

## Gastroenterology, hepatology and nutrition and allergy, immunity and infection joint session

### G20 "BURNOUT" IN CARERS OF CHILDREN WITH CHRONIC INTESTINAL FAILURE

<sup>1</sup>S Beath, <sup>1</sup>C Holden, <sup>1</sup>C Clifford, <sup>1</sup>C James, <sup>1</sup>G Gupte, <sup>1</sup>E Sexton, <sup>1</sup>C Bunford, <sup>1</sup>S Murphy, <sup>1</sup>S Protheroe, <sup>2</sup>V Zamvar, <sup>2</sup>G Lazonby, <sup>2</sup>J Puntis. <sup>1</sup>Birmingham Children's Hospital, West Midlands, UK; <sup>2</sup>The Leeds General Infirmary, Leeds, UK

The management of chronic intestinal failure (CIFx) has improved dramatically in the past 15 years, with up to 90% of infants on parenteral nutrition (PN) surviving for at least 5 years. However, each year 10–20 children with CIFx develop life-threatening complications. The burden of home care results in some parents experiencing severe fatigue, with adverse consequences for the health of their child.

**Aim:** To review social circumstances, community support and symptoms of "burnout" defined as lack of adherence to outpatient monitoring.

**Methods:** Members of the multidisciplinary teams from two teaching hospitals reviewed patients' social circumstances by case record review and personal contact, and scored families for adherence (0 for no cooperation or deception, 1 for more than three missed appointments per year, 2 for full cooperation).

**Results:** Community nursing support was available to only 10/30 small bowel transplant (SBTx) patients. The technical skills needed for home PN meant that respite care was not readily available except via hospitalisation, although two SBTx families did access their local hospice. 12 parents disclosed that they were or had been depressed (six CIFx, five SBTx). In nine families the parents separated during follow-up (four CIFx, five SBTx). A child protection case conference was held for 10 families, resulting in eight children being placed with another family member (six) or fostered (two). "Burnout" in SBTx was found to be related to episodes of rejection after discharge home ( $p = 0.051$ ) and in CIFx patients "burnout" was related to line infections,  $p = 0.017$ ; by Fisher's test (see table).

**Conclusion:** Strategies to alleviate burnout are urgently needed to avoid catastrophic outcomes such as serious PN-related complications and SBTx rejection. Early social work input, respite care, access to hospices with appropriately trained staff, community nurse involvement and/or home care nursing teams should be part of the package of care for children with CIFx and SBTx.

Abs G20 Table Social circumstances, adherence to outpatient monitoring and episodes of social services interventions in families of children

Results	No of patients	Isolated mother	Parents with learning difficulties	Burnout (adherence score 0 or 1)	Child protection conference
CIFx	43	12 (28%)	9 (21%)	22 (51%)	6 (19%)
SBTx unit	30	5 (17%)	7 (23%)	14 (47%)	4 (13%)

CIFx, chronic intestinal failure; SBTx, small bowel transplantation.

### G21 MINIMISING RISK IN PARENTERAL NUTRITION FOR CHILDREN: A NATIONAL SURVEY AND RECOMMENDATIONS

<sup>1</sup>S Connor, <sup>1</sup>J Cope, <sup>2</sup>L Kay, <sup>3</sup>B McElroy, <sup>4</sup>J Wallace, <sup>2</sup>J Puntis. <sup>1</sup>Great Ormond Street Hospital, London, UK; <sup>2</sup>The General Infirmary at Leeds, Leeds, UK; <sup>3</sup>Shrewsbury and Telford Hospital, Shrewsbury, UK; <sup>4</sup>Yorkhill Hospitals, Glasgow, UK

**Background:** Parenteral nutrition (PN) is an effective and widely used intervention, yet is sometimes complicated by life-threatening adverse events including compounding and administration errors.

**Aims:** To examine variation in the preparation of neonatal and paediatric PN in hospitals, including the use of guidelines, product procurement, workload and the prescribing and compounding process. To make recommendations for minimising risk to patients.

**Methods:** The study was developed by the paediatric chief pharmacist group with support from the chief pharmaceutical officers of the four UK health departments. Background data were requested from chief pharmacists. A clinical questionnaire (exploring prescribing practice and associated processes such as biochemical monitoring and the interface with the clinical pharmacist in hospitals) and a technical questionnaire (investigating workload data and the compounding practices of aseptic units) were then sent to all NHS hospitals using PN for children.

