INTERNATIONAL JOURNAL OF PAEDIATRIC DENTISTRY

The British Society of Paediatric Dentistry

Clinical Effectiveness Bulletin

Editor: Chris Deery
Assistant Editors: Peter Day & Fiona Gilchrist
No 2
September 2009

IN THIS ISSUE

From the Chair

There have been an increased number of high quality audit reports submitted to the Bulletin this year and we hope that this will continue. It is always very interesting and useful to see what audits are taking place in other centres and helps us all to generate new ideas.

We are really pleased that the Policy Document 'Dental Neglect in Children' is now completed and on the website. Many different agencies have been involved in the development of this document which is really important for the Society and has highlighted its members' involvement in child protection. We have two Guidelines which are going through the final stages of approval 'The use of fissure sealants and management of the stained fissure in first permanent molars' and 'Treatment of traumatically intruded permanent teeth in children'. These should be available on the BSPD and Royal College of Surgeons of England websites later this year.

The Policy and Clinical Effectiveness Committee meets twice a year and has representatives nominated by BSPD, the Consultants and Trainees Groups and the Specialists' Branch. There will be some vacancies next year and I would encourage anyone interested to put themselves up for nomination.

Deborah Franklin
Chair, BSPD Clinical Effectiveness Committee

1

Role of specialist dental assessment in paediatric cardiac surgery patients

G. RICHARDSON[1], H. ZAITOUN[1], E. GIBSON[1], H. MICHAEL[2] & R. LLEWELYN[1]
[1]*Department of Paediatric Dentistry, and* [2]*Department of Cardiology, Alder Hey Children's NHS Foundation Trust, Liverpool, UK*

Introduction: The British Heart Foundation[1] estimates there are over 4600 children born with congenital heart disease in the UK each year. Although not all congenital heart disease requires treatment, the majority of defects require surgical intervention accounting for around 7000 cardiac procedures undertaken on children annually in the UK[1,2]. Where present, dental disease can often complicate the management and well-being of patients awaiting cardiac surgery. Indeed current guidance from the National Institute for Health and Clinical Excellence (NICE)[3] recommends that any episodes of infection in individuals at risk of infective endocarditis should be investigated and treated promptly to reduce the risk of endocarditis. Assessment of the dentition prior to cardiac surgery is therefore essential as in some circumstances poor oral health may result in the delay or cancellation of surgery causing significant disruption to the patient, cardiac team and overall service provision. In Alder Hey Children's Hospital, prior to 2008, referral to the Paediatric Dentistry Department was initiated by a member of the cardiac surgery team a few days before the intended procedure leading to significant delays in treatment for some patients. This prompted an audit to evaluate the extent and implications of such delayed referrals in order to optimise the provision of care for this group of patients.

Aim: 1. To identify dental disease in cardiac patients awaiting imminent cardiac surgery. 2. To modify the existing cardiac surgery assessment pathway to incorporate a more effective dental care pathway.

Method:

Cycle 1: Data were collected retrospectively over a 13-month period (October 2006 – October 2007) to establish baseline practice. A data collection tool was developed, piloted and used to collect information from the standard cardiac surgery pre-assessment documentation for all children listed for surgery over the audit period. The first and third authors collected the data which included cardiac diagnosis; dental attendance patterns and the outcome of any oral assessment undertaken either by the cardiac or dental team.

Cycle 2: Prospective analysis was undertaken over a 6 month period (May 2008 – October 2008) using the data collection tool as above. Following presentation of cycle audit findings to the cardiac surgery department, the nursing assessment documentation was modified to facilitate early referral to the Paediatric Dentistry Department where appropriate.

Results:

Cycle 1: A total of 95 patients were listed for cardiac surgery over a 13 month period and of which 23 (24%) underwent specialist dental assessment. Dental assessment was undertaken a mean 3.4 days prior to surgery (range 0–35). Mean age at assessment was 7.4 years (range 4.2–8.7); 49% male: 51% female. Of those assessed, seven (30%) required short-notice cancellation of their planned cardiac procedures due to dental infection. A further three (13%) were able to complete the necessary dental treatment under local or general anaesthetic prior to their cardiac procedures.

Recommendations: 1. Oral health teaching sessions, which included caries assessment, were provided for the cardiac surgery team.
2. Initiation of dental assessment at patient listing appointment rather than at surgical pre-assessment.
3. Modification of nursing initial assessment form to 'fast track' dental assessment if required rather than waiting for surgical pre-assessment appointment.

Cycle 2: A total of 47 patients were included over a 6 month period of which 11 (31%) underwent specialist dental assessment. Dental assessment was undertaken a mean 98 days prior to surgery (range 64–106). Mean age at assessment was 7.9 years (range 4.5–9.1); 47% male: 53% female. Of the 11 patients referred for dental assessment, four cases (36%) required urgent dental treatment due to infection. All dental treatment was completed prior to cardiac surgery resulting in no cancellation of their originally planned procedures.

Discussion: The changes implemented to the initial assessment documentation allowed the cardiac nursing staff to refer appropriate patients to the dental department months rather than days prior to their proposed surgery. As a result, no patients required cancellation of their cardiac surgery due to dental infection in the second audit cycle. Early referral also facilitated the provision of all necessary dental treatment prior to cardiac surgery with minimal disruption to the patient, paediatric dental and cardiac surgery teams. Furthermore, by continuing to provide oral health education for cardiac staff, it is hoped that future dental intervention in this group of patients will be minimised. This audit cycle has highlighted the importance of the paediatric dental team in management of this complex group of patients.

Action plan: This is a completed audit cycle, which has resulted in changes to the provision of care for cardiac surgery patients. All patients with either visible dental decay or those not receiving regular dental care, are now assessed by a member of the dental team. Furthermore, the timing and documentation used for the pre-surgical assessment has changed incorporating prompts to activate the dental referral. Our aim is to maintain these changes and increase oral health awareness.

References:

1. British Heart Foundation. http://www.heartstats.org.
2. Central Cardiac Audit Database (CCAD). http://www.ccad.org.uk/002/congenital.nsf/WMortality?Openview.
3. National Institute for Health and Clinical Excellence. Prophylaxis against infective endocarditis: antimicrobial prophylaxis against infective endocarditis in adults and children undergoing interventional procedures. NICE Clinical Guideline No 64. London: National Institute for Health and Clinical Excellence, 2008.

2

The value and efficiency of sickle cell screening prior to paediatric exodontia under general anaesthesia

A. ABDEL-KARIM[1], O. CHAWLA[1], C. DEERY[1] & J. M. YATES[2]
[1]*Department of Paediatric Dentistry, and* [2]*Department of Department of Oral and Maxillofacial Surgery, Charles Clifford Dental Hospital, Sheffield, UK*

Introduction: Sickle cell anaemia is an inherited genetic condition affecting the red blood cells. Difficulties arise in the identification of heterozygous carrier state, sickle cell trait, due to its subtle phenotype. Although this form of the disease is rarely associated

with mortality, hypoxia which may occur during general anaesthesia (GA) may initiate a sickle crisis. This may have detrimental effects on health. It is therefore imperative that such individuals are identified prior to treatment so appropriate measures may be undertaken.

Currently two screening modalities exist for such patients in the UK:

1. Screening prior to GA: This usually consists of full blood count and sickle dex prior to admission. This type of screening is usually requested by anaesthetist for all children of non-caucasian background. Here ethnic origin is used as an indicator. However this fails to identify 20% of at risk patients[1].
2. Screening at birth: This was introduced following the Newborn Screening Programme (NSP) in 2004[2]. This aims to identify sickle cell disease, to allow early medical intervention and therefore reduce mortality. This tool can also be used to identify sickle cell trait[3]. As all newborns regardless of ethnicity are screened, this is a more robust screening modality.

Aim: This was a retrospective study aimed to compare the effectiveness of sickle cell screening prior to GA and screening under the NSP amongst children undergoing dental general anaesthesia, at Sheffield Children's Hospital.

Standards: One hundred per cent of all children born after 2004 should be screened at birth under the NSP.

Method: The haematological records of 132 non-caucasian patients who underwent screening prior to exodontia under GA, between April 2006 and March 2007, were examined. In particular the presence of sickle cell trait and/or any other haemoglobinopathy was recorded. Other abnormalities noted included anaemia (Hb < 10g/dl). Information regarding NSP was accessed at the Sheffield Children's Health Records Database, to establish whether sickle cell screening had been performed at birth.

Results: The mean age for the study group was 8 years. All 132 patients had been subjected to screening prior to GA. Haemoglobinopathy was seen in only four of patients. Two patients exhibited thalassemia trait and two patients exhibited sickle cell trait. Interestingly, anaemia was the most common abnormality seen in 13 of the sample. When retrieving information regarding newborn screening at the Children's Health Records Database, NHS numbers were required for identification. This was only available in 30% of the sample, hindering information accessibility. Fourteen percent (19/132) of patients were born after 2004 and therefore it could be expected that they would have been screened under the NSP. However, information regarding newborn screening was available for only 14 patients, 75% of those born after 2004. The remaining 25% had no information available at the Sheffield Children's Health Records Database. Of these two patients were born in localities outside of Sheffield and information regarding NSP was likely to be held at the local databases. The remaining three patients were born outside of the UK and were not screened under NSP. Eighty-five per cent of the total sample (113/132) were born before 2004, prior to implementation of NSP. Therefore, none of the patients in this group were screened at birth.

Discussion: Currently only a small proportion of children undergoing exodontia under GA were born after the introduction of NSP. It is reasonable to assume at present a significant proportion of the paediatric population being admitted for GA exodontia have not been screened at birth as most were born prior to the introduction of sickle cell newborn screening. Although the majority of patients born after the introduction of NSP were screened at birth, information was unavailable for five patients. The NSP does not include children born outside of the UK. Considering the current increase in immigration trends into the UK such patients are likely to represent a significant number of individuals in the future[4]. In addition, problems arise where a child moves out of the locality where they were born. Information regarding NSP is not always transferred between local databases. Furthermore NHS numbers required to access NSP databases are not readily available in clinical records. This limits the accessibility of this information. Screening prior to GA revealed anaemia to be common among children undergoing GA exodontia. This is to be expected as children undergoing such procedures are likely to come from the more deprived sections of our society[5]. In addition, limited food intake due to dental symptoms, increases likelihood of anaemia related to haematinic deficiency[6]. In cases where anaemia was identified treatment was arranged via the general medical practitioner and general anaesthesia offered when appropriate.

