General

G221 THE BRITISH PAEDIATRIC SURVEILLANCE UNIT: A PUBLIC HEALTH EVALUATION

[1]RL Knowles, [2]R Lynn, [2]H Friend, [3]S Mitchell, [4]C Michie, [5]C Ihekweazu. *[1]UCL Institute of Child Health, London, UK; [2]Royal College of Paediatrics and Child Health, London, UK; [3]Central Manchester and Manchester Children's University Hospitals NHS Trust, Manchester, UK; [4]Ealing Hospital NHS Trust, London, UK; [5]Health Protection Agency, London, UK*

Introduction: The British Paediatric Surveillance Unit (BPSU) was established over 20 years ago. It is internationally renowned for its contribution to (1) understanding rare disorders and uncommon infections in childhood that are of public health importance, and (2) the development and evaluation of policies for their prevention and management. Although shown to have high sensitivity and positive predictive value,[1] the BPSU has not been comprehensively evaluated.
Aim: To evaluate the effectiveness and usefulness of the BPSU as a public health surveillance system, using US Centers for Disease Control and Prevention (CDC) internationally recognised criteria for the evaluation of surveillance systems, in order to identify areas of strength and opportunities for improvement.
Methods: We evaluated BPSU operational activity and outputs with regard to eight attributes of surveillance systems: usefulness, timeliness, flexibility, data quality, acceptability, simplicity, stability and representativeness. Data sources included: (1) BPSU electronic and paper records; (2) published reports; (3) survey of 600 clinicians receiving the Orange Card; and (4) survey of 27 investigators using the BPSU (2003–07).
Results: 43% of paediatricians reported changing their clinical practice as a consequence of BPSU studies, with the vitamin K, Kawasaki disease and group B Streptococcus studies most commonly cited. 83% perceived the study of rare paediatric conditions to be very important or important. 60 completed BPSU studies have resulted in 64 peer review publications, with only nine studies yet to publish. The administrative system for monthly reporting is efficient and timely; 90% of monthly cards are returned within 60 days and over 90% of clinicians found questionnaires easy to complete. The system is flexible: studies responding to public health concerns have addressed HIV/AIDS, variant Creutzfeld–Jakob disease and water birth safety. Alternative reporting sources are regularly established to maximise ascertainment. Although approval of new studies may take 12 months, investigators welcomed the support provided for study development. BPSU methodology has been replicated in 12 countries worldwide.
Conclusions: BPSU methodology provides a simple, effective system for national surveillance of rare childhood conditions. Future goals should include increasing responsiveness to urgent public health concerns, supporting investigators in communicating their findings, and promoting patient and public engagement with the BPSU.

1. **Knowles RL,** *et al*. *J Public Health* 2006;**28**:157–65.

G222 THE DIAGNOSIS OF SERIOUS INFECTIONS IN CHILDREN: A SYSTEMATIC REVIEW OF CLINICAL TESTS IN AMBULATORY CARE

[1]A Van den Bruel, [2]T Haj-Hassan, [2]M Thompson, [3]H Moll, [3]R Oostenbrink, [4]M Lakhanpaul, [1]B Aertgeerts, [1]F Buntinx, [2]D Mant. *[1]University of Leuven, Leuven, Belgium; [2]University of Oxford, Oxford, UK; [3]University of Rotterdam, Rotterdam, The Netherlands; [4]University of Leicester, Leicester, UK*

Introduction and aims: The early recognition of serious infections (sepsis, meningitis, pneumonia, pyelonephritis, etc.) in children is difficult because clinical presentation is often non-specific in the early stages of disease. Evidence on which clinical tests are most useful in ambulatory care appears conflicting. A collaborative project was set up to summarise all available evidence, derive summary estimates and explore heterogeneity between studies to inform clinical practice.
Method: A systematic literature search in MEDLINE, EMBASE, DARE and CINAHL was supplemented by an extensive snowballing strategy. Quality of studies was assessed using QUADAS and additional topic-specific items. Evidence tables and forest plots were constructed for descriptive analyses, and meta-analyses were performed using the bivariate method.
Results: 44 articles were included in the review. Overall, 408 results are available on a wide range of clinical tests including observation scales, vital signs and physical examination. The meta-analysis of the Yale Observation Scale, based on five studies yielded a summary sensitivity of 32.5% (95% CI 21.7 to 45.5), and specificity of 78.9% (95% CI 73.9 to 83.1). The sensitivity of the physician's clinical impression ranged between 50 and 66% in three studies; specificity ranged between 55 and 92%. Parental concern has a sensitivity of 46% (95% CI 28 and 66) and specificity of 97% (95% CI 96 and 97), based on one study. Poor peripheral circulation has a sensitivity of 15% (95% CI 2 and 27) in one study with unreferred patients, and 26% (95% CI 18 and 36) in another study with referred patients.
Conclusions: A large body of evidence was identified. The majority of individual tests have high specificity but low sensitivity.

G223 IMPROVING THE SAFETY AND QUALITY OF CARE FOR HOSPITALISED CHILDREN THROUGH STANDARDISATION OF OBSERVATION AND MONITORING: DEVELOPMENT OF A PAEDIATRIC EARLY WARNING SYSTEM

A McCabe, H Duncan. *Birmingham Children's Hospital, Birmingham, UK*

Aims: To develop a standardised observation and monitoring policy.
1. To develop a standardised observation and fluid balance chart with embedded paediatric early warning score.
2. To incorporate the observation and monitoring policy and the standardised charts into a paediatric early warning system.