**Results:** Response rates for questionnaires were as follows: background from chief pharmacists 96%; clinical neonatal 78%; clinical paediatric 78%; technical questionnaire 82%. Almost two-thirds of pharmacy aseptic units had a capacity plan, but in only half did this include risk assessment of PN processes and practice. Only 25% of units had access to a nutrition support team. The decision to start PN was almost always at consultant level; a junior doctor or pharmacist then decided on the content of the PN. Only 21% of neonatal and 46% of paediatric units had agreed clinical guidelines for PN. Approximately two-thirds of prescriptions were said to be individualised. A standard proforma for prescribing PN was used in only two-thirds of units; further transcription of the prescription for pharmacy was common. Approximately 80% of units regarded the use of standard PN bags as feasible, but a lower proportion used these in practice; inability to source suitable preparations from suppliers was seen as one of the major barriers. Safety checks at the point of administration were variable and sometimes lacking.

**Conclusions:** There is considerable variation in the process of prescribing PN and preparation of the final feed product. Such variation signifies inherent risk. Greater standardisation including the use of agreed protocols, pharmacist lead prescribing, access to nutritional support teams and the use of "standard bag" feeds are likely to improve safety.

### G22 THE PREVALENCE AND CUMULATIVE INCIDENCE OF VARICELLA INFECTION IN A NATIONALLY REPRESENTATIVE COHORT OF 5 YEAR OLDS: AN ANALYSIS TO INFORM VACCINE POLICY

G Manikkavasagan, C Dezateux, H Bedford. UCL Institute of Child Health, London, UK

**Background:** Although a safe and effective vaccine against varicella zoster virus (VZV) is available, mass immunisation has not been introduced in the UK due to concerns regarding potential increases in age at VZV infection or herpes zoster incidence, as well as a lack of evidence on its cost effectiveness. UK VZV vaccine policy is currently under review but national longitudinal data are lacking to inform optimal timing and vaccine schedules.

**Aims:** To report VZV prevalence and cumulative incidence by age 5 years using data from the UK Millennium Cohort Study; to examine sociodemographic and ethnic associations with risk of infection by 5 years.

**Methods:** Maternal report of childhood VZV infection by ages 3 and 5 years obtained at home interview for 12 509 singleton children (50.9% boys) whose natural mother was the main respondent. Maternal ethnicity, social class and education, household composition and use of day care were also reported. Prevalence and cumulative incidence estimates were weighted for survey design. Forward stepwise Poisson regression was performed to evaluate the risk of infection (Stata version 9).

**Results:** Mothers reported a positive history in 9339 children by 5 years (weighted prevalence 76.9%; 95% CI 75.9% to 78.0%). 5350 children were reported to have acquired infection by 3 years, leaving 3989 children acquiring infection between ages 3 and 5 years (weighted cumulative incidence ages 3–5 years 32.2%; 95% CI 31.1% to 33.3%). Risk of infection by 5 years was positively associated with maternal social class (adjusted risk ratio (aRR) 1.04; 95% CI 1.02 to 1.05, for mothers from professional backgrounds), household composition (aRR 1.03; 95% CI 1.02 to 1.05, for children who live in families with other children) and day care attendance (aRR 1.05; 95% CI 1.03 to 1.07). Children whose mothers were from ethnic minority backgrounds were less likely to have acquired infection by 5 years (aRR 0.95; 95% CI 0.92 to 0.98).

**Conclusions:** Approximately three-quarters of children in the UK are reported to have acquired VZV infection by 5 years. Maternal social class, ethnicity and preschool contact patterns strongly influence acquisition by this age. These findings suggest that, were universal immunisation to be introduced in the UK, an infant schedule would be optimal.

**G23 ANALYSIS OF A NEW LOCAL MICROBIOLOGY DATABASE TO INVESTIGATE EPIDEMIOLOGY AND ANTIBIOTIC RESISTANCE PATTERNS OF CULTURE-POSITIVE PAEDIATRIC INFECTIONS IN A LARGE TEACHING HOSPITAL TO INFORM EVIDENCE-BASED LOCAL EMPIRICAL ANTIBIOTIC GUIDELINES**

<sup>1</sup>S Rees, <sup>1</sup>D Jolley, <sup>2</sup>D Browning, <sup>3</sup>A Pallett, <sup>1</sup>S Faust. <sup>1</sup>University of Southampton, Southampton, UK; <sup>2</sup>Health Protection Agency, Southampton, UK; <sup>3</sup>Southampton University Hospitals NHS Trust, Southampton, UK

**Aims:** To use a new local microbiology database to ascertain local incidence and trends of culture-positive invasive infections and colonisation in children admitted to a large teaching hospital and to investigate local antibiotic resistance patterns in order to inform evidence-based local empirical antibiotic guidelines.