Action plan:

1. Currently only a small proportion of children undergoing dental GA are subject to the NSP, as most patients were born prior to its introduction. Therefore it can be considered good practice to screen these children prior to GA.
2. Differences of opinion exist as to the need for screening patients of all ethnicities prior to GA. However, as demonstrated patients undergoing dental GA are prone to haematological abnormalities especially anaemia. In addition, screening based on ethnicity fails to identify at risk patients. The NSP does not provide information regarding the increasing proportion of children born outside of the UK. This provides adequate justification for screening all patients prior to GA.
3. Problems were identified in the relay and accessibility of information regarding NSP. Better designed identification tools and a central database should be considered which would improve information accessibility.
4. Similar studies should be conducted within different localities to establish the efficacy of the NSP nationally.

References:

1. Streetly A. A national screening policy for sickle cell disease and thalassemia major for the United Kingdom. *Brit Med J*. 2000; **320**: 1353–1354.
2. Streetly A, Clarke M, Downing M. Implementation of the newborn screening programme for sickle cell disease in England: results for 2003–2005. *J Med Screen*. 2008; **15**: 9–13.
3. Sickle Cell & Thalassemia Antenatal Newborn Screening Programme NHS. *Laboratories Handbook*. NHS, 2006.
4. London Health Observatory. Analysis of Frequent Users by PCT 2003/04. 2006.
5. Pitts NB, Boyles J, Nugent ZJ, Thomas N, Pine CM. The dental caries experience of 5-year-old children in Great Britain (2005/6). Surveys co-ordinated by the British Association for the Study of Community Dentistry. *Community Dent Health*. 2007; **24**: 59–63.
6. Sheiham A. Dental caries affects body weight, growth and quality of life in pre-school children. *Br Dent J* 2006; **201**: 625–626.

3

General anaesthesia for pre-school children: the impact of dental therapist input

J. DAVIES & J. FEARNE

Department of Paediatric Dentistry, Dental Institute, Barts and the London NHS Trust, London, UK

Introduction: Early childhood caries (ECC) is defined as the 'presence of one or more decayed (non-cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces' in any primary tooth in a child 71 months of age or younger[1,2]. These children present a particular challenge as they are often

pre-cooperative or have a prohibitive amount of treatment required for their short attention spans. Much controversy exists over whether restorative care should be provided for these patients or whether a solely preventive regime should be instigated. If treatment is required, often general anaesthesia (GA) is the only route for this young age group. Due to restraints on paediatric dental services, GA for pre-school children is often limited to extractions of multiple carious teeth. It is felt that this could be reduced if appropriate behaviour management techniques are in place[3].

Aims: The primary aim was to assess the impact on the definitive treatment plan when children with ECC attended two appointments with a dental therapist. Further aims of the audit were to examine compliance with the 18 week wait pathway and the proportion of children receiving preventive advice.

Standards:

1. No carious teeth should be left untreated either by restoration or extraction following an anaesthetic[4].
2. 100% of children in the study should receive preventive advice[3].
3. All children should have their first treatment appointment within 18 weeks of their initial referral.

Method: This was a prospective audit of pre-school children referred for GA attending a new patient clinic between May and July 2008. Children who fulfilled the following inclusion criteria were included in this audit:

1. Younger than 71 months at initial consultation
2. No significant medical history (ASA I or II)
3. Had symptomatic teeth
4. Had at least one restorable tooth
5. Had no erupted first permanent molars
6. Parent/guardian consented to treatment plan

At the initial consultation visit, the number of carious and pulpally involved teeth was noted and a provisional treatment plan was formulated. Two appointments were made with a dental therapist for acclimatisation and preventive advice. At each therapist appointment, data was collected using a proforma. After the second visit with the dental therapist, a final treatment plan was formulated either for the child to have continuing care with the dental therapist, extraction of teeth only under a short GA or dental rehabilitation under GA.

Results: In total, 35 children fulfilled the inclusion criteria of which 16 were male. The average age was 46 months at their initial visit (range 21–64 months). The average dmft was seven (range = 2–13, SD = 3.17) and the average number of grossly carious (pulpal involvement) teeth was three (range = 0–11, SD = 2.34). The average waiting time between the hospital receiving the referral letter and the first treatment appointment with a dental therapist was 9 weeks (range 4.6–17.3 weeks); no patient waited longer than 18 weeks from referral to initial appointment. The first appointment with the dental therapist was attended by 27 of the 35 patients representing an attendance rate of 77%. The following treatment was received at the first therapy appointment: 96% oral hygiene, diet and fluoride advice; 48% temporary dressings and 30% definitive restoration. Second therapy appointments were given to 22 of the 35 patients. Some patients were not given a second appointment as the treatment was already completed (n = 2, 6%), the patient was pre-cooperative (n = 9, 26%) or they had failed to attend their initial appointment and did not respond to the letter sent (n = 2, 6%). Two patients failed to attend the second appointment and were contacted; one of these patients had attended in pain and had had their teeth extracted under GA and parents of the other child requested comprehensive treatment under GA. Patients that attended this appointment received the following treatment: 15% oral hygiene; diet and fluoride advice; 20% temporary dressings and 60% definitive restoration. A further 15% had no treatment as the patient proved uncooperative or the appointment was made to discuss the treatment plan at the parent's request. The only child not to receive preventive advice at their first visit received it at their second visit.

Of the 35 initial patients, two patients failed to attend either of their appointments with the dental therapist; did not respond to letters sent and were not included in the following analysis. The remaining 33 patients were classified into the following groups: continued care with dental therapist (n = 9, 27% of sample); patients having a GA for extractions only (n = 9, 27%) or patients having comprehensive treatment under anaesthetic (n = 15, 46%). The average ages for these groups were 51.2, 47.7 and 42.5 months respectively. The average dmft was six, eight and eight respectively. The nine patients who had continued care with the dental therapist had their treatment completed without GA and will be reviewed regularly in the department.

The total number of carious teeth for the cohort of patients was 202. Of these teeth, 73 (36%) were considered unrestorable; these were teeth that were grossly carious or were likely to have pulpal involvement (as a rule pulpotomies on primary molars are not performed under GA at the Royal London Hospital). The remaining 129 teeth (64%) were considered restorable. The total number of restored teeth was 101 (79 under GA, 22 with local anaesthetic). Of the 88 teeth extracted, the majority were extracted under GA; only two were extracted under local anaesthetic. The remaining 13 teeth were either anterior teeth close to exfoliation or were deemed suitable for fluoride varnish application and monitoring (Fig. 1). Figure 2 illustrates the impact of different care pathways on treatment planning

Discussion: This audit demonstrated that the dental therapist appointment prior to a general anaesthetic may fulfil a variety of functions. It gives an opportunity for delivering preventive advice after the initial consultation appointment where both children and parents are receiving plenty of new information. It also allows better assessment of the child's cooperation and possible restorative treatment with or without resorting to GA for extractions later. This approach is not appropriate for all, but may in certain cases prove useful.

Conclusion: Assuming that all 33 of the children would have had a GA, the therapist appointments resulted in a 27% reduction in number of GAs as nine patients had continuing therapy care instead. There was also a 56% reduction in the number of teeth requiring extraction when compared with extraction only GA treatment (114 teeth vs. 202 teeth). In all cases, the 18 week wait

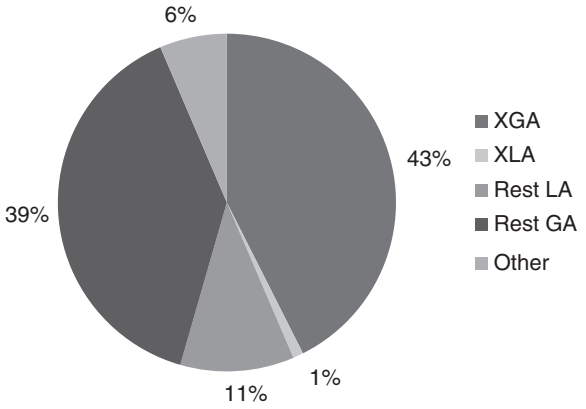

Fig. 1. Fate of carious teeth.
XGA = extraction under general anaesthetic, XLA = extraction under local anaesthetic, Rest LA = restoration under local anaesthetic, Rest GA = restoration under general anaesthetic.

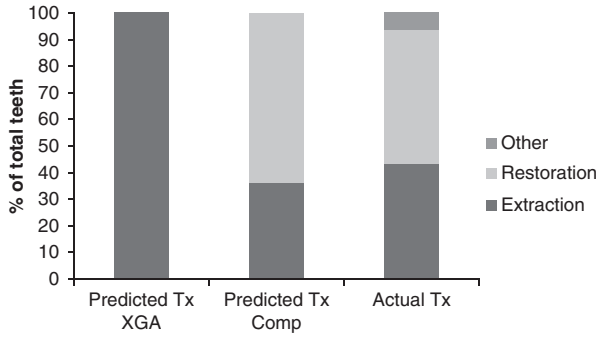

Fig. 2. Predicted vs Actual treatment. Predicted Tx XGA = Proportion of teeth extracted under GA if this was the only available option; Predicted Tx Comp = predicted proportion of teeth extracted/restored if all children could receive comprehensive treatment under GA; Actual Tx = actual treatment received.

targets were met and all children received preventive advice including oral hygiene instruction, diet and fluoride advice.

Action plan: As a result of this audit, an integrated care pathway has been formulated for the treatment of children with ECC. The care pathway will be re-audited and a follow up study examining children over a period of 2 years will be initiated.

References:

1. Ismail A, Sohn W. A systematic review of clinical diagnostic criteria of early childhood caries. *J Public Health Dent*. 1999; **59**: 171–191.
2. American Academy of Pediatric Dentistry. Policy on early childhood caries (ECC): classifications, consequences, and preventive strategies. *Pediatr Dent*. 2005; **27**: 31–33.
3. Rayner J, Holt R, Blinkhorn F, Duncan K. British Society of Paediatric Dentistry: a policy document on oral health care in pre-school children. *Int J of Paediatr Dent*. 2003; **13**: 279–285.
4. Davies C, Harrison M, Roberts G. *Guideline for the use of GA in Paediatric Dentistry*. [www. document]. Royal College of Surgeons of England, 2008.