Methods: This study utilised a combination of action research and change management research frameworks. A local observational study of existing practices and focus groups were held. A literature review and national survey of practices were completed to inform the development process. A working party developed the observation and monitoring policy and the standardised observation and fluid balance charts.
Results: The results of this study are incorporated into the paediatric early warning system. The system consist of: an observation and monitoring policy; standardised observation and fluid balance charts; an embedded early warning score; an escalating referral algorithm; SBAR (Situation-Background-Assessment-Recommendation) communication; multimodal education for frontline carers and audit, evaluation and feedback.
Conclusions: The Confidential Enquiry into Maternal and Childhood Death (CEMACH) report, *Why Children Die–A Pilot Study 2006*, recommended ''For paediatric care in hospital we recommend a standardised and rational monitoring system with imbedded early identification systems for children developing critical illness—an early warning score''. Recent publications have demonstrated that implementation of an early warning score can reduce the number of preventable cardiac or respiratory arrest calls.[1–4] A rationalised systems approach is essential to assist bedside clinicians to identify the deteriorating child, communicate concerns to appropriately trained clinicians and provide treatment that is effective in improving the outcomes for hospitalised children.

1. **Tiballs 2005**.
2. **Sharek 2007**.
3. **Brilli 2007**.
4. **Hunt 2008**.

G224 PREDICTING FAILURE OF NASAL CONTINUOUS POSITIVE AIRWAYS PRESSURE AND NEED FOR INTUBATION IN INFANTS WITH BRONCHIOLITIS: EXPERIENCE FROM OUR REGIONAL AUDIT

[1]A Kannivelu, [2]C Kallapa, [3]M Bebbington, [4]I Mahabeer. *[1]Heartlands Hospital, Birmingham, UK; [2]University Hospital of North Staffordshire, Stoke on Trent, UK; [3]Newcross Hospital, Wolverhampton, UK; [4]Worcester Royal Hospital, Worcester, UK*

Aim: To study the failure rate of nasal continuous positive airways pressure (nCPAP) when used for bronchiolitis and identify any predictive factors.
Method: Prospective audit of infants requiring nCPAP in five district general hospitals (DGH) in our region from October 2007 to February 2008.
Results: 48 of 1147 (4%) of infants admitted with bronchiolitis were treated with nCPAP. 0.6% of admissions, ie, 15% of those requiring nCPAP (seven), were intubated and transferred to an intensive care unit (ICU). Historical data from one of the DGH involved suggested that 5% were admitted to ICU for bronchiolitis in 2001 before a high dependency unit was set up and 2% were admitted in 2002, before the availability of nCPAP. Median corrected age of infants requiring nCPAP was 2 weeks (range −4 to 15 weeks). 25 (52%) were born prematurely and three (6%) had congenital heart disease. The mean (95% CI) increase in pH was 0.09 (0.04 to 0.13) and mean (95% CI) decrease in pCO_2 was 2.15 (0.9 to 3.4) kPa in infants who had gas documented (n = 13) immediately before and within 4 h of being on nCPAP. They were statistically significant ($p<0.01$). Median corrected age of seven infants who failed CPAP and required intubation was 6 weeks (range 2–15 weeks). Five (71%) were born prematurely, including one with trisomy 21 and heart disease. The reasons were apnoea in three cases, increasing respiratory distress in three and worsening gas in one. They had worse initial gas as shown in the table.
Conclusions: nCPAP improves respiratory acidosis in infants with bronchiolitis. There has been reduction in ICU admission since the use of nCPAP in DGHs. nCPAP is less likely to be useful when there is already uncompensated respiratory acidosis, and failure of nCPAP was common in those who were born prematurely suggesting the influence of chronic lung disease.

Abstract G224 Initial blood gas values of infants treated with CPAP for bronchiolitis

Patient group	Mean pH (SD)	Mean pCO_2 (SD)
Failed CPAP (n = 5)	7.14 (0.19)	11.68 (5.2)
Didn't fail CPAP (n = 25)	7.27 (0.07)	8.86 (1.9)
p Value	0.015	0.037

Median duration of nasal CPAP before intubation was 7.5 h (range 1.5–38).
CPAP, continuous positive airways pressure.

G225 ARE WE SAILING SMOOTHLY?

B Akhtar, T El-Azzabi, H Aleshaa, M Ahmed. *Department of Paediatrics, Burton Hospitals NHS Foundation Trust, Queen's Hospital, Burton Upon Trent, Staffordshire, UK*