**Methods:** The local Health Protection Agency has recently developed a new computer database to analyse all local trust microbiology data from January 2003 to December 2007. A total of 11 253 isolates was analysed from 3968 children aged 61 days to 18 years (median 6 years). Antibiotic sensitivity data quoted are by breakpoint testing. No denominator data (numbers of negative samples) or clinical phenotype information was available for this analysis.

**Results:** 25% of all positive samples occurred in the first 2 years of life, with a second peak in teenagers (20% in 13–16 years inclusive). 49% positive samples were from swabs (all sites), 25% respiratory secretions, 15% urine, 6% blood cultures, 3% fluids and 3% faeces. 3322 were Gram-positive cocci, 2968 Gram-negative bacilli, 935 fungi/yeast, 19 acid-fast bacilli, 10 protozoa and 3575 mixed cultures. There were 1437 *Staphylococcus aureus* isolates, of these 11% were methicillin-resistant *S aureus* (MRSA). In blood culture, there were 27 methicillin-sensitive *S aureus* (MSSA)-positive isolates and five MRSA. 36 blood culture isolates of *Streptococcus pneumoniae* were fully penicillin sensitive. Non-typeable *Haemophilus influenzae* (n = 313, 142 respondents, 165 swabs/fluids) showed 100% sensitivity to cefotaxime but 22% resistance to ampicillin, with resistance to co-amoxiclav rising from 1.4% in 2003 to 18% in 2007. *Moraxella catarrhalis* (n = 33 respondents, 25 swabs, three blood) showed 90% resistance to ampicillin but over 93% susceptibility to cefotaxime. 1083 of 1293 urine isolates (nephrology and surgical wards excluded) were known uropathogens: *Escherichia* spp. (31%), coliform (25%), *Streptococcus* (9%), *Pseudomonas* (5%), *Staphylococcus* (2%) and *Proteus* (2%), plus 25% mixed growth. 75% of all isolates were sensitive to cefotaxime, 75% to co-amoxiclav, 75% to ciprofloxacin, 80% to nitrofurantoin and 62% to trimethoprim. 295 isolates were obtained from 239 eye swabs, of which 20% were polymicrobial (*H influenzae* 100, *S pneumoniae* 38, MSSA 26, MRSA six, *Moraxella* 12, group A *Streptococcus* three, *P aureus* two).

**Conclusions:** Data have changed local empirical antibiotic guidelines for pneumonia, urinary tract infection and eye infection. MRSA isolate numbers appear to have peaked in 2003–4 and do not appear to be increasing.

**G24 IMPROVING EARLY PROTEIN INTAKE FOR VERY PRETERM INFANTS USING A STANDARDISED CONCENTRATED PARENTERAL NUTRITION FORMULATION**

<sup>1</sup>C Morgan, <sup>1</sup>I Badhawi, <sup>1</sup>C Grime, <sup>2</sup>S Herwitker. <sup>1</sup>Liverpool Women's Hospital, Liverpool, UK; <sup>2</sup>Royal Liverpool Hospital, Liverpool, UK

**Introduction:** Neonatal parenteral nutrition (NPN) does not prevent early postnatal growth failure and negative nitrogen balance in many very preterm infants. Individualised NPN prescribing remains standard practice. However, individualised NPN does not avoid additional electrolyte supplementation and may result in suboptimal nutritional delivery because of fluid restriction, multiple drug infusions and metabolic instability. A standardised concentrated NPN (scNPN) regimen (85 ml/kg per day aqueous NPN; 15 ml/kg per day intralipid; 50 ml/kg per day supplementary 10% dextrose infusion) was introduced to “protect” protein administration. Three nutritionally identical scNPN bags were developed: scNPN1, 2 and 3, to manage common neonatal electrolyte variations. A system of standardised electrolyte infusions accompanied scNPN implementation.

**Aim:** To establish whether the new scNPN regimen could improve protein intake while maintaining metabolic stability.

**Methods:** The study was approved by the local audit committee. Demographic and biochemical data were collected from the neonatal intensive care unit electronic/paper data management system. In the infant subset (<29 weeks; scNPN >12 days) detailed fluid/drug infusion data were collected for the first 14 days of life. Target scNPN volume (14 days) was calculated assuming optimal scNPN administration from the scNPN starting time. Actual calorie and protein intake were calculated and compared with a previous randomised controlled trial control group receiving a nutritionally identical individualised NPN. Cost analysis of scNPN was performed.