4

The provision of dental care for children attending a paediatric cardiology outpatient clinic

J. JOHNSON[1], C. WILLIAMS[1] & S. QURESHI[2]
[1]*Department of Paediatric Dentistry, and* [2]*Department of Paediatric Cardiology, Guy's and St Thomas NHS Foundation Trust, London, UK*

Introduction: Congenital heart defects (CHD) are structural problems of the heart present at birth. The British Heart Foundation[1] estimates that approximately 4600 (one in every 145 live births) babies are born in the UK each year with CHD. With improved detection, diagnosis and progress of surgical and anaesthetic methods, the number of surviving children is increasing[2]. Early dental health problems are common in children with CHD with more untreated caries and a higher caries prevalence compared to healthy children[3]. Lower frequencies of regular dental care have been displayed in children with CHD[4]. This audit was carried out to investigate the provision of dental care for children with CHD in South London area, and their current oral health status.

Aims:

1. To establish the current dental health of the children with CHD who attend the cardiac outpatient clinics at the Evelina Children's Hospital
2. To establish the previous dental care each child has received to date and by whom it was provided to aid in the planning of future service provision at Guy's and St Thomas NHS Foundation Trust.

Standards: There are no written standards available for the oral health management of CHD children. Most of the literature on CHD and dentistry denotes particular importance to the management of the dentition in medically compromised children[5].

Methods: Data were collected by the primary author in the form of a structured interview questionnaire with the parent or guardian of children attending the outpatient cardiac clinics at the Evelina Children's Hospital, Guy's and St Thomas NHS Foundation Trust. The information was transcribed by the primary author and entered onto a Microsoft Excel® spreadsheet.

Data collected:

1. To determine the number of children who regularly see a dentist and if so what type of dentist
2. The age these children first visited a dentist and the reason for initial attendance
3. Past dental experience and prevention advice (oral hygiene, diet advice, fluoride use, fissure sealants) they have received
4. To determine the current caries experience of each child and the previous interventional care each child has received.

An intra-oral clinical screening examination of the dentition, recording untreated caries and restorations present, was performed after obtaining verbal consent from the parent/guardian.

Results: Fifty-two parents were interviewed and 52 clinical examinations of the children with CHD were carried out by the primary author over a 4 month period. No parent or child refused. The children ranged in age from 3 to 15 years of age. Of these, 23% (n = 12) had never visited a dentist. Thirty had seen a General Dental Practitioner (GDP), eight within the Salaried Dental Service and two had been seen in a hospital setting by a specialist in paediatric dentisty. Forty-six percent (n = 24) of the patients could be classed as regular attendees having attended within the last 12–18 months. Figure 1 demonstrates the reasons given as to why children with CHD initially attended a dentist. The mean (range) age at which the children first visited the dentist was five (1–16 years) years of age.

Clinical examination revealed that 57% (n = 30) children had active caries affecting either their primary or permanent dentition. Fifty-six percent (n = 17) had six or more cavities which had not been restored. Treatment received by the children included glass ionomer dressings, composites, preformed metal crowns and amalgams. Nine children had restorative work performed in a dental surgery with or without local anaesthetic. Six children had undergone general anaesthesia but in only one case was this under the care of a specialist in paediatric dentistry. Extractions were the only treatment provided for five of these children. Preventative advice was broken down into the four pillars and is summarised in Fig. 2. It was reported that 23% (n = 24) 38% (n = 20) 28%

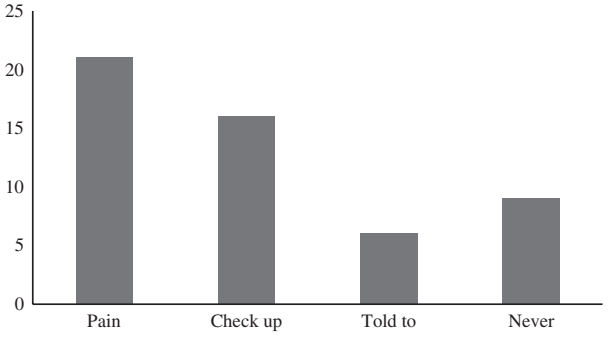

Fig. 1. Reasons cardiac patients attended a dental practitioner.

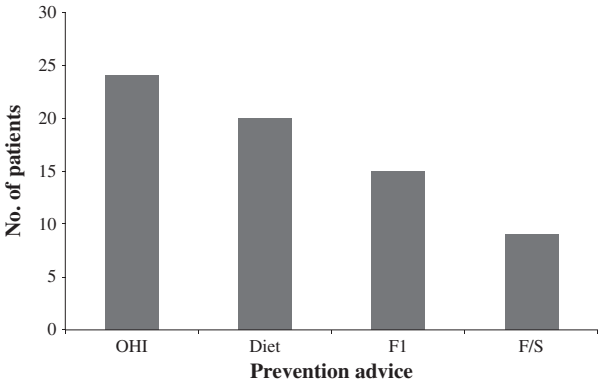

Fig. 2. Proportion of parents who had received preventative advice.

(n = 15) 17% (n = 9) of the patients had been given advice regarding oral hygiene, diet, fluoride and fissure sealants respectively. Of the ten children who received restorative care, nine had also received preventative advice.

Discussion: The National Institute of Clinical Excellence (NICE) guidelines on antibiotic prophylaxis for patient's with cardiac defects encourages that such patients are seen by a heath care professional (HCP) and early prevention advice is strongly advocated[6]. Regular access to dental care for CHD patients is sub-optimal with only 77% having ever seen a dentist and of these only eight children have received care in a specialist paediatric dental unit. Only six children were advised by a HCP to seek dental treatment and received information regarding where it could be obtained. These six children were under 5 years of age. The prevalence of untreated tooth decay in this group is far higher than the national average found in the 2003 Children's Dental Health Survey[7].

Action plan: There is a need for clear protocols and referral pathways for all CHD child patients once under the care of a paediatric cardiologist at the Evelina Children's Hospital, Guy's and St Thomas NHS Foundation Trust. A dental care pathway will be formulated for these patients by the hospital paediatric dental team. This will include shared care with the primary dental care team. Of paramount importance is that preventative advice will be given at an early age by dental care professionals.

Proposed pathway:

1. An information leaflet will be created for the patients to give to a primary care dentist explaining the need for dental input, referral addresses and contact points. They will receive this t the child's first cardiac clinic appointment.
2. Preventative advice and dental caries will be managed by the primary care dentists.
3. If the dentist is unable to manage the child or their dental needs referral should be made to the Department of Paediatric Dentistry.
4. For patients with no access to primary care a specific referral form can be developed to allow paediatric cardiologists to refer patients directly to the Children's Dental Department within the trust.

Further audit is recommended at the Evelina Childrens' Hospital once the new protocol and referral pathway have been fully implemented.

References:

1. British heart foundation. www.bhf.org.uk.
2. Grahn K, Wikström S, Nyman L, Rydberg A, Stecksén-Blicks C. Attitudes about dental care among parents whose children's suffer from severe congenital heart disease: a case control study. *Int J of Paediatr Dent*. 2006; **16**: 231–238.
3. Pollard MA, Curzon ME. Dental health and salivary Streptococcus mutans levels in a group of children with heart defects. *Int J Paed Dent*. 1992; **2**: 81–85.
4. Stecksén-Blicks C, Rydberg A, Nyman L, Asplund S, Svanberg C. Dental caries experience in children with congenital heart disease: a case control study. *Int J of Paed Dent*. 2004; **14**: 94–100.
5. Tasioula V, Balmer R, Parsons J. Dental health and treatment in a group of children with congenital heart disease. *Pediatr Dent*. 2008; **30**: 323–328.
6. National Institute for Health and Clinical Excellence. Prophylaxis against infective endocarditis: antimicrobial prophylaxis against infective endocarditis in adults and children undergoing interventional procedures. NICE Clinical Guideline No 64. London: National Institute for Health and Clinical Excellence, 2008.
7. Pitts NB, Chestnutt IG, Evans D, White D, Chadwick B, Steele JG. The dentinal caries experience of children in the United Kingdom, 2003. *Br Dent J*. 2006; **200**: 313–320.

5

Audit on the completion of consent forms for treatment carried out under paediatric dental general anaesthesia

P. SHAH & A. JOHNSON

Unit of Paediatric Dentistry, Eastman Dental Hospital, University College Hospital of London (UCLH) Foundation Trust, London, UK

Introduction: Consent is required before carrying out any dental procedure. It is good practice to seek written consent if treatment is complex or involves significant risks or side-effects[1]. Written consent is required for treatment under general anaesthetic (GA). Consent should be continuous and consent for treatment under GA should be obtained prior to the day of the actual procedure to allow the patient and parents time to reflect. It is important that the children and parents understand the all relevant benefits and risks[1].

Aim: To evaluate the completion of consent forms for paediatric dental patients in the Department of Paediatric Dentistry at the Eastman Dental Hospital undergoing treatment under GA at University College London Hospital (UCLH).

Standards: All consent forms should have 100% of the required information completed.

Method: A list was compiled of all the information that should be present on the consent form for three types of procedure namely: extractions, conservation with or without extractions and surgical procedures. A proforma was designed to collect the information. One hundred consent forms were evaluated after the patient's pre-assessment appointment, but before their treatment appointment between January and April 2008. The information that should be present on the form is presented in Table 1 and results section. The consent forms were divided according to the specific procedure undertaken.

Results: Twenty-six percent of forms were completed by senior house officers, 7% by specialist registrars, 34% by consultants and 33% by specialists. Leaflets about dental treatment under general anaesthesia are not normally provided at the planning appointments, but this was only specified in 11% of the cases. In the section 'Statement of interpreter' a signature, the date and the name of the interpreter was present in all cases, where applicable. Fifty-two percent of forms had recorded that a copy of the form was given to the parent. In four percent of cases, the duplicate copy that should have been given to the parents was still present in the notes. Of the 100 procedures undertaken 25% were extraction only cases, 59% were conservation and extractions,

and 16% were surgical procedures. Figure 1 shows the use of relevant words that should have been present in the explanation of a specific procedure.

Table 1. Proportion of consent forms that had the required information completed (n = 100).