Introduction: Shared care is one approach to improving care at the interface by minimising the apparent fragmentation of services. Effective communication between various sectors is a crucial factor in the delivery of good quality health care. The Sheffield Assessment Instrument for Letters (SAIL) uses a consensus framework to look at letters between general practitioners and hospital specialists and is considered as a valid indicator of written communication with families of sick children.
Aims: To assess the quality and content of outpatient clinic (OPC) letters between primary and secondary care by using SAIL as a framework in a district general hospital setting.
Methods: We retrospectively selected (randomly) and reviewed 200 OPC letters between August and November 2008. These letters were assessed using SAIL by three assessors (independent of each other). Data were analysed using Microsoft excel.
Results: 200 letters dictated by consultants and middle grade doctors in training were selected (100 each). Documentation of history and examination was appropriate in most letters (96% and 81% respectively). 85% of letters contained a medical problems list. There was an adequate record of information shared with the family in 44% of letters. In only 67 letters (34%), all doses of medication were clearly stated in formal units. An adequately justified clear plan to investigate (or not to investigate) was evident in approximately 50% of the letters. Follow-up plans were recorded in 99% of letters. When a patient was followed up, the purpose of follow-up was adequately justified (99%). The mean of the checklist score using the formula $20^{*}(N_1/(N_1+N_0))$ and derived for each letter from the summation of a 20-point checklist was 14.8 for consultants and 14.9 for middle grade doctors (p-value not significant).
Conclusions: Further improvement in clear documentation of medication/doses as well as information shared with the families is warranted. This study demonstrates that SAIL can be used as a valuable tool to assess effective written communication and thus can be used to provide feedback to the clinicians. SAIL can be used as one of the assessment tools for paediatric trainees as well as part of a revalidation kit for paediatricians in future.

G226 MICRO-AUDITING AS A TOOL FOR MONITORING THE QUALITY AND SAFETY OF CLINICAL PRACTICE: FEASIBILITY AND PERFORMANCE IN THE GENERAL PAEDIATRIC SETTING

J Vamvakopoulos, N Ahmad, H Bridgestock, S Davies, V Diwakar, I Wacogne. *Birmingham Children's Hospital, Birmingham, UK*

Background: Audit is a fundamental element of clinical governance but its value as a driver of continuous quality improvement hinges on establishing an ''audit spiral''. Conventional clinical auditing is labour intensive and time consuming, features that limit its scope and utility. Micro-auditing is an alternative strategy employed routinely in the industrial sector and recently trialled successfully in the neonatal intensive care unit setting.[12]
Aims: We set out to test the feasibility of micro-auditing in the general paediatric setting and its utility for foundation doctors on paediatric rotations.
Methods: We devised and trialled a multi-modular micro-auditing tool comprising 28 standards spanning a range of clinical activities (clerking, ward review/infection control, bedside record-keeping, prescribing, handover and discharge). Audit data were prospectively collected over five working days by a team of four foundation doctors.
Results: Coverage of our target patient population (n = 77) varied across micro-audit modules, ranging from 27.3% (clerking) to 100% (handover). Data analysis identified potential for practice improvement in four of five modules. Notable findings included incomplete recording of immunisation and drug history (clerking); suboptimal prescribing and use of growth charts (ward review/charts); and a failure to communicate the need for, and type of, desired follow-up (handover).
Conclusions: Micro-auditing is an alternative to traditional audit that can be readily accommodated alongside routine clinical workload in general paediatrics; other advantages include a much faster turn-around time and potential value as an educational tool for junior doctors and medical students. The latter, as well as various strategies for facilitating real-time data collection, are currently under investigation.

1. **Ursprung R,** *et al*. *Qual Saf Health Care* 2005;**14**:284–9.
2. **LEE LCL, *et al***. *Arch Dis Child Fetal Neonatal Ed* 2008; doi:10.1136/adc.2007.131052.

G227P CAN ONE ELIMINATE PREVENTABLE HYPOTHERMIA IN NEONATES?

[1]S Krishnamoorthy, [2]P Lachman, [2]V Vansomeren. [1]*Royal Free Hospital, London, UK;* [2]*Great Ormond Street Hospital, London, UK*

Background: Hypothermia in neonates has been a persistent problem and this has been shown in several audits across the country as well as in major studies such as ''Epicure''. It is also well known that hypothermia can adversely affect both term and preterm neonates in most instances.
Aim: To eradicate neonatal hypothermia using a ''care bundle'' approach.
Method: The local incidence was hypothermia was determined through a random weekly sampling on labour and postnatal wards over 4 weeks, which gave an incidence of about 30% at our hospital. We then identified a ''core working group'' of neonatologists, practice managers and midwives, who formulated several interventional measures to tackle the problem in discussion with other team members. Each planned intervention was studied in a small patient population using the concept of Plan–Do–Study–Act (PDSA) cycles. All those interventions that resulted in a positive outcome were grouped together to develop a ''hypothermia care bundle''. Staff education and support and parent education programmes were run simultaneously to raise the profile of the problem. The ''care bundle'' was rolled out for full implementation in April 2008, after a 3-month trial phase. Interim analysis of ''process'' and ''outcome'' was carried out 3 months after full implementation. Weekly random sampling is continuing to monitor the incidence of hypothermia.
Results: In this study of 688 babies over 3 months, the incidence of hypothermia could be brought down to zero levels using the care bundle approach. Though the ''outcome'' has thus been excellent, problems in ''process'' measures were identified and corrective action has been planned to consolidate the gains.
Conclusions: Hypothermia in labour and postnatal wards can be completely eliminated using improvement methodology and the care bundle approach.