**Results:** ScNPN usage was: scNPN1 (18%); scNPN2 (65%); scNPN3 (17%) in 118 infants receiving scNPN in June to December 2006 (1483 scNPN days). Electrolyte derangement rates were: sodium 12.4%; potassium 5.4%; phosphate 2.9%; calcium 1.7%. In the infant subset (n = 38; 526 scNPN days) median (range) of 98% (80–102%) prescribed scNPN target volume was delivered. Mean (SD) protein intake (g/kg per 14 days) was 34.5 (4.1) for scNPN and 28.1 (2.5) for individualised NPN (p<0.001). There was no difference between 14-day calorie intakes. Rates of treated hyperglycaemia or metabolic acidosis were within an acceptable range. Annual cost savings were £39 510 (38% reduction).

**Conclusions:** Using scNPN improves the efficiency of parenteral nutrition delivery and early protein intake while maintaining biochemical and metabolic stability and at less cost.

**G25 NON-ALCOHOLIC FATTY LIVER DISEASE IN A UK COHORT OF OBESE CHILDREN**

<sup>1</sup>A Ford, <sup>2</sup>C Wei, <sup>2</sup>E Crowne, <sup>1</sup>J Shield. <sup>1</sup>University of Bristol, Bristol, UK; <sup>2</sup>Department of Paediatric Endocrinology and Diabetes, Bristol Royal Hospital for Children, Bristol, UK

**Introduction:** Non-alcoholic fatty liver disease (NAFLD) is described as fatty infiltration of the liver without excessive alcohol consumption. A raised ALT has been suggested as a reasonable surrogate marker of NAFLD. The prevalence of NAFLD in the paediatric population is increasing in conjunction with the increasing prevalence of obesity and is reported in up to 23% of obese children in the USA. Little is known about the prevalence of NAFLD in obese children in the UK and its association with metabolic abnormalities.

**Aim:** To describe the prevalence of NAFLD in children with obesity and whether this is associated with impaired glucose metabolism and components of the metabolic syndrome.

**Methods:** The cohort included 216 children (90 male), aged 2.9–17.6 years (median 12.4 years) with mean body mass index (BMI) of 3.36 (SD 1.92–6.22) who attended the Childhood Obesity Clinic at the Bristol Royal Hospital for Children. Each participant underwent an oral glucose tolerance test (OGTT) with fasting lipid profile taken at baseline and were measured for weight, height, waist circumference, percentage body fat and blood pressure. The parental history of type 2 diabetes was recorded. The metabolic syndrome was defined using the 2007 International Diabetes Federation definition.

**Results:** 34 out of 216 (16%) children had raised ALT (>40 IU/l) with a greater prevalence in boys ( $n = 21$ ,  $p = 0.01$ ). 30% of children with a positive parental history of type 2 diabetes had a raised ALT compared with 13% with no parental history of type 2 diabetes ( $p = 0.019$ ). Those with an elevated ALT were more likely to fulfil the criteria for the metabolic syndrome ( $p < 0.001$ ). In addition, those with a raised ALT were more likely to have subtle abnormalities in glucose metabolism during an OGTT with an elevated glucose level at times 60 ( $p = 0.034$ ), 90 ( $p = 0.024$ ) and 120 ( $p = 0.013$ ) minutes and a higher glucose area under the curve ( $p = 0.014$ ). Puberty and measures of body composition (BMI SD, waist circumference SD and body fat SD) were not associated with raised ALT.

**Conclusion:** The prevalence of NAFLD is considerable in children with obesity and is associated with components of the metabolic syndrome, especially in those with a positive parental history of type 2 diabetes. It seems likely that NAFLD is an additional obesity comorbidity linked to the metabolic syndrome and possibly should be used as an additional criteria for its classification.

## G26 DEVELOPING AN EVIDENCE BASE FOR THE BRITISH NATIONAL FORMULARY FOR CHILDREN GUIDELINES ON EMPIRICAL ANTIMICROBIAL THERAPY IN NEONATAL SEPSIS

<sup>1</sup>B Muller-Pebody, <sup>1</sup>A Johnson, <sup>1</sup>R Blackburn, <sup>1</sup>C Goodall, <sup>2</sup>P Heath, <sup>2</sup>M Sharland. <sup>1</sup>Health Protection Agency, Centre for Infections, London, UK; <sup>2</sup>St George's Hospital, London, UK

**Objectives:** To review national laboratory surveillance data to determine the relative frequency and antimicrobial susceptibility profile of pathogens involved in neonatal bacteraemia in England and Wales in order to assess the appropriateness of the current British National Formulary for Children (BNFC) guidelines for empirical antimicrobial therapy.

**Design:** All reports of neonatal bacteraemia received under the Health Protection Agency's voluntary laboratory surveillance scheme from January 2006 until March 2008 were extracted from the database for descriptive analysis. The organisms were ranked by frequency and the proportions susceptible to the antimicrobials recommended in the BNFC for early and late onset sepsis were determined.