Required Information	Percentage of forms with Information
Patient's first name and surname, date of birth, gender	100
NHS organisation, patient's age, responsible health professional, job title	96
Patient Identifier Number	87
Special requirements e.g. need for interpreters	3
Information on other procedures that may be required	36
General Anaesthesia box ticked	95
'And/or regional' crossed out	25
Local anaesthesia box ticked	37
Date, signature, name and designation of health professional	98
Contact details	32
Parental signature	99
Parents name	95
Relationship to child	93
Parent having put date when signing	97

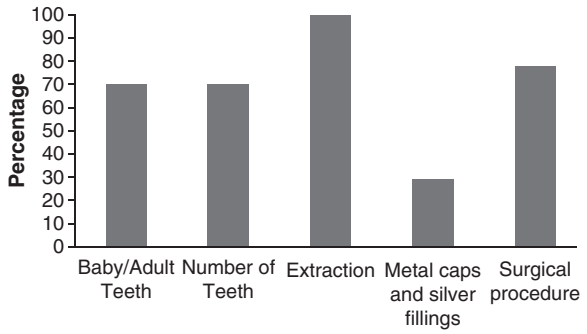

Fig. 1. Proportion of consent forms with relevant information in relation to explanation of procedure.

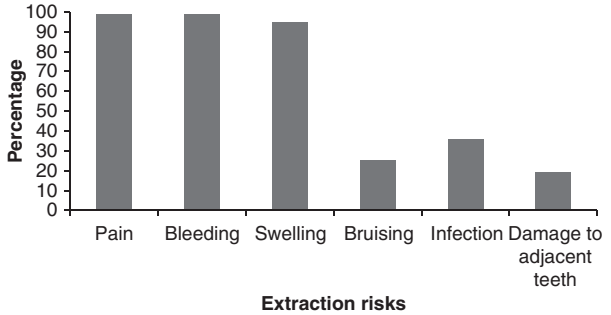

Fig. 2. Proportion of consent forms that had the relevant extraction risks present.

In the cases where the procedure was conservation and extractions, 11% of the forms stated the risk of possible wear or loss of fillings and metal caps. Among the consents for surgical procedures 77% had not stated risk of nerve damage where this was a possibility and in 12% of cases where an exposure and bonding was planned, the risk of failure of bonding was not stated. All cases had a benefit stated as either restoration of oral health or orthodontic reasons (depending on the reason for the procedure). Only 64% of forms had the risks of GA stated. The percentage of forms that had the relevant risks in relation to extractions stated is shown in Fig. 2.

Discussion: The results of this audit showed that none of the consent forms had 100% of relevant information completed. There were inconsistencies present in the completion of the forms especially in the categories of procedure and risk. This could result in some patients and parents not having all the relevant information about the procedure prior to the GA appointment.

Implementation of findings: Based on the findings, a list of minimum information that should be present on the consent forms for procedures under GA has been drawn up with input from all clinical members of the department. A memo with this information has been distributed to all staff and laminated copies of completed consent forms are kept on all clinics to act as a reminder for clinicians completing the forms. Instruction in completion of consent forms will form part of the induction of all new staff. A re-audit will be carried out in 6 months after implementation of the above.

Acknowledgements:

Thanks to Suzanne Dunkley and Paul Ashley for their help.

References:

1. Department of Health. Seeking consent: working with children. 2001. [WWW document]. URL: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4007005.
2. General Dental Council. *Principles of Patient Consent*. 2005.
3. Davies C, Harrison M, Roberts G. Guideline for the use of general anaesthesia (GA) in Paediatric Dentistry. 2008. [WWW document]. URL: http://www.rcseng.ac.uk/fds/clinical_guidelines.
4. Nunn J, Foster M, Master S, Greening S. British Society of Paediatric Dentistry: a policy document on consent and the use of physical intervention in the dental care of children. *Int J Paed Dent*. 2008; **18** (Suppl. 1): 39–46.

6
Caries risk assessment and prevention

Y. SHAMMAA[1], R. R. WELBURY[1], L. OVENSTONE[2] & C. CAMPBELL[1]

[1]*Department of Paediatric Dentistry, Glasgow Dental Hospital and School, and* [2]*Bridgeton Health Centre, Community Dental Service, Glasgow, UK*

Introduction: The prevalence of dental caries in children in the West of Scotland remains a significant clinical problem, with a mean dmft of 2.16 (1.33–2.68) in 5-years-olds, and mean DMFT of 1.06 (0.42–1.28) in 12-year-olds in the Greater Glasgow and Clyde region[1,2]. According to Deery *et al.*[3] (2007) the majority of children attending the hospital and community dental services in the East of Scotland are at high caries risk. Caries risk status has implications for planning preventive care, including; radiographic frequency, fluoride varnish application frequency, recall intervals and need for fissure sealants. If caries risk status can be lowered, this optimises the child's dental health and is cost-effective. Ideally, a caries risk assessment (CRA) and

preventive care should be fully documented in the patient's notes. In 2007 a retrospective audit in the Department of Paediatric Dentistry, Glasgow Dental Hospital & School (GDHS) aimed to:

1. Establish the standards of documentation for CRA and preventive care at undergraduate level.
2. Instigate a prevention protocol in the form of a CRA and prevention sheet for the use in GDHS and community dental service (CDS) undergraduate outreach teaching facilities. SIGN 47 and 83 guidelines were used as gold standard[3,4].

Audit results highlighted the poor documentation of CRA in patient's notes (0%). Radiographs were taken for most patients 96%. Fluoride varnish (FV) was applied in less than half (48%). Toothpaste strength advice was only given in 4%. Tooth brushing instruction was received by 84%, dietary counselling in 64% and fissure sealants placed in just over half (56%). These are shown in Table 1.

The lack of documentation of CRA in patient's notes has implications for continuity of care and frequency of preventive treatment. Giving advice on toothpaste strength is crucial; however, this was rarely documented in the patient's notes. In addition, preventive care for fluoride varnish, toothbrushing instruction, dietary counselling and fissure sealant did not match the standards set by SIGN 83 and SIGN 47. Action points from this audit included:

1. The design and implementation of a CRA and prevention sheet
2. Its use was explained to both the clinicians within the Department of Paediatric Dentistry and all clinical teachers at a joint study day for GDHS and CDS outreach teaching in autumn 2007.

In 2008 this audit was repeated within GDHS and at a community outreach-teaching clinic.

Aim: To establish the standards of preventive care after implementation of the CRA and prevention protocol sheet for undergraduate students in both GDH & S and Bridgeton CDS outreach clinic.

Standards: 1. SIGN 47 & 83 guidelines
2. 80% compliance with all aspects of the CRA and prevention protocol sheet.

Methods: Retrospective data collection took place at GDHS and Bridgeton CDS between December 2007 and January 2008. Fifty patients were selected from Glasgow Dental Hospital and 34 patients selected from Bridgeton CDS. All patients were treated by undergraduate students. A data collection sheet was used and the following noted: CRA, radiograph prescribed, fluoride varnish applied, toothpaste strength advice, tooth brushing instruction, dietary counselling, fissure sealant application and advice on sugar-free medication.

Results: Glasgow dental hospital and school: The median age of patients seen was 10.7 (3.75–16.7) years old. The majority were over 5-years-old (<5: $n = 2$, 4%, >5: $n = 48$, 96%). The CRA sheet uptake was 34% and this appears to have improved preventive treatment for patients. The following improvements were found (Table 1):

1. 28% increase in application of fluoride varnish
2. 10% increase in toothpaste strength advice
3. 8% increase in tooth brushing instruction
4. 26% increase in dietary counselling
5. 38% increase in fissure sealant application if applicable

Bridgeton community outreach clinic: The median age of patients seen was 7.0 (0.83 –16.0) years old. A third were pre-school ($n = 10$) and two thirds were over 5, ($n = 24$). The CRA sheet uptake was 100%, with just over half receiving a radiograph (53%) and this has resulted in a high standard of preventive care for patients (Table 1):

1. 76% had application of fluoride varnish
2. 79% received toothpaste strength advice
3. 91% received tooth brushing instruction
4. 91% received dietary counselling
5. 78% received fissure sealant application.
6. No patients required sugar-free medication advice as per medical history review.

Table 1. Caries risk assessment and prevention audit: cycles 1 and 2.

	CRA	Radiograph	FV	TPS	TBI	DC	F/S	MED
2007								
GDHS	0%	96%	48%	4%	84%	64%	56%	0%
$n = 25$	$n = 0$	$n = 24$	$n = 12$	$n = 1$	$n = 21$	$n = 16$	$n = 14$	$n = 0$
2008								
GDHS	34%	98%	76%	14%	92%	90%	94%	0%
$n = 50$	$n = 17$	$n = 49$	$n = 38$	$n = 7$	$n = 46$	$n = 45$	$n = 47$	$n = 0$
2008								
Bridgeton	100%	53%	76%	79%	91%	91%	78%	0%
$n = 34$	$n = 34$	$n = 18$	$n = 26$	$n = 27$	$n = 31$	$n = 31$	$n = 26$	$n = 0$

GDHS = Glasgow Dental Hospital and School; CRA = caries risk assessment; FV = fluoride varnish; TPS = toothpaste strength; TBI = toothbrushing instruction; DC = dietary counselling; F/S = fissure sealant; MED = sugar-free medicine advised.

Discussion:

1. The CRA and prevention sheet has improved preventive advice and strategies for undergraduate clinics at GDHS and has achieved a high standard of care at the CDS outreach clinic.
2. The uptake of 100% at Bridgeton of CRA is far better than the 34% uptake at GDH.
3. More patients receive a radiograph at GDH than Bridgeton; this is probably a reflection of the age profile, with a higher percentage of pre-school children seen in the undergraduate clinic in the community dental service.
4. A similar uptake is observed for application of fluoride varnish, toothbrushing instruction and dietary counselling.
5. More patients received advice on toothpaste strength at Bridgeton.
6. More patients received fissure sealants at GDHS; again this may be a reflection of the age profile, with older patients seen at GDHS.

Action plan:

1. The CRA and prevention audit results were presented in a paediatric departmental meeting at GDHS and at a regional audit meeting.
2. An undergraduate poster competition has taken place focusing on SIGN 83 and toothpaste strength advice. This aims to increase student awareness (nursing, therapist & dental), focusing on advice regarding toothpaste strength. This poster is now on display in the waiting area and will hopefully help to improve awareness amongst parents and children.
3. A poster is now available in the student teaching area at GDHS regarding toothpaste strength (Appendix 2).
4. This project will be repeated in 2009 aiming for at least 80% use of the CRA & 80% compliance with all aspects of the prevention sheet.

Acknowledgements:
Many thanks to all the staff within The Department of Paediatric Dentistry, Glasgow Dental Hospital and School who contributed to designing the toothpaste strength advice sheet.