G228P RECTAL PARALDEHYDE IN THE MANAGEMENT OF ACUTE AND PROLONGED TONIC-CLONIC CONVULSIONS

A Rowland, B Stewart, A Gill, R Appleton. *Alder Hey Children's NHS Foundation Trust, Liverpool, Merseyside, UK*

Aims: Paraldehyde has been, and continues to be, used as an anticonvulsant based on very limited published data. What data there are have focused largely on its intramuscular route of administration. This prospective study aimed to collect data on the effectiveness and safety of rectal paraldehyde in the management of an acute, including prolonged, tonic-clonic convulsion.
Methods: Data collection forms were designed and distributed to four hospitals in a Regional Epilepsy Network. Over a 12-month period, nursing staff completed a form for each dose of rectal paraldehyde administered and returned it to the pharmacy department. Information collected included age of the child, dose of paraldehyde, other anticonvulsants used to terminate the seizure (convulsion), cessation of the seizure and any respiratory depression.
Results: Data were collected from 55 episodes in 32 patients; complete data were available in 53 episodes. Patients were aged from 5 months to 16 years (mean 6.12 years, median 5.91 years) and received a paraldehyde dose of 0.08–0.83 ml/kg (mean dose 0.65 ml/kg). 12 episodes occurred in the emergency department, 10 in critical care and 31 in inpatient wards. 35 (66%) of the children had a pre-existing diagnosis of epilepsy. Rectal paraldehyde terminated the seizure in 33 (62%) episodes and within 10 min of administration in 23 (70%) of the 28 episodes where a time was recorded. In the 35 episodes where a pre-existing diagnosis of epilepsy was recorded, paraldehyde stopped the seizure in 26 (74.3%). There was no difference in the dose of paraldehyde used between the episodes where the seizure stopped and the episodes where it did not stop. No respiratory depression was recorded in any episode. A benzodiazepine was used before paraldehyde in 58% of episodes. In 27 of the 33 episodes (82%) where paraldehyde terminated the seizure, no further rescue anticonvulsants were required.
Conclusions: This prospective study provides unique evidence that rectal paraldehyde appears to be effective and safe and justifies its continued role in the management of acute, including prolonged, tonic-clonic convulsions in children within the Advanced Paediatric Life Support (APLS) guideline for the management of convulsive status epilepticus.

G229P INCIDENTAL IRON DEFICIENCY ANAEMIA IN HOSPITALISED CHILDREN: A MISSED OPPORTUNITY

[1]M Raj, [2]N Ayub. [1]*Kings College Hospital, London, UK;* [2]*Royal Shrewsbury Hospital, Shrewsbury, UK*

Introduction: Iron deficiency anaemia is the most common nutritional disorder in the world. Iron deficiency reduces the potential of affected children and treatment is known to increase concentration and school attendance. It is important that any iron deficiency detected incidentally is recognised and treated appropriately.
Aim: To determine the incidence and management of iron deficiency anaemia in hospitalised children who had a full blood count performed as part of their investigations for their presenting illness.
Methods: This study was conducted over a 1-year period at the Shrewsbury and Telford Hospitals NHS Trust and subsequently repeated over a 6-month period at the Worthing and Southlands Hospital NHS Trust. A retrospective case note review was undertaken of hospitalised children between the ages of 9 months and 16 years whose blood tests were consistent with the WHO criteria for the diagnosis of iron deficiency (haemoglobin <11 g/dl and/or MCV <75 fl). Children with a known cause for their anaemia were excluded. Data were extracted to determine the management of these children against the hospital guideline.
Results: 4045 (63%) of the paediatric inpatients had a full blood count performed during the study period. 171 children were eligible for the study but case notes were retrievable for only 131 and after applying the exclusion criteria, the study group was 86 children. 3.3% had incidental iron deficiency anaemia. 80% of the study group had haemoglobin between 8 and 11 g. An MCV of 65–75 fl was found in 56% of the children with haemoglobin of 8–11 g/dl. 84% of the children were under 6 years with half of them under 2 years. Guideline standards for iron supplements were met in only 22%, dietician was involved in 7% and follow-up for both repeat blood tests and clinical review was arranged in a fifth of the eligible children. There was no significant difference in all these parameters between the two different hospital trusts.
Conclusions: Incidental iron deficiency in hospitalised children is not uncommon but remains unrecognised and the opportunity to treat it appropriately is often missed. Greater awareness of this may lead to less missed opportunities for treatment.

G230P REVIEW OF ANTIFUNGAL PROPHYLAXIS IN NEONATES: A UK NATIONAL SURVEY

S Sampath, S Kapoor. *Sheffield Children's NHS Trust, Sheffield, UK*

Aims: To identify the frequency of antifungal prophylaxis (AFP) use in UK neonatal units, type of antifungal agents used, criteria and indications for their use. This survey also aimed to identify the barriers for AFP use.
Methods: Names of the level 2 and 3 neonatal units were identified in ''Directory of critical care 2007''. One consultant from each centre was initially contacted by email. Those who did not respond to emails were contacted by letters, requesting them to fill in a questionnaire.
Results: Of 153 units contacted 147 (96%) responded. 35% among them are using antifungal prophylaxis. Main antifungals of choice are

flucanazole (44%) and nystatin (50%). 21% used the gestational age or birth weight as the only criteria while considering the prophylaxis. 61% considered the prophylaxis based on gestational age or birth weight plus an additional risk factor like prolonged intubation, central lines or broad-spectrum antibiotics especially cephalosporin. AFP was used more frequently in bigger centres (71% in units with 10 or more intensive cots compared 18% in units with two to five intensive cots). It was used more commonly in babies <28 weeks (82%) and in babies with birth weight <1000 g (69%). Among those who did not use prophylaxis, 92% did not think incidence of fungal infection is high enough to justify prophylaxis, 85% said criteria for using AFP needs clarification, 88% were worried about increased fungal resistance and 78% think further studies are needed.