**Results:** During the study period, the surveillance scheme received 1516 reports of bacteria isolated from blood cultures taken from neonates less than 48 h old and 3482 reports for neonates 2–28 days old. Ninety-eight species were reported but six species accounted for 83% of all isolates. For neonates less than 48 h old, group B streptococcus (GBS) was the most frequent pathogen, accounting for a third of bacteraemias. The second, third and fourth most common bacteria isolated were coagulase-negative staphylococci (CoNS) with 22%, non-pyogenic streptococci (9%) and *Escherichia coli* (9%). For neonates 2–28 days old, CoNS were most frequently isolated (45%), followed by *Staphylococcus aureus* (13%), Enterobacteriaceae (9%), *E coli* (7%) and GBS (7%). The clinical significance of the CoNS isolates was uncertain due to a lack of linked clinical data. The antimicrobial profiles for the five most frequent organisms in each age category revealed a 90% or greater

susceptibility to the currently recommended antibiotic regimes with the exception of CoNS ( $\geq 41\%$  susceptibility) and Enterobacteriaceae ( $\geq 75\%$  susceptibility).

**Conclusions:** On the basis of these data the BNFC's recommendations for empirical antimicrobial treatment in septic neonates appear adequate. There remains a need for more robust prospective, integrated, national, clinical and laboratory surveillance data to enhance the quality of the evidence base.

## G27 UNDERSTANDING LONG-TERM PROTECTION FROM CARRIAGE AND DISEASE FOLLOWING CONJUGATE VACCINES

<sup>1</sup>E Clarke, <sup>1</sup>N Williams, <sup>2</sup>R Heyderman. <sup>1</sup>University of Bristol, Bristol, UK; <sup>2</sup>Malawi-Liverpool Wellcome Trust Clinical Research Programme, Blantyre, Malawi

**Background:** Polysaccharide vaccines are unable to recruit T-cell help in the generation of antibody responses. This limits their capacity to protect infants and to provide long-term protection. Conjugate vaccines overcome this, through the recruitment of T cells via the conjugated carrier protein. Meningococcal conjugate vaccines induce antibody-mediated protection in all age groups and prevent the carriage of meningococcus in the nasopharynx. They also generate evidence of polysaccharide-specific B-cell memory. However, the role of B-cell memory in long-term protection from carriage and disease is unknown. We have investigated the ability of systemic vaccination to induce immunity in the nasopharynx and the mechanisms by which the memory B cells may subsequently be activated. We provide new insights into the way conjugate vaccines may provide long-term protection from carriage and disease in the population.

**Methods:** Adults were vaccinated with a Men C conjugate vaccine and systemic (blood) and nasopharyngeal (tonsillar) responses were examined. ELISpot assays were used to study memory B-cell responses.

**Results:** Both systemic and nasopharyngeal polysaccharide-specific memory B-cell numbers increased significantly following systemic vaccination. The cells did not differentiate into plasma cells in response to stimulation with polysaccharide alone. However, significant differentiation did occur in response to "bystander" CD4 T cells activated with other stimuli including influenza antigens. This was dependent on contact between the CD4 T cells and the B cells. Stimulating the memory B cells with group C or group B meningococci also promoted their differentiation into antibody-secreting plasma cells. This was not solely dependent on T cells, suggesting other bacterial components (eg, lipopolysaccharide) are also capable of stimulating the differentiation of polysaccharide-specific memory B cells.

**Conclusion:** Conjugate vaccination induces nasopharyngeal and systemic polysaccharide-specific B-cell memory. Their differentiation is promoted by "bystander" T cells that may be activated by unrelated antigens such as influenza, as well as through T-cell-independent signals present within meningococcus itself. This provides a mechanism by which long-term protection from carriage, and hence disease, may be maintained through the activation of local memory B cells, in response to other infections or following colonisation with other meningococcal strains.

## G28 IS THE ANION GAP IMPORTANT IN CHILDREN WITH DIARRHOEA AND VOMITING?

<sup>1</sup>R Mathews, <sup>2</sup>D Housley, <sup>2</sup>N Nathwani. <sup>1</sup>Royal Free and University College London Medical School, London, UK; <sup>2</sup>Luton and Dunstable Hospital, Luton, UK

**Introduction:** Diarrhoea and vomiting is a common presentation in young children. Metabolic acidosis is a commonly noted abnormality at admission. The aetiology of the acidosis is frequently believed to be volume depletion (dehydration), although

other causes such as gastrointestinal tract bicarbonate loss are suggested. Young children can develop ketosis readily, and this is frequently overlooked as a cause or contributory factor.