References:

1. Merrett M, Goold S, Jones CM *et al*. National Dental Inspection Programme. Report of the 2006 Survey of P. Children. Scottish Dental Epidemiological Co-ordinating Committee, 2007.
2. Merrett M, Goold S, Jones CM *et al*. National Dental

Inspection Programme. Report of the 2007 Survey of P7 Children. Scottish Dental Epidemiological Co-ordinating Committee, 2008.
3. Deery C, Simpson T, Valvona S. Evaluating the use of fissure sealant in Lothian. *Scottish Dentist*. 2007; March – April: 14.
4. Preventing Dental Caries in Children at High Caries Risk: SIGN Guideline Number 47, Edinburgh: Royal College of Physicians, 2000.
5. Prevention and Management of dental decay in the pre-school child: SIGN Guideline Number 83. Edinburgh: Royal College of Physicians, 2005.

7

The frequency of repeat extractions under general anaesthesia in children: re-audit

S. CAREW O' DONNELL & S. S. ALBADRI
Paediatric Dentistry Department, University of Liverpool Dental Hospital, Liverpool, UK

Introduction: The recent national guidelines for the use of general anaesthesia (GA) in paediatric dentistry states that repeat GA is undesirable and should be avoided when possible[1]. The General Dental Council 'Standards for Dental Professionals' stated that 'general anaesthetic should only be carried out when it is judged to be the most clinically appropriate method of anaesthesia'[2]. The same report stressed that there must be clear justification for its use. Such justification has been listed as the responsibility of both the referring clinician and the dentist carrying out the treatment[3]. Despite this, dental treatment under GA remains a valuable procedure, especially for those children who are very young or extremely anxious or have extensive caries in multiple quadrants that requires urgent treatment[1].

In consideration of the issues outlined above, an audit was carried out at Liverpool University Dental Hospital (LUDH) over a 3 month period in 2003, which aimed to investigate the frequency of repeat GA for teeth extractions in children[4]. This audit highlighted the fact that radiographs were available less frequently in children that had repeat GA. It was also noted that fewer teeth were extracted at the initial GA in children who had repeat GA compared to those who had a single GA. The authors' concluded that more radical treatment planning procedures may enable a reduction in the numbers of children that require a repeat GA for dental treatment. These findings are supported by the results of previous studies 1. Kakaounaki *et al.*[5]. (2006) suggest that a more formal preventative programme in the post-operative period can lessen the recurrent development of dental disease and therefore avoid the need for a repeat GA. As a result of this audit, the prescription of paediatric dental treatment under GA at LUDH now has to be approved and signed by a consultant or specialist in paediatric dentistry to ensure that those children are receiving the highest level of care expected in a tertiary referral centre.

Aim: To investigate the effectiveness and implementation of the recommendation highlighted in the previous audit on the frequency of repeat extractions under GA in children at LUDH.

Methods: The records of all children undergoing dental extractions under GA at LUDH between 1st May and 31st July 2008 were examined. A data collection form, similar to that used in 2003, was used to record the relevant information. Information collected included date of birth, date and source of referral, date of assessment, as well as grade of the clinician carrying out the assessment. Investigation of previous treatment under GA was also carried out, including the date, radiographs available, reason recorded for extraction, reason for GA, the teeth extracted and whether any teeth recorded as carious or restored were left *in situ*.

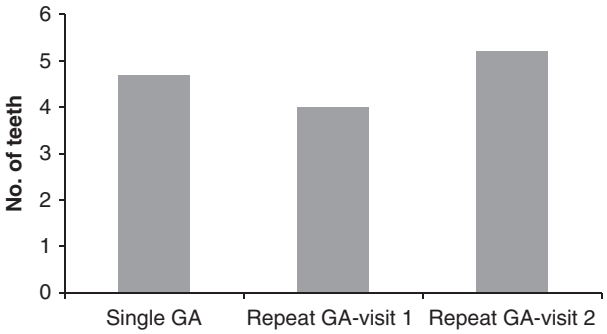

Fig. 1. Number of teeth extracted at each GA.

Results: A total of 108 children had extractions under GA in the outpatient department in LUDH between May and July 2008. Five children (4.6%) had an entry in their clinical records for a previous dental GA with a mean age of 7.4 years (SD = 2.4; range = 4.9–10.9). The mean interval between the two GA visits was 3.9 years (SD = 2.3; range = 2–7.1). Three (60%) of the five children that underwent a repeat GA, did so within 3 years of their first GA. Radiographic assessment was carried out for 57 (52%) children who had a single dental GA. Conversely, only one out of five children who had a repeat GA had a radiograph available at the time of the first GA. The majority of children had extractions due to dental caries in primary teeth. This is mirrored in the repeat GA patient group. Three of the five children had caries in the primary dentition, one child had extractions due to caries in the mixed dentition and the remaining child had gross caries affecting all first permanent molar teeth. Seventy-five children (69.7%) were examined and planned by a specialist in paediatric dentistry. Thirty-three children (30.5%) were examined by a non-specialist, of those only 20 had the treatment plan countersigned (approved) by a specialist in paediatric dentistry, two had recorded that the treatment had been discussed with a specialist, in 11 children there was no record that the plan was discussed or approved by a senior staff member. Of those children that underwent a second GA, three were treatment planned for their initial GA by a paediatric specialist and two by a non-specialist. Treatment plans for the initial GA remained unaltered from planning to treatment stage. Three of the five children who experienced more than one GA visit had carious teeth left *in situ* at the initial GA. Only one child had an appointment to restore these teeth in the dental hospital following this. Fewer teeth were extracted at the first GA in children who had a repeat GA compared to those who had a single GA (Fig. 1). This mirrors the pattern of the initial audit.

Discussion: This re-audit emphasises the importance of the audit cycle in improving the quality of care and service performance. Fewer children had a second GA in 2008 as compared with the initial audit in 2003. In 2003, 11.9% of the children had had a repeat GA, half of these being within 2 years compared to 4.6% in 2008 with an average interval of 3.9 years. This re-audit shows an increase in the number of children who had a radiograph available as part of the assessment process (2008-57%, 2003-34.3%). However, as in the initial audit, radiographs were available less frequently in patients who had repeat GA compared to those who had received single GA. As a result of the initial audit, it is mandatory that all treatment plans at the children's department be approved by a specialist in paediatric dentistry. There was no evidence in 11 case notes that the treatment plan had been approved by a specialist. This may highlight a need for further education of junior staff members during the induction process. In addition, a written protocol for treatment planning under GA within the clinic can be used as reference for all the staff. Needless

repetition of dental treatment under GA in children is an issue that should not be ignored. This audit illustrates the positive impact of changes made as a result of the initial audit; such as confirmation of treatment plans by a specialist in paediatric dentistry and ensuring that when clinically indicated radiographs were available for treatment planning. However, there is a need to ensure that as a referral centre all the treatment plans are confirmed by a specialist in paediatric dentistry.

Action plan: In addition to emphasising the treatment planning procedure during the junior staff induction session, a written protocol for dental treatment of children under GA will be prepared. This will comply with the recent national guidelines available on the subject[1,2].

References:

1. Davies C, Harrison M, Roberts G. Guidelines for the use of general anaesthesia (GA) in Paediatric Dentistry. Royal College of Surgeons of England, Faculty of dental surgery. *Online Publication* 2008. http://www.rcseng.ac.uk/fds/clinical_guidelines.
2. General Dental Council. *Standards for Dental Professionals*. London: General Dental Council, 2005.
3. Shaw AJ, Meechan BJ, Kilpatrick NM, Welbury RR. The use of inhalation sedation and local anaesthesia instead of General Anaesthesia for extractions and minor oral surgery in children: a prospective study. *Int J Paediatr Dent*. 1996; **6**: 7–11.
4. Albadri SS, Jarad FD, Lee GT, Mackie IC. The frequency of repeat general anaesthesia for teeth extractions in children. *Int J Paediatr Dent*. 2006; **16**: 45–48.
5. Kakaounaki E, Tahmassebi JF, Fayle SA. Further dental treatment needs of children receiving exodontias under general anaesthesia at a teaching hospital in the UK. *Int J Paediatr Dent*. 2006; **16**: 263–269.

8

An audit of pain experienced by children awaiting dental treatment under general anaesthetic

R. NICHOL, D. AL-HENNAWI & P. DAY

Department of Paediatric Dentistry, Leeds Dental Institute, UK

Introduction: It is well accepted that pain, as a symptom of untreated dental caries is a major source of diminished quality of life[1]. It can also be associated with sleep disturbance, interference of eating habits and schooling. Shepherd *et al*[2] (1999) reported that almost half of the 589 children interviewed had experienced dental pain and 17.7% reported that the dental pain had caused them to cry[2]. Low *et al*[3] (1999) reported the effect of extensive caries on the quality of life in young children, as assessed by the child's parent/guardian. This study concluded that although pre-school children with dental caries do not necessarily complain of pain, they do manifest effects of pain by changing their eating and sleeping habits. Due to these detrimental effects of untreated dental caries it was felt appropriate to investigate the pain and/or infection children were suffering whilst awaiting dental treatment under general anaesthetic (GA).

Aim: This audit was carried out to assess the reported pain and infection experienced by children on the waiting list for dental treatment under GA at Leeds Dental Institute and to compare the results with those of the same audit carried out in 2004. The time period audited was that following the child's initial consultation at Leeds Dental Institute up until the dental treatment was carried out under GA.

Standards: In 2004, over 80% of patients experienced pain whilst on the waiting list and 38% had at least one episode of infection, as reported by parents/guardians at the time of their child's GA admission. In the 2007 audit period the waiting time for treatment under GA had reduced due to government targets. Therefore we aimed to investigate the effect on children's experience of pain and infection.

Methods: This audit was first carried out between February and April 2004 when the parents of children attending for dental treatment under general anaesthetic were interviewed regarding episodes of pain and/or infection their child had suffered whilst on the waiting list. It was also ascertained what treatment had been provided for their child to alleviate the pain and who provided this treatment. Results were collected from children awaiting both the extraction only or comprehensive care GA lists. This audit was then repeated from April to June of 2007 and the results compared. A standard data collection sheet was designed and used for both audits. The data was collected as part of the clerking process by direct interview with the parent/guardian on the day the child was admitted for their treatment. The interview was conducted by the Consultant, Specialist Registrar or post-graduate student after the appropriate training by the lead author for use of data collection sheet. The following additional information was collected from the patient's dental notes: age, gender, medical history, main reason for referral and the date the patient was placed on the waiting list.