Conclusions: Majority of the consultants in UK consider that the incidence of fungal infection in their unit is not high enough to justify AFP. There are concerns regarding the emergence of antifungal resistance. There is wide variation in the type, dosage and duration of AFP and the criteria for AFP use is not very clear. There is need for further studies with power targeting babies especially of <28 weeks' gestation/<1000 g—looking at type of AFP use, the lowest effective dose needed, the effective minimum duration of AFP and the possible long-term emergence of fungal resistance. This study also suggests the need for developing a universal recommendation and protocol for AFP use.

G231 DIAGNOSING URINARY TRACT INFECTIONS IN CHILDREN: NATIONAL INSTITUTE FOR CLINICAL EXCELLENCE AND EASY?

M Hesseling, P Ho, E Farrell, D Loverock. *Glan Clwyd Hospital, Bodelwyddan, Denbighshire, UK*

Introduction: The recent National Institute for Clinical Excellence (NICE) guideline on urinary tract infections (UTIs) in children represented a major shift in the management of children with UTIs. Prompt and accurate diagnosis remains vital for the appropriate management of such children. The initial NICE consultation document acknowledged the difficulties in early diagnosis and recommended further research into the use of dipstick testing.

Methods: We conducted a retrospective study looking at 209 case notes of children with a diagnostic code of UTI. We collected data on dipstick, microscopy and culture results. A pure growth of >100 000 bacteria was used as the widely accepted gold standard in diagnosing UTIs.

Results: The coded diagnosis of UTI was incorrect in nearly 40% of cases. On reviewing national statistics for the whole of Wales we found that this could potentially amount to up to 600 cases per year of incorrectly coded diagnoses of UTI in Wales alone. Equally concerning was that we found that 15% of UTIs would have initially been missed if NICE guidelines had been followed at the time.

Conclusions: The current way of diagnosing and coding of UTIs could have serious implications on the management of children with suspected UTIs. We recommend that all children with a suspected UTI are initially labelled with "presumed UTI" until the review of the urine culture result allows a more definitive diagnosis. We suggest that this will lead to a significant decline in inappropriate diagnosis and therefore in inappropriate management. We recommend caution and flexibility in the use of the NICE guideline in order to avoid both underdiagnosis and overdiagnosis of UTIs in children.

G232 IMPACT OF THE NATIONAL INSTITUTE FOR CLINICAL EXCELLENCE GUIDELINE FOR THE MANAGEMENT OF URINARY TRACT INFECTION IN CHILDREN ON THE IDENTIFICATION OF RENAL CORTICAL SCARS

S Nailor. *Kingston Hospital NHS Trust, Kingston Upon Thames, Surrey, UK*

Introduction: Urinary tract infection (UTI) is common in children. The recommended management and investigation of UTI has changed significantly since the publication of the National Institute for Clinical Excellence (NICE) guideline for the management of UTI in children in August 2007. This has resulted in much controversy.

Aim: To determine how many renal cortical scars, and other abnormalities, may fail to be identified following the introduction of the NICE guideline.

Method: Retrospective single centre study in a general paediatric department. We identified all DMSA scans performed in children (⩽16 years old) during the 12-month period prior to the NICE guideline being introduced. The case notes of those with an abnormal DMSA scan were then examined to identify those cases who would not have met the NICE criteria for a DMSA scan.

Results: 154 children were identified to have had a DMSA scan within the 12-month period before the NICE guideline was introduced. Of the 154 DMSA scans performed, 47 were reported as abnormal. 37 (24%) of these were performed for UTI, eight for abnormal antenatal scans and two for other reasons. Of the 37 abnormal DMSA scans performed for UTI, renal cortical scarring was identified in 19 (12.3%). 13 (8.4%) had a significant difference (>56% unilaterally) in the function of both kidneys, three (2%) had a non-functioning kidney, one (0.6%) had hydronephrosis and one (0.6%) had a duplex system. Taking the 19 identified to have a renal cortical scar, if the NICE guideline had been adhered to six of these (31.6% of those with renal cortical scars) would not have had a DMSA scan.

Conclusions: The introduction of the 2007 NICE guideline on the management of UTI in children will result in failure to identify renal cortical scarring in a third of all children with renal scars.

G233 MORTALITY AMONG INFANTS BORN WITH OROFACIAL CLEFTS IN A SINGLE CLEFT NETWORK

[1]CS Narayanan, [2]P Hall, [2]T Ahmad, [2]W Kelsall. *[1]Luton and Dunstable Hospital, Luton, UK; [2]Addenbrooke's Hospital, Cambridge, UK*

Aim: To determine mortality rate and cause of death in infants born with orofacial clefts in a clinical network over a 6-year period, and compare with the national post neonatal mortality rate of 1.5 per 1000 live births.[1]

Methods: Retrospective case note review of all children who have died between 6 April 2002 and 5 April 2008. Data were collected on a standardised pro forma. Clefts were classified as isolated cleft palate (CP), isolated cleft lip (CL) and combined CP and palate (CLCP). The clinical course was reviewed and information analysed in a Microsoft Excel spreadsheet.