**Aim:** To review acid-base abnormalities in children with diarrhoea and vomiting and assess the importance of anion gap calculations.

**Methods:** We conducted a retrospective audit of blood gases done over a 6-month period, and randomly selected 39 patients who had metabolic acidosis. Data on their presentation and subsequent treatment were retrieved from the notes; including length of illness, food and fluid intake before admission and any fluid resuscitation given during their stay. Standard blood gas parameters, plus anion gap, lactate and documented presence of ketonuria were recorded. The degree of dehydration was assessed from clinical observations, fluid balance and biochemistry (electrolytes, urea, creatinine albumin and lactate). Patients with hypo or hyperglycaemia were excluded.

**Results:** 31 patients were included. The median age of the patients was 18 months and the median duration of illness was 3 days. The median pH was 7.316 (min–max 7.190–7.348). 21/31 patients (68%) had an anion gap greater than 18, with a median of 19.7 (min–max 12.6–24.2). The median lactate was 2.0 mmol/l. Of those who had a urine dipstick on admission 80% had 3+ or 4+ ketones present.

**Conclusion:** High anion gap acidosis is common. Due to the absence of hyperlactataemia and the presence of significant ketonuria, we propose that ketosis plays a major role in the acidosis seen in infants admitted with diarrhoea and vomiting. The importance of the anion gap and documentation of ketonuria is highlighted. If these results are validated, then the provision of glucose (oral or intravenous) as part of fluid resuscitation regimens should be reviewed.

#### G29 THE BRITISH INTESTINAL FAILURE SURVEY: A REGISTRY TO DETERMINE THE FREQUENCY AND OUTCOME OF CHILDHOOD INTESTINAL FAILURE

<sup>1</sup>J Puntis, <sup>2</sup>C Lloyd, <sup>3</sup>H Gowen. <sup>1</sup>The General Infirmary at Leeds, Leeds, UK; <sup>2</sup>Birmingham Children's Hospital, Birmingham, UK; <sup>3</sup>Institute of Child Health, Birmingham, UK

**Aims:** To identify prospectively all cases of intestinal failure (IF) (defined as parenteral nutrition (PN) dependency for  $\geq 28$  days) in UK children in order to anticipate future demands for IF services including home PN and intestinal transplantation.

**Methods:** The registry was set up as a collaboration between the British Society of Paediatric Gastroenterology, Hepatology and Nutrition, and British Association of Paediatric Surgeons. Children under 19 years are eligible for enrolment; premature newborns on PN because of gut immaturity are excluded. Outcome data (PN status; complications; transplantation; death) were solicited at 6-monthly intervals.

**Results:** 23 centres have agreed to participate in the British Intestinal Failure Survey (BIFS), 10 have submitted data; two further centres are currently seeking local trust approval. Between July 2005 and November 2008, 182 children (92 males) were registered; the median age at commencement of PN was 14 days (range 0–17 years). Diagnoses were short bowel syndrome (n = 120), disorder of motility (n = 14), enteropathy (n = 23) and “other” (n = 25). 16 subjects have died (seven before transplant referral, seven on the transplant waiting list and two post-transplant). 84 remain on PN (29 of which are on home PN) and 82 progressed to full enteral feeding. 38 subjects were referred for transplant assessment and 11 were transplanted (three isolated liver, two isolated small bowel and six combined liver and small bowel).

**Conclusions:** The registry has successfully established a national network of paediatric gastroenterologists and surgeons and collected national data on children with IF through this cooperative effort. Maintaining recruitment over time and obtaining follow-up

data will depend on continuing commitment fostered through close links between the BIFS registry manager and reporters in participating centres. Comprehensive reporting of data will provide a powerful tool in discussions with the Department of Health and specialist commissioners with regard to appropriate quality standards and future configuration of services.

#### G30 MONITORING CANCER AND DEATH IN UNINFECTED CHILDREN BORN TO HIV-INFECTED WOMEN IN ENGLAND AND WALES 1996–2006

J Masters, C Peckham, P Tookey. MRC Centre of Epidemiology for Child Health, UCL Institute of Child Health, London, UK

**Aim:** To describe and assess a system for long-term monitoring of cancer and death in children born to HIV-infected women in England and Wales (E&W),<sup>1</sup> most of whom have avoided HIV infection but have been exposed to antiretroviral therapy (ART) in fetal life.

**Methods:** Surveillance of obstetric and paediatric HIV is carried out through the National Study of HIV in Pregnancy and Childhood (NSHPC);<sup>2</sup> data collected include timing and type of ART exposure. Cancers and deaths in individuals born in E&W can be monitored by “flagging” them on the central health register inquiry system (CHRIS). As names are not available to the NSHPC, cases first need to be matched with entries in the births and deaths registration database (BDRD) using demographic variables. In 2002 an algorithm was devised that enabled a high proportion of cases to be correctly matched and flagged. The NSHPC is notified of cancer and death registrations.