Results: In the 2004 audit, over a 3 month period, 192 patient's parents or guardians were interviewed regarding any pain or infection their child may have suffered since being placed on the general anaesthetic waiting list. At this time the mean waiting time was 4.8 months for the exodontia only list and 8.1 months for the comprehensive care list. When the audit was repeated in 2007, 265 patient's parents or guardians were interviewed over a 3 month period. The mean waiting time for these patients was 3.9 months for the exodontia only list and 4.4 months for the comprehensive care list. In both audits the most common reason (>70%) given for referral was dental caries in an uncooperative child. The data for the exodontia and comprehensive care lists were combined and shown in Table 1 for the 2004 and 2007 audit periods.

Table 1. Combined results of children suffering pain and infection while awaiting exodontias and comprehensive dental care provided under General Anaesthetic for the 2004 and 2007 audit periods at Leeds Dental Institute.

	2004	2007
Number of patients	192	265
Mean age (years)	8.8 (range 2–17)	7.4 (range 2–17)
Male: Female ratio	1:0.98	1:1.04
Mean waiting time (months)	6.5 (range 1–15)	4.1 (range 0–14)
Reported pain while on waiting list (%)	80.2	50.0
Risk of pain each month child is on waiting list (%)	12.3 (80.2/6.5)	12.2 (50.0/4.1)
Reported infection while on waiting list (%)	38.2	18.0
Risk of infection each month child is on waiting list (%)	5.9 (38.2/6.5)	4.4 (18/4.1)
Most common treatment provided (%)	Analgesics (54)	Antibiotics (57)
Most common treatment provider (%)	GDP (42)	GDP (50)

Discussion: The increased numbers of children and reduction in waiting time for comprehensive care under GA in the 2007 audit

is an indicator of the increased capacity Leeds Dental Institute now has for providing dental general anaesthetics for children. It can be seen from the results that the patient's mean age has reduced from 8.8 to 7.4 years in the 3 years between the audits, although the reasons for this are not clear.It is encouraging to see that the time a child had to wait for their dental GA decreased between the two audit periods. It can be assumed that this is a result of government waiting targets decreasing the time an individual should wait to start treatment after their initial consultation. In some situations children waited longer for their GA if treatment was attempted under local anaesthetic in the first instance. From the results, the risk of pain and infection a child was likely to suffer each month they were on the waiting list was calculated by dividing the percentage of children reporting pain or infection by the number of months waited. Although this assumes pain and infection are evenly distributed over the months, it is interesting to note that for both the audited time periods the risk of having at least one episode of pain each month was remarkably similar being 12.3% for the 2004 audit period and 12.2% for the 2007 audit period. For infection, it was calculated that the children in the 2004 audit period had a 5.9% chance of suffering at least one episode of infection each month they were on the waiting list compared to 4.4% for the 2007 audit period. We can therefore conclude that for our cohort of patients, over the two audited time periods, each month a child waited for their GA there was approximately a 12% chance of having an episode of pain and a 5% chance of having an episode of infection. Although this sample may be biased as children may have been referred by their general dental practitioner as a result of pain and infection as well as management problems, it shows that morbidity in young children with dental caries is common, and that providing no treatment may exacerbate the pain and infection the children suffer. These findings also provided a time frame of when these symptoms may be suffered. Milsom and co-workers reported that almost half (48%) of the children included in their study had suffered at least one episode of pain, 43.3% had required extraction due to pain or sepsis and that 33.7% had received a course of antibiotics as a result of primary tooth caries[4]. This study which retrospectively analysed general dental practitioner records of 677 children is likely to be an underestimation of pain and infection suffered as direct questioning about symptoms was unlikely to be undertaken, unlike the two audit periods reported in this study. Along with decreased waiting times for the children included in the 2007 audit was decreased episodes of pain and infection suffered as reported by parents/guardians. This allows us to make the conclusion that the frequency of reported pain and infection seems to be related to the time waited for treatment. It may also be assumed that with decreasing waiting times and reported morbidity to this child population, the prescription of antibiotics should decrease which has benefits regarding antibiotic resistance and cost.

Action plan: From these results it could be anticipated that with government targets shortening waiting times even further, the episodes of pain and infection suffered by children on dental general anaesthetic waiting lists will be further reduced. This will be analysed by re-auditing, in 24 months the reported pain and infection suffered by children whilst on a dental general anaesthetic waiting list.

References:

1. Rockville MD. *Oral health in America: a report of the surgeon general*. US Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institute of Health, 2000.
2. Shepherd MA, Nadanovsky P, Sheiham A. The prevalence and impact of dental pain in 8-year-old school children in Harrow, England. *Brit Dent J*. 1999; **187**: 33–41.
3. Low W, Tan S, Schwartz S. The effect of severe caries on the quality of life in young children. *Pediatr Dent*. 1999; **21**: 325–326.
4. Milsom KM, Tickle M, Blinkhorn AS. Dental pain and dental treatment of young children attending the general dental service. *Brit Dent J*. 2002. **192**: 280–284.

9

An audit of cancelled paediatric dental general anaesthetic extraction appointments

J. A. KELLY[1], H. A. SPRATT[2] & B. E. S. BREISTEIN[2]

[1]*Paediatric Department, School of Dentistry, and* [2]*Community Dental Service, Belfast Health and Social Care Trust, Belfast, UK*

Introduction: Since The Appleby Report[1] and the subsequent implementation of waiting list targets within the NHS, improving theatre efficiency and patient experiences has become an essential part of service management.

Previous reports have documented that for a number of reasons (including cancellations), operating theatres are used for only 50–60% of the total allocated working time[2]. One aspect not reported in the available literature, are reasons for cancellation of paediatric dental general anaesthetic appointments (DGA) at short notice.

Such cancellations are detrimental at several levels: 1. Paediatric patients: a delay in the treatment of dental decay and sepsis may cause patient morbidity, reduced quality of life for that patient and others on waiting list, and repeated fasting or absence from school;

2. Parents and carers: through loss of earnings and increased transport costs if reallocated

3. Service level: resulting in increased costs and waiting lists, resulting in under-utilisation of manpower.

An audit was initiated to assess the extent and reasons for all cancellations within 48 h of appointment time affecting paediatric DGA services within the Community Dental Service Belfast Health and Social Care Trust over the 6 month period from 1st February to 31st July 2007. Such cancellations or abandonments of planned procedures may have been at the request of staff, parents or patients themselves.

Aim: To determine the number and reason for cancelled theatre slots in a 6 month period.

Methods: Data was recorded prospectively for 19 paediatric DGA lists at the Day Procedure Unit (DPU), Mater Hospital, Belfast.

At the pre-assessment appointment informed written consent and confirmation of receipt of comprehensive written and verbal, pre- and post-operative instructions were obtained for all patients.

A data capture form was used to record the

1. total number of treatment appointments
2. per DGA session, the total
3. number of cancellations with short notice (i.e. within 48 h of appointment time) and the reasons
4. given for such cancellations.

Results: Nineteen lists were operational, equating to a total of 148 DGA appointments. Of these, 33 (22%) were cancelled at short notice, with a mean of 1.7 and a range of 0–4 per list.

Friday 13th April had the smallest individual list total. July had the highest percentage of monthly cancellations and the smallest total monthly sample size.

The reasons identified for DGA cancellations are shown in Fig. 1. During the audit time frame there were no cancellations due to unavailability of staff or administrative errors.

Discussion: Cancellation rates of 22% were higher than the 14% previously recorded for Northern Ireland, and the standard of 10% reported by Appleby[1].

Despite July having a reduced number of lists, it had the highest percentage of cancellations. This may be due to July historically being a holiday and politically sensitive time for residents of Northern Ireland. It is particularly relevant to this DPU, as it is geographically

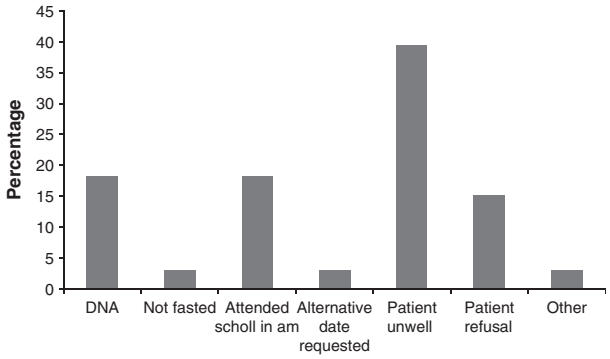

Fig. 1. Reasons for cancelling dental general anaesthesia appointments at 'short notice'.

located close to the 'peace line', thus causing difficulties for patients and even staff to attend during this time period.

Friday 13th April also proved to be unpopular, having the least number of appointments allocated and a DNA rate of 25%.

Patient illness since initial assessment was most the common reason for cancellation, accounting for 40% of the cancellation total.

A total DNA rate of 4% met the local Belfast Trust target, and was significantly less than the 24% rate previously reported by Thompson[5]. This therefore supports his recommendation and the department's use of pre-assessment clinics.

An additional problem highlighted by this audit, was failure to comply with pre-operative instructions regarding supervision and fasting, which together accounted for a further 21% of the cancellations.

The 'patient refusal of induction' rate of 3.4% of total cases was higher than the 1.37% previously reported by Sood *et al*[6], and reveals a need to manage anxious patients more effectively.

Action plan: This audit demonstrated a need to reduce the cancellation of paediatric DGA appointments in order to improve efficiency, productivity and patient experience. Therefore the following recommendations should be implemented:

1. Strict adherence to an 'appointment confirmation system'. This should have the additional benefit of enabling staff to inquire if there has been any illness since assessment and enable reallocation if appropriate
2. Dedicated telephone line and answer machine
3. Poster of audit results and implications to be displayed in waiting room for parent's consideration
4. Managers to consider alternative uses for theatres for the unpopular dates identified e.g. maintenance or annual leave
5. To reduce the problems identified with managing paediatric patients in the preoperative fasting period,
6. Paediatric DGA lists should be changed to morning sessions
7. 'Refusal of induction' should be addressed by using distracters in the waiting room and the use of dental anxiety scales at the pre-assessment clinic to identify patients requiring pre-medication. There should also be increased availability of pre-medication which is currently limited by nursing levels. An analysis of cost-effectiveness revealed a potential saving if the costs in providing regular, additional nursing cover are compared to the costs resulting from refusal of induction and subsequent reallocation for pre-medication.