Results: Over the 6-year study period, 1007 children were born with orofacial clefts. There were 381 CP, 219 CL and 407 CLCP. Fifteen children have died at a median age of 6.5 (1–36) months with a death rate of 14.8/1000 cleft births. Looking at specific cleft groups the death rates vary widely. There were 13 deaths in children born with CP with a calculated death rate of 34/1000 CP births. One child with CL died, calculated death rate of 4.5/1000 births and one child with CLCP calculated death rate of 2.4/1000 births. All of the CP cases were diagnosed postnatally and both CLCP and CL diagnosed antenatally. Most of the children who died (14 of 15) had abnormalities in other systems in addition to the cleft. Five (33%) had cardiac defects, eight (53%) had a recognised syndrome, six (40%) had arthrogryposis, five (33%) had CNS anomalies four (26%) had chromosomal abnormalities and two (13%) renal anomalies. In 13 (85%) cases palliative care was decided after discussion with parents and all of these children died before their first birthday. Two deaths occurred after their first birthday in hospital—one unexpectedly due to tracheostomy obstruction and the other in the postoperative period following cardiac surgery.

Conclusions: Most deaths in children with orofacial clefts occur in the first year. Children born with an isolated cleft palate have a 20-fold increase in mortality when compared with normal children and at least fivefold increase when compared with children with other clefts. In view of these risks children with CP should have regular input from paediatricians.

1. **Live births, still births, infant and childhood deaths under 15: numbers and rates, 1981–2006**. Office of National Statistics Series DH3 No. 39.

G234 ACUTE MANAGEMENT OF INHERITED METABOLIC DISORDERS: DEVELOPMENT OF WEB-BASED NATIONAL BEST-PRACTICE GUIDELINES BY THE BRITISH INHERITED METABOLIC DISEASE GROUP

[1]A Chakrapani, [2]A Morris, [3]J Leonard. *[1]Birmingham Children's Hospital NHS Foundation Trust, Birmingham, UK; [2]Royal Manchester Children's Hospital, Manchester, UK; [3]Institute of Child Health, London, UK*

Children with inherited metabolic disorders (IMD) are prone to developing acute life-threatening decompensation in response to catabolic stress, such as infection and surgery. Timely emergency medical management can prevent serious consequences such as death and permanent disability. However, delays in implementing emergency management are common because of the complexity of treatment regimens and the general lack of experience due to the rarity of these conditions. Individualised emergency management protocols are usually given to parents and are available via specialist units, but are often misplaced or forgotten in emergencies.

Aims: To develop and publish web-based national emergency management guidelines to: (1) facilitate better access for parents and medical professionals; (2) harmonise and simplify management guidelines; and (3) reduce delays in implementing emergency treatment.

Methods: A national guideline panel was convened by the British Inherited Metabolic Disease Group (BIMDG) in March 2007. Following a national call for the submission of existing protocols to all specialist IMD units, guidelines were collated and circulated to the guideline panel. The guidelines are continually updated and revised through an iterative process via a series of meetings and email correspondence.

Results: Downloadable versions of the emergency management guidelines were peer reviewed and published on the BIMDG website for public access in July 2008. A total of 31 guidelines covering a broad range of acute metabolic conditions are available for public access under five sections: emergency management, management of medium chain acyl CoA dehydrogenase deficiency, prospective management of surgery, prospective management of neonates at risk and management of undiagnosed metabolic problems.

Conclusions: Download statistics to date suggest widespread use of the guidelines and feedback has been positive. Increasing awareness of the website among parents and health professionals should improve acute hospital management of patients with IMD.

G235 PROPRANOLOL FOR INFANTILE HAEMANGIOMAS: OUTCOME AND PROPOSED GUIDELINES

F Manunza, S Syed, J Linward, M Glover, B Laguda, C Gholam, A Giardini, H Kennedy, J Harper. *Great Ormond Street Hospital for Children, London, UK*

Aims: Until now the first line treatment for problematic infantile haemangiomas (IH) has been oral steroids given as a reducing course usually until about 6 months of age. Recently, it has been reported that propranolol, a non-selective β-blocker, can inhibit the vascular proliferation of IH during their growth phase. Propranolol works by vasoconstriction and possibly decreased expression of pro-angiogenic factors causing apoptosis of capillary endothelial cells.[1] Our aim is to evaluate the efficacy and tolerability of propranolol alone and in combination with steroids in children with IH. Treatment and outcome of 10 patients were prospectively analysed.

Methods: Propranolol was given as a first-line treatment for IH that potentially could give rise to serious complications who would otherwise have been prescribed prednisolone to five patients and as a second-line treatment for haemangiomas not responding to prednisolone in five patients. The drug was administered according to a standardised protocol in collaboration with our cardiology team at Great Ormond Street Hospital. Outcome was assessed clinically, by serial photography and monitoring adverse effects. Bloods, echocardiogram, ECG and abdominal ultrasound were performed as baseline evaluation. Our initial dose was 1 mg/kg in three divided doses daily. Children were monitored in hospital for 4 h at the start of medication and 1 week later when the dose was increased to the maximum of 2 mg/kg. Blood pressure and heart rate were checked every 30 min on the ward for the 4 h period, then twice weekly for 2 weeks and thereafter once weekly.

Results: From the onset of treatment the IH stopped growing in nine of our patients. All patients demonstrated significant clinical improvement from the first week. Planned follow-up and treatment was 1 year. No adverse events were noted and no patient had to stop therapy.