**Results:** By September 2008, 6303 births to HIV-infected women in E&W, in 1996–2006, had been notified to the NSHPC. Before 2002, 352 children born in 1996–2000 were matched on the BDRD and flagged on CHRIS (33% of eligible cases). Since 2002, 4964 children born in 2001–6 have been flagged (96% of eligible cases). An additional 16 children were matched on the BDRD but were not flagged because of adoption or other issues. Of the total 5316 flagged children, 89% are known to be uninfected, 4% are infected and 7% indeterminate. 93% of the uninfected/indeterminate children were exposed to ART (76% to more than two drugs). Nine deaths in uninfected children have been notified (two occurred after NSHPC follow-up of the child had ceased) and 23 in indeterminate children. Causes of death were: complications of prematurity (15); sudden infant death syndrome (two); accidents (three); congenital abnormalities (eight) and infections (four). Only one cancer in an uninfected child has been notified to date: ocular cancer diagnosed at 18 months of age, after NSHPC follow-up of the child had ceased.

**Conclusion:** A high proportion of ART-exposed children born in E&W are being successfully monitored for death and cancer, and it is reassuring that only one cancer has so far been reported in the uninfected group. The challenge now is to secure long-term commitment to both the flagging protocol and the infrastructure needed to respond to any significant findings.

1. Hankin *et al.* *AIDS* 2007;**21**:867–9.
2. Townsend *et al.* *Br J Obstet Gynaecol* 2008;**115**:1078–86.

#### G31 GROWTH FACTORS ARE ASSOCIATED WITH OUTCOME IN MALAWIAN CHILDREN WITH BACTERIAL SEPSIS

<sup>1</sup>L Mankhambo, <sup>1</sup>D Banda, <sup>2</sup>P Balmer, <sup>1</sup>S Nkhoma, <sup>1</sup>H Phiri, <sup>1</sup>S White, <sup>3</sup>E Molyneux, <sup>1</sup>M Molyneux, <sup>4</sup>CA Hart, <sup>5</sup>E Carrol. <sup>1</sup>Malawi–Liverpool Wellcome Trust Clinical Research Programme, Blantyre, Malawi; <sup>2</sup>Health Protection Agency, Manchester, UK; <sup>3</sup>Department of Paediatrics, College of Medicine, University of Malawi, Blantyre, Malawi; <sup>4</sup>Division of Medical Microbiology, The University of Liverpool, Liverpool, UK; <sup>5</sup>Division of Child Health, The University of Liverpool, Liverpool, UK

**Background:** Bacterial sepsis remains a major cause of death in children globally. The development of newer therapies for sepsis

relies on a better understanding of its pathophysiology. Increased levels of both vascular endothelial growth factor (VEGF) and platelet-derived growth factor (PDGF) have been demonstrated in adults with sepsis. However, their role and significance in paediatric sepsis have not previously been explored.

**Methods:** Children (n = 293) presenting with severe pneumonia or meningitis were recruited into the study. Plasma VEGF, PDGF and fibroblast growth factor (FGF) were measured on admission in a multiplex immunoassay. Healthy children from the community served as controls.

**Results:** Median plasma VEGF, PDGF and FGF concentrations were significantly higher in children with sepsis than in controls (91.0 pg/ml vs 12.3 pg/ml,  $p < 0.0005$ , 1078.0 pg/ml vs 437.9 pg/ml,  $p = 0.02$  and 235.9 pg/ml vs 44.5 pg/ml,  $p < 0.0005$ , respectively). There was no difference in median VEGF, PDGF and FGF concentrations between HIV-infected and HIV-uninfected children. VEGF, PDGF and FGF concentrations were higher in survivors than in non-survivors, but only PDGF remained significantly increased after controlling for HIV status (1209.3 pg/ml vs 796.9 pg/ml,  $p = 0.001$ ). Using a logistic regression model and controlling for HIV, only PDGF greater than 1400 pg/ml remained significantly associated with a 66% reduction in the risk of death (odds ratio 0.34, 95% CI 0.17 to 0.67).

**Conclusions:** VEGF, PDGF and FGF levels are increased in paediatric sepsis but are not influenced by HIV status. Lower VEGF, PDGF and FGF levels are associated with an unfavourable outcome in children with bacterial sepsis, and low PDGF levels are independently associated with mortality. The molecular mechanisms by which PDGF might contribute to a favourable outcome need to be explored further.