This audit will be repeated following implementation of these changes.

Acknowledgements:
Fiona Hamill[2] and Karen Trainor[2] for their help in data collection.

References:
1. Appleby J. *Independent Review of Health and Social Care Services in NI*. Department of Finance and Personnel Publication, 2005.
2. National Audit Office. Use of Operating Theatres in the National Health Service. London: HMSO, 1987.
3. Sheiham A. Dental Caries affects body weight, growth and quality of life in pre-school children. *Br Dent J*. 2006; **201**: 625–626.
4. Thomson PJ. Reducing failure rates for in-patient oral surgery. The use of a pre admission clinic. *Br Dent J*. 1991; **170**: 59–60.
5. Thomson PJ. Cancelled operations. A current problem in oral and maxillofacial surgery. *Br Dent J*. 1991; **171**: 244–245.
6. Sood S, Campbell C, Hosey MT. What happens to children who refuse DGA induction? *Int J Paediatr Dent*. 2003; **13**: 389 (Abstract 20).

10

Audit of dental record keeping within the paediatric dentistry at the eastman dental hospital

C. GARDENER

Unit of Paediatric Dentistry, Eastman Dental Hospital, University College Hospital of London (UCLH) Foundation Trust, London, UK

Introduction: All clinical records should be contemporaneous, comprehensive, factual, accurate and written with clear meaning[1]. Records are essential for patients care, research and audit[1,2,3]. They also play an important role in establishing facts associated with complaints and medico legal cases[2,4]. The University College London Hospital (UCLH) trust is committed to maintaining and improving the standards of clinical record keeping[1]. They have produced a policy guidelines outlining standards referred for clinical documentation (Table 1). An aide memoir such as a standard proforma may be implemented so that junior members of staff can maintain high standards within a department and standardise record keeping[2,4]. The Royal College of Surgeons of England and the General Dental council (GDC) have given clear guidelines for clinicians on clinical record keeping with a minimum of information that should be recorded[3,5].

Aim: To examine the standard of record keeping within the Department of Paediatric Dentistry at the Eastman Dental Hospital is.

Standards: All the case notes should contain 100% of the required information as laid out by the UCLH Policy.

Method: The Trust proforma was modified to be Eastman-specific still in accordance with Trust Guidelines[1].

One hundred sets of case notes were evaluated prospectively from all clinicians following patient visits during the months of February to July 2008. The records used were selected from two clinical sessions. The clinical sessions included new patient consultant clinic, review and treatment sessions. The most recent entry in each set of case notes was analysed. The cases were further analysed and split into four headings: patient demographics (front sheet); assessment; procedure and case note folder.

Results: The case notes were analysed for grade of clinician who completed the last entry. The results were, Consultant and graduates; 26, SpR; 21 and SHO; 27 case notes completed. The distribution of the clinical case notes identified and clinician was evenly distributed, this occurred by chance. The results of the key standards are shown in Fig. 1. Looking at the patient demographics in isolation – only 93% of the notes had a correct front sheet. Critical information which was missing included general medical and dental practitioner details (3%). Analysis of patient assessment

showed 97% of the records were complete. Information missing from was that no medical history or clinical examination was documented. In the section marked procedure, only 84% of case notes were complete. This was due to no formal treatment plan being written in the case notes. Results for the case-note folder section showed 90% of notes to be complete – however, 10% of these were written using red ink. The practice of using red ink is not within trust guidelines.

Table 1. University College London Hospital Trust Guidelines Standards of Clinical Record Keeping[1].

All entries must be in black ink
Patient name and number should be recorded at the top of every page
Entries must be legible, clear and concise
Each entry must be dated
All entries must be signed and dated with name and designation printed clearly
Medical history must be updated and documented at each visit
All conversations including telephone calls must be documented and dated consistently
If a patient fails to attend or cancels this must be documented and dated.
All correspondence must be filed in chronological order in the appropriate section
All new patient proforma should be filed in the appropriated section
All case note should have the department where the patient has been seen
Abbreviations should not be used in patient record. If used, they should conform to local protocol
A single line should be used to delete and alteration/ errors, so that the original entry remains legible

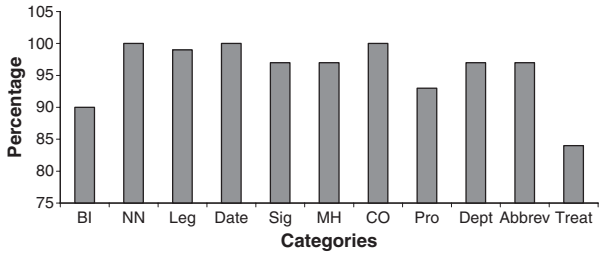

Fig. 1. Results of key standards for case notes. BI = black ink; NN = name and number; Leg = legibility; Sig = signature; MH = medical history; CO = chronological order; Pro = proforma; Dept = department; Abbrev = abbreviations; Treat = treatment provided.

Discussion: The results of this audit showed that not all the case notes examined contained 100% of the required information as laid out by the Trust's policy. There were inconsistencies in all sections. With regard to patient demographic, 3% of the information missing included lack of general and dental practitioner details. This information is crucial to the trust as remuneration and budgets' have to be managed according to patient treatment. A key standard is the use of black ink in all case records. This is historic as the use of older photocopying machines made coloured inks unreadable. One hundred per cent compliance was not achieved in this regard because of the use of red ink for ease of identification of a patient who has undergone treatment under general anaesthesia (GA). However, with the advent of a trust wide.

Action plan: Following presentation of the findings of this audit, a reference information sheet has been drawn up with all the clinicians' input. A memo of this information has been distributed and a laminated copy placed in clinical areas.

The audit will be repeated in 6 months and further changes implemented depending on the findings.

Acknowledgement:

I would like to thank Adèle Johnson for her help.

References:

1. Clinical record keeping. *Procedure for Maintaining Quality Standards*. University College London Hospitals, 2008.
2. Ho MY, Anderson AR, Nijjar A *et al*. Use of the Crabel Score for improving surgical case note quality. *Ann R Coll Surg England*. 2005; **87**: 454–457.
3. Guidelines for Clinicians on Medical records and notes. The Royal College of Surgeons of England, 1994.
4. Pessian F, Beckett HA. Record keeping by undergraduate dental students: a clinical audit. *Brit Dent J*. 1997; **11**:703–705.
5. General Dental Council. *Maintaining Standards*. London: General Dental Council, 1997.

11

Assessment of walk-in emergencies in paediatric dentistry

S. T. McDONNELL, S. LAMPITT, C. A. HOOD & I. C. MACKIE

Unit of Paediatric Dentistry, School of Dentistry, Higher Cambridge Street, Manchester, M15 6FH, UK

Introduction: The department of Paediatric Dentistry at Manchester Dental Hospital (MDH) is primarily a tertiary referral centre. There is therefore the need to adopt strict criteria for the acceptance and provision of care for 'walk-in' emergencies which might otherwise be treated in the primary or secondary care sectors. The criteria for acceptance were children presenting with acute pain, swelling, trauma or bleeding[1]. Walk-in emergencies were audited for the first time between January and April 2007. This audit identified deficiencies in documentation of walk-in emergencies including the recording of date of birth (DOB), registration details of general dental practitioner (GDP) and the criteria under which the patient was accepted. In addition it was recorded that on a number of occasions the service was unavailable due to the lack of staff. As a result a day sheet was created to improve documentation and to facilitate regular audit of service provision (Appendix 1).

Aims: To assess the profile, diagnosis and treatment provided for walk-in emergency patients presenting to the Department of Paediatric Dentistry and to determine if they met the departmental acceptance criteria.

Standards: **The standards for this audit are as follows:** 1. Registration with a GDP details should be recorded in 100% of cases

2. The DOB should be recorded in 100% of cases

3. The criteria for patient acceptance should be met in 100% of cases

4. The reasons for not being accepted should be documented in 100% of cases

5. There should be adequate staff to provide the service in 100% of cases

Method: A prospective audit on all patients attending as walk-in emergencies to the paediatric dental unit at the MDH was carried out between February and May 2008. Patients were triaged by trained dental nurses using the departments criteria for acceptance already described. The proforma (Appendix A) was completed

initially by the triage nurse which included their date of birth, whether the patient was registered with a GDP, their presenting complaint and the criteria under which the child was accepted or not. The notes were retrieved by SMD at a later date and using a data collection proforma (Appendix 2) this and information about the diagnosis and treatment provided was recorded together with the presence of a referral letter. Data were entered into Microsoft Excel® to facilitate analysis.

Results: Data were available for 91 out of 125 patients who presented over the 3 month period. The average age of children presenting was 7.5 years (range 1–17 years). Two patients over 16 (age 17) were accepted because they were undergoing active treatment in the department. In all cases GDP registration, DOB. and reasons for acceptance or not were recorded. There was adequate staff to assess and treat patients in all but one case. Forty-five percent ($n = 41$) of those presenting were registered with their GDP. Thirty-four percent of patients ($n = 31$) had a referral letter. Sixty eight per cent ($n = 21$) of referral letters were from GDPs the remainder were from other sources.

The most common reason for attendance recorded by the dental nurse at triage was acute pain ($n = 42$), followed by swelling ($n = 16$), trauma ($n = 12$) and chronic pain ($n = 12$). Other reasons accounted for the remaining 10% ($n = 9$). Ninety percent ($n = 82$) of patients were accepted by the triage nurse. The remainder ($n = 9$), did not fit the acceptance criteria ($n = 8$) or could not be accepted because there were no staff available to assess them ($n = 1$).

The diagnosis recorded by the dentist for those accepted ($n = 82$) is shown in Fig. 1.

Thirty nine per cent ($n = 32$) of patients accepted had treatment on the day of presentation. The treatment provided is shown in Fig. 2. 'Other' treatment included restorations ($n = 1$), pulpotomy ($n = 1$), Alvogyl® dressing ($n = 1$).

Fifty-six percent ($n = 46$) of children seen were booked in for further definitive care at MDH. A high proportion of patients were referred for GA extractions ($n = 35$). The remainder were referred for treatment under inhalation sedation ($n = 7$) or were seen for a review appointment ($n = 3$) or referred to consultation clinic ($n = 1$).