Conclusions: These data confirm that propranolol is a valuable treatment for IH and is well tolerated. Propranolol proved to be effective in those patients who had not responded to prednisolone and was also impressive as a single therapy. Larger studies are needed to determine which patients are most appropriate for propranolol and to ensure the safe use of this new and exciting treatment for IH.

1. **Leaute-Labreze C,** *et al*. Propranolol for severe haemangiomas of infancy. *N Engl J Med* 2008;**358**:2649–51.

G236 AN AUDIT TO EVALUATE THE INTRODUCTION OF THE PAEDIATRIC ANALGESIA WHEEL INTO CLINICAL PRACTICE AT UNNAMED HOSPITAL

[1]M Hamilton, [2]R Hixson. *[1]University Hospital of North Durham, Durham, County Durham, UK; [2]Darlington Memorial Hospital, Darlington, County Durham, UK*

Aims: Prescribing medicines to children can be challenging and is often associated with errors. Evidence suggests that medication safety needs to be improved, particularly in babies and young children. Errors in analgesic prescriptions can lead to inadequate treatment of pain, or overdose with the potential for side-effects or even death. This audit was performed to determine whether the prescribing accuracy of analgesic drugs to children could be improved by introducing a new device, the Paediatric Analgesia Wheel, into a clinical environment.

Methods: The Paediatric Analgesia Wheel was introduced into the operating theatres of an unnamed hospital in July 2008. Prescription charts of children under 16 years old who had undergone elective or emergency surgery were examined, 50 being inspected before the introduction of the wheel (group 1), and 50 being inspected after the introduction of the wheel (group 2). The information recorded from each chart consisted of number of analgesic prescriptions made, dose, minimum dosage interval, maximum dosage frequency and route of administration. Our standard of best practice was the prescribing of a dose that was accurate for the weight of the child, based upon BNF for Children recommendations and easily administered with available oral and intravenous syringes.

Results: A significantly greater number of prescriptions was made per child in group 2 (mean increase 0.96) following the introduction of the Paediatric Analgesia Wheel. There was a statistically significant reduction in absolute percentage dose error (mean decrease 5.8%) with a reduction in standard deviation about the ideal dose following its introduction. There was no statistically significant difference in the number of correct entries for minimum dosage interval, maximum dosage frequency or route of administration.

Conclusions: The availability of the Paediatric Analgesia Wheel resulted in a statistically significant increase in both the number of prescriptions made and dosage accuracy when compared with our defined standard of best practice. This could have significant implications for improving prescribing for children throughout the hospital environment.

G237 THE SOOTHING POWER OF CHOCOLATE

C Masterton-Smith, S Kanumakala, K Patel. *Brighton and Sussex Medical School, Brighton, East Sussex, UK*

Aims: Venepuncture is a common and painful clinical procedure, carried out on children in hospital. It is obviously painful, and in addition, it is associated with a certain degree of anxiety and distress.

Oral sucrose has been proven to reduce pain and distress in neonates having a heel-prick test; another painful procedure. To explore this concept further, we evaluated whether chocolate could be used to decrease the pain and distress associated with venepuncture in children; as various studies suggest that chocolate is associated with pleasure and increased mood, and may act as a painkiller.

Methods: All children aged 5–10 years who attended for a routine blood test were invited to participate in the study. After parents had given their consent, each child was randomly assigned to one of the two groups. Group A (the control group) were given chocolate after venepuncture, whereas group B (the intervention group) were given chocolate before venepuncture. After venepuncture all children scored their pain on the Wong–Baker faces scale without parental assistance; a nurse blind to randomisation helped them to record their score. Independently of this, the parent also scored their perception of the child's pain on the Wong–Baker faces scale. The researcher completed a Children's Hospital of Eastern Ontario Pain Scale (CHEOPS) form, as an objective measure of the child's distress and pain during the procedure.

Results: 60 children were recruited and randomly assigned to the two groups. The results were then analysed. There was a significant difference in the CHEOPS scores between the groups ($p<0.01$); showing less pain and distress in the intervention group. There was also a difference between the parent and child pain scores in the control group ($p<0.01$), with parents overestimating the child's pain. Boys scored higher than girls on their pain scores ($p<0.05$), and younger children scored higher than older children ($p \leqslant 0.01$).

Conclusions: We believe that chocolate is effective in reducing the pain and distress associated with venepuncture; supported by the independent CHEOPS scores in this study. Younger children and male children scored higher for their pain than older children and girls respectively, with parents overestimating their child's pain, irrespective of which group their child was in. A larger study is required to further validate the findings of this study.

G238 PAEDIATRIC MEDICINES MANAGEMENT: EXPLORATION OF CHILD, PARENTAL AND HEALTHCARE PROFESSIONAL ATTITUDES IDENTIFIES POTENTIAL CLINICAL RISK

[1]R James, [2]A Fox, [2]A Bevan, [3]J Robinson, [3]M Davies, [4]J Staniforth, [5]B Gennery, [1]S Faust. *[1]University of Southampton, Southampton, UK; [2]Southampton University Hospitals NHS Trust, Southampton, UK; [3]PharmaKodex Ltd, Cambridge, UK; [4]University of Bath, Bath, UK; [5]University of Surrey, Guildford, UK*

Aims: Safe and effective medicines management is important to reduce clinical risk for in the NHS.[12] We aimed to survey children, parents and healthcare professionals in order to explore specific aspects of paediatric pharmaceutical practice that will allow further planning and development of hospital and community paediatric medicines' management and education.

