office.
- NHS England (2013): *Transforming urgent and emergency care services in England*. London: NHS England.
- NHS Information Centre (2011a): *Executive Summary: Adult Dental Health Survey 2009*. Leeds: The Health and Social Care Information Centre.
- NHS Information Centre (2011b): *3: Urgent Conditions – a report from the Adult Dental Health Survey 2009*. Leeds: The Health and Social Care Information Centre.
- NHS Information Centre (2011c) *6: Service considerations – a report from the Adult Dental Health Survey 2009*. Leeds: The Health and Social Care Information Centre.
- NHS Sheffield (2010): *Urgent dental care service specification*. Sheffield: Dental Public Health Unit.
- National Institute for Health and Care Excellence, NICE (2015): *Antimicrobial stewardship: systems and processes for effective antimicrobial medicine use*. London: NICE.
- Office of National Statistics, ONS (2011): *Neighbourhood Statistics and Census Report. Sex 2011 (QS104EW), Age Structure 2011 (KS102EW), Ethnic Group 2011 (KS201EW)* www.neighbourhood.statistics.gov.uk/dissemination/LeadDatasetList.do?a=7&b=6275231&c=Sheffield&d=13&g=6357291&i=1001x1003&m=0&r=1&s=1376114674670&enc=1&domainId=13&nsjs=true&nsck=false&nssvg=false&nswid=1366
- Palmer, N.A.O., Dailey, Y.M. and Martin, M.V. (2001): Can audit improve antibiotic prescribing in general dental practice? *British Dental Journal* **191**, 391-393.
- Scottish Dental Clinical Effectiveness Programme, SDCEP (2013): *Management of acute dental problems. Guidance for health care professionals*. Dundee: SDCEP
- Topping, G.V.A. (2005): Out-of-hours emergency dental services – evaluation of the first year of a pilot project in Fife. *British Dental Journal* **198**, 193-197.
- Tulip, D.E. and Palmer, N.O.A. (2008): A retrospective investigation of the clinical management of patients attending an out of hours dental clinic in Merseyside under the new NHS dental contract. *British Dental Journal* **205**, 659-664.
- Turner, J., O'Cathain, A., Knowles, E., Nicholl, J., Tosh, J., Sampson, F., Coleman, P. and Coster, J. (2012): *Evaluation of NHS 111 pilot sites*. Sheffield, UK: University of Sheffield.