Discussion: Documentation and staffing of walk-in emergencies has improved since the previous audit. There was adequate staff to assess and treat patients in 99% of cases compared to 84% in the previous audit. The proportion of patients presenting who did not meet the criteria for acceptance however has increased from 12% to 20%. Although 10% of children who presented were not accepted an additional 10% of children who were accepted did not meet the criteria for emergency care. This illustrates the problems staff can face at triage. Anecdotally clinicians report that it is difficult to send children away when they do not strictly fit the acceptance criteria as children are often not directly responsible for their situation and parents can be very persistent. This can be an emotive issue especially if parents have been unable to access primary or secondary care. In contrast others would argue that this is not the responsibility of a tertiary care provider such as MDH and that these children have circumvented the normal referral pathway.

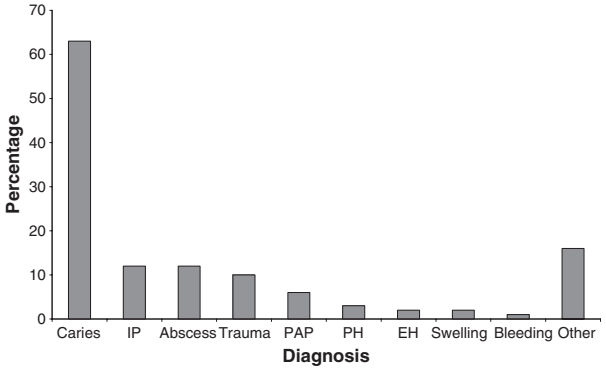

Fig. 1. Diagnosis recorded for patients accepted as walk-in emergencies ($n = 82$). Some patients had more than one diagnosis. IP = irreversible pulpitis; PAP = periapical pathology; PH = primary herpes; EH = enamel hypoplasia.

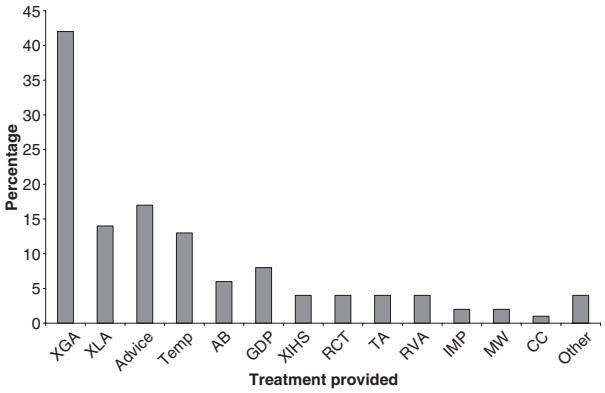

Fig. 2. Treatment provided on the day of presentation for patients accepted as walk in emergencies. XGA = referred for GA extraction; XLA = extraction under LA; Temp = temporary dressing; AB = antibiotics prescribed; GDP = referred to general dental practitioner; XIHS = referred for extraction under inhalational sedation; RCT = root canal treatment; TA = appointment for treatment; RVA = review appointment; IMP = impressions; MW = mouthwash; CC = appointment for consultant clinic.

There are a number of publications on dental emergency services. Few if any are directly comparable due to differences in setting (country, community or hospital), age range of patients or the nature of the service (daytime only, out-of-hours only or 24 h). This audit and other reports on daytime emergency services showed dental caries was the most common reason for presentation followed by dental trauma[2,3]. For out-of-hours services, however, dental trauma was the most common reason for presentation followed by dental caries[4,5,6]. One out of hours service in the UK[7] differed from these American studies[4,5,6] reporting dental caries as the most common reason for presentation followed by dental trauma. It is not really clear therefore whether the differences are due to the time the service was provided or the setting of the service. Although most studies looked at the presenting complaint or diagnosis very few recorded treatment provided. Rowley *et al.*[8] (2006) reported treatment provided for trauma and caries only, in a way that was not comparable to this audit. This audit looked at both initial care on the day of attendance as well as any subsequent care provided by MDH. Thirty-six percent of patients received treatment on their first presentation and 8% received advice only and were not reappointed. A qualitative interview study of emergency dental services concluded that emergency dental services should not be just treatment focused as many attenders want advice and reassurance as much as relief from symptoms[10].Fifty-six percent of children accepted were rebooked for further appointments at MDH. This service therefore provides access to definitive care which is obviously an advantage over other services that simply provide amelioration of acute symptoms.

Conclusions:
Documentation and staffing of walk-in emergencies has improved since the previous audit. The proportion of patients who did not meet the criteria for acceptance has increased. Dental caries and its sequelae was the most common reason for presentation followed by dental trauma. The most common form of treatment provided on the day was extractions under local anaesthetic followed by temporary dressings. Most of those reappointed were reappointed for extractions under general anaesthetic.

Action plan:
1. A letter has been drafted for Primary Care Trusts to forward to GDPs advising them about referral criteria.
2. Staff in the department have been reminded about acceptance criteria in the form of a memo.

Acknowledgement:
I would like to acknowledge the assistance of Dr. Peter Day in the preparation of this manuscript.

References:
1. http://www.cmmc.nhs.uk/dental/paediatric-dentistry.
2. Blinkhorn AS, Attwood D, Kippen AM. A report on the feasibility of establishing a paediatric emergency dental service at Glasgow dental hospital. *Community Dent Health*. 1991; **8**: 257–262.
3. Lygidakis NA, Marinou D, Katsaris N. Analysis of dental emergencies presenting to a community paediatric dentistry centre. *Int J of Paediatr Dent*. 1998; **8**: 181–190.
4. Zeng Y, Sheller B, Milgrom P. Epidemiology of dental emergency visits to an urban children's hospital. *Pediatr Dent*. 1994; **16**: 419–423.
5. Majewski RF, Synder CW, Bernat JE. Dental emergencies presenting to a children's hospital. *ASDC J Dent Child*. 1988; **3**: 339–342.
6. Battenhouse MA, Nazif MM, Zullo T. Emergency care in paediatric dentistry. *ASDC J Dent Child*. 1988; **1**: 68–71.
7. Fleming P, Gregg TA, Saunders ID. Analysis of an emergency dental service provided at a children's hospital. *Int J Paediatr Dent*. 1991; **1**: 25–30.
8. Rowley ST, Sheller B, Williams BJ. Utilisation of a hospital for treatment of dental emergencies. *Pediatr Dent*. 2006; **28**: 10–17.
9. Anderson R. Patient expectations of emergency dental services: A qualitative interview study. *Br Dent J*. 2004; **197**: 331–334.

From the Editor
I hope you have enjoyed the second Bulletin and it has generated some ideas. The overall aim is to promote audit within the specialty, and by sharing information, make our clinical audit more effective in promoting good practice. We had a 50% increase in submissions this year and we therefore had to disappoint some people. As with all submissions together with the quality of the information adherence to the instructions to authors is always welcome, as the meercat says ''simples''.
As I did last year I encourage people from all aspects of paediatric dentistry to submit audits.
I would like to thank our referees, those who submitted audits and Peter Day and Fiona Gilchrist for their support.

Chris Deery, Editor

Guidance to Authors - Audits
The BSPD Clinical Effectiveness Bulletin is a peer reviewed publication. Its production is overseen by an editorial team and peer review referees drawn from SpRs in paediatric dentistry. Printing and distribution is at the discretion of the BSPD. All articles are subject first to editorial review of suitability for inclusion, and then sent for peer review. The referees' reports are fed back to the authors and utilised by the editors to recommend amendments as well as decide upon inclusion.

Document submission
Manuscripts should be submitted in Microsoft by disk or by email attachment.
A covering letter or email should accompany each submission stating the names and working addresses of all authors. The principal author should confirm the work to be their own and acknowledgments given as appropriate. Confirmation of receipt will be returned by the newsletter editor. In the event of no reply from the editor, the principal author should inquire.

Submission format
Submissions will only be accepted in Microsoft WORD format. Any graph included is best formulated in Excel and pasted into the Word document. The associated Excel files should be sent with the submission.
Authors are recommended to discuss with the editorial panel the general style of their report. It should be noted that the bulletin has limited space and submissions are generally tailored to fit comfortably on one page or less of the Newsletter.
Submissions should be formatted with double line spacing to fit A4 paper size. (If possible, the recommended font is Times New Roman, 12, top margin = 2.54cm, bottom = 2.1cm, left and right margins = 3.17cm).
Audit project submissions will be expected to broadly follow a format as described:
- **TITLE:** This should be succinct and accurately reflect the project (up to a maximum of 12 words).
- **AUTHORS and AFFILLATIONS** including e-mail address.
- **INTRODUCTION:** To include rationale or need to undertake the project. Previous projects/publications as available can be refereed to and if appropriate the cycle number of the audit and the effects of previous action plans.
- **AIMS**: A clear list of the project aims.
- **STANDARD(S):** Should be quoted if available.
- **PROCESS**/MATERIALS & METHODS: A clear explanation of the audit process should be given.
- **RESULTS:** Text to describe the results obtained. Results can also be given in table or graph form if more clearly represented this way (see below). Text should avoid simply repeating findings shown by graphs/charts. Clarification or explanation can be given if necessary.
- **DISCUSSION**: As appropriate.
- **ACTION PLAN or IMPLEMENTATION OF FINDINGS**: The author's plans for implementation of findings to change practice as necessary, or to audit further should be described.
- **Acknowledgements**
- **References:** these should be listed as per the International Journal of Paediatric Dentistry and cited in the text the same way.

Tables:
Where possible, these are **preferred to graphs and charts**. They should be included into the Microsoft WORD document. These should be succinct with a limit of 10–15 rows to fit comfortably on the page.
The accompanying legend should be concise and in bold. It should be included in the main text rather than the figure itself.

Graphs and Charts:
If included should be in Excel and pasted into the word document. The Excel files should also be included in the submission. Please do not use excessive formatting such as 3-D, unless this adds information.
For the purpose of publication graphs will be limited in number and should not be overly complex to ensure they are easily understood. As with tables the accompanying legend should be concise and in bold. It should be included in the main text rather than the figure itself.

Refereeing and editing

Each submission will be subject to anonymous independent peer review. The editor's decision to publish will be based on referees' reports. Submitting authors will normally be sent a copy of the reports for their consideration. The editor reserves the right to edit the manuscript.

(Thank you to the British Society of Orthodontics whose Guidance for Prospective Authors formed the basis for this document.)

Please send or email (C.Deery@sheffield.ac.uk) submissions to:

Chris Deery
Editor of BSPD Clinical Effectiveness Bulletin
Professor of Paediatric Dentistry
Department of Oral Health & Development
School of Clinical Dentistry
Claremont Crescent
Sheffield
S10 2TA