Method: Four qualitative questionnaires were designed to record attitudes of children aged 5–8 (n = 16), parents of children taking regular medication (n = 13), paediatric nurses (n = 10) and paediatric doctors (n = 7). Research Ethics Committee approval was obtained for a trained researcher to conduct interviews on paediatric wards. Data analysis consisted of simple descriptive analysis. Key themes relating to children's medicines were identified, analysed and conclusions drawn.

Results: Taste was identified as the major deterrent for children taking regular medicine. Important clinical issues identified included doctors failure to check drug dose using current weight (44%), problems taking medicines (77% children spit or vomit), nurses not recording missed doses (20%), failure to replace lost doses, unwillingness to ask doctor to prescribe alternative medication or formulation (40%), incompatible medicine disguising, problems with collection of medicines (8%), problems with "at school medicines" (17% "not good") and poor knowledge of how to dispose of unused medicines. All groups identified a need for new methods of drug delivery for children.

Conclusions: We have identified specific areas of potentially inadequate paediatric medicines' management that could indicate widespread clinical risk. Further research and development of effective systems and training is required in prescribing for children, drug administration, multidisciplinary team working, links with primary healthcare and the school, and in family education. Alternative formulations for children are desired by parents and healthcare professionals, which may improve medication concordance.

1. **Healthcare Commission**. The Best Medicine. *The management of medicines in acute and specialist Trusts* 2007.
2. **Smith J.** 4.3 Safer use of medicines in children. *Building a safer NHS for patients: Improving medication safety* A report by the Chief Pharmaceutical Officer. London: Department of Health; 2004.

G239 EVALUATING THE POTENTIAL FOR OPPORTUNISTIC VACCINATION IN SECONDARY CARE

J Murali, R George. *Wrightington, Wigan and Leigh NHS Trust, Lancashire, UK*

Aim: To assess the immunisation status of children attending paediatric secondary care services and to establish reasons for poor compliance with an aim to evaluate the potential of "opportunistic vaccination".

Methods: Its a prospective study of 52 children aged 2 months to 3 years, who were randomly chosen from A&E and ward attendees. Completion of a proforma, regarding their child's immunisation status and other socio-economic factors was done. The need and importance of immunisations was also explained to the parents. If they were not up-to-date, clinicians offered to provide the appropriate immunisation following consent (the child being well enough). All children had their status counter checked using a robust electronic database maintained in primary care. If any discrepancy was found, clinicians offered to perform the immunisation or made arrangements for the child to be immunised in the community. Compliance was checked in 2 weeks.

Results: Six of 52 (12%) children were not up to date with their immunisations. Socio-economic and environmental factors did not differ between the group who were up to date and those who were not. The demographics of children not up to date are shown below.

Five of six (83%) of these agreed to have it done or have it arranged in the community; these five children were then immunised following our intervention.

Conclusions: Immunisation status can be obtained without disturbing ward routine. Lack of awareness seems to be the significant factor. Parents are more receptive and accept the offer of

Abstract G239 Demographic factors of children not up to date with their immunisations

Maternal age	Paternal age	Marital status	Maternal work	Paternal work	Travellers	Kids in family	Travel to surgery	Distance in miles
32	23	Single	Carer	N/A	N	4	Walk	1
30	30	Married	Full time	Full time	Y	1	N/a	N/a
27	22	Married	Carer	Carer	N	2	Walk	0.5
28	24	Separate	Unemployed	Full time	N	1	Car	1.5
36	40	Married	Student	Full time	N	3	Car	3
37	31	Married	Part-time	Full time	N	2	Walk	2

catch-up immunisation in a hospital setting. Hospital attendance is a real opportunity for catch-up immunisation. Active medical advice and intervention can result in prompt uptake of immunisations.

G240 IMPROVING THE MANAGEMENT OF CONSTIPATION

N Ismail, I Ratchford, C Proudfoot, J Gibbs. *Countess of Chester Hospital, Chester, UK*

Aim: To assess the impact of a nurse-led clinic for children with constipation who fail to make satisfactory progress in a general paediatric clinic.
Methods: 50 children aged from 1.5 to 10 years with constipation for more than 6 months who had not improved after at least three attendances at a general paediatric clinic were transferred to a nurse-led clinic over a 2-year period. The nurses explained functional constipation, explored parental frustrations, discussed concerns over medication, encouraged compliance with medication, provided advice on normal toileting behaviour and offered telephone contact between clinics. The severity of constipation and its impact on the child as well as parental understanding of constipation and its treatment were assessed by questionnaire on referral to the nurse-led clinic and after three visits, 4 months later. Changes were analysed using the McNemar or Wilcoxon signed rank test as appropriate.
Results: After three visits to the nurse-led clinic, highly significant improvements were noted in the frequency of motions, pain on defecation and general health ($p<0.001$ for each). The number of children who soiled halved ($p<0.001$), and those who still soiled did so less frequently. Parental understanding of constipation and satisfaction with treatment increased appreciably ($p<0.01$). Overall laxative dosages did not change ($p>0.05$ for each laxative).
Conclusions: Children with chronic constipation who are not making progress in a general paediatric clinic can improve substantially when transferred to a nurse-led clinic where parental understanding, frustration and concerns about constipation are explored, compliance with medication is encouraged and advice given on normal toileting behaviour.