### G32 A SINGLE-CENTRE EXPERIENCE OF ADALIMUMAB FOR INDUCTION OF REMISSION IN REFRACTORY PAEDIATRIC CROHN'S DISEASE

R Srinivasan, S Khan, L Brooke, AK Akobeng, AG Thomas, AO Fagbemi. *Booth Hall Children's Hospital, Manchester, UK*

**Aim:** We aimed to describe our single-centre experience of using adalimumab, a fully human monoclonal antibody to tumour necrosis factor alpha (TNF $\alpha$ ), in children with refractory Crohn's disease.

**Methods:** All subjects received a loading dose of adalimumab at 24 mg/m<sup>2</sup> followed 2 weeks later with a maintenance dose, which was then continued 2-weekly. The Paediatric Crohn's disease activity index (PCDAI) was used to define: (1) remission (PCDAI <10 at 12 weeks of treatment); (2) response (PCDAI  $\leq$ 30 or a reduction of 15 points from baseline at 12 weeks); or (3) lack of response (PCDAI >30, an increase in PCDAI  $\geq$ 15 after starting treatment). One-tailed p values for a reduction of PCDAI scores were computed by comparing medians of distribution of PCDAI at baseline, 6 weeks and 12 weeks using the Wilcoxon matched-pairs signed rank test (non-parametric).

**Results:** Prospectively collected data on 15 patients (nine male, six female) treated with adalimumab at our centre since March 2007 were reviewed. The median age at diagnosis was 10.3 years (3.84–15.59). Adalimumab was started at a median age of 14.74 years (5.53–16.89). The last infliximab infusion before commencement of adalimumab was 4 weeks (2–156)—mode. The reason for starting adalimumab was allergy to infliximab in five subjects and lack of response to it in the remaining 10, respectively. Data including clinical and laboratory parameters for the PCDAI were available on 10 and seven subjects, respectively, at 6 and 12 weeks. PCDAI at baseline (median) was 32.5 (15–60) at 6 weeks: 11.5 (2.5–35); n = 10, and at 12 weeks: 12 (2.5–15); n = 7. The reduction in PCDAI between baseline and 6 weeks was significant ( $p = 0.002$ ) as was the reduction between baseline and 12 weeks ( $p = 0.007$ ). At 12 weeks of treatment, data were available on seven

patients—three were in remission, four were showing response. No adverse effects related to adalimumab use have been recognised or reported in the subjects studied so far.

**Conclusion:** Adalimumab seems to be useful in inducing remission and disease response in children with refractory Crohn's disease. Significant reductions in PCDAI occur from baseline within 6 weeks of treatment, maintained at 12 weeks.

### G33 BIOLOGICAL THERAPY FOR PAEDIATRIC INFLAMMATORY BOWEL DISEASE: A NATIONWIDE "REAL LIFE" EXPERIENCE

<sup>1</sup>DC Wilson, <sup>1</sup>M Wilson, <sup>2</sup>G Mahdi, <sup>3</sup>R Russell. <sup>1</sup>*Child Life and Health, University of Edinburgh, Edinburgh, UK;* <sup>2</sup>*Paediatric Gastroenterology, Royal Aberdeen Children's Hospital, Aberdeen, UK;* <sup>3</sup>*Paediatric Gastroenterology, Yorkhill Hospital, Glasgow, UK*

**Background and Aims:** Biological agents are increasingly used as treatment for paediatric inflammatory bowel disease (IBD) in the UK, yet the evidence base is very limited and safety concerns are rising. We aimed to evaluate the pattern of usage, effectiveness and safety in the clinical setting using a Scottish national framework.

**Methods:** Usage of the biological agents infliximab, adalimumab and natalizumab for the treatment of paediatric IBD (aged <18 years of age at start of biological treatment) from 1 January 2000 to 31 October 2008 was collated in a retrospective audit. Treatment was administered by members of the Scottish Paediatric Gastroenterology, Hepatology and Nutrition Group (all regional centres and interested district general hospitals in Scotland).

**Results:** 76 children had one or more biological agent administered from a median (range) age of 14.3 years (6.6–17.9); 34 (45%) were female and 73 had Crohn's disease (CD), three had ulcerative colitis (UC) and one had indeterminate colitis. Twelve (16%) had trials of two biological agents. 74 children (70 CD) had infliximab, with a median (range) of four (1–25) infusions and all with moderate–severe IBD. 26 entered remission, 25 responded and 23 had no response. 34 had induction only, 14 had induction then episodic (10 then to maintenance) and 26 had induction/maintenance. Seven of 36 (19%) required escalation of therapy. 10 (13%) had infusion events, with two having anaphylaxis and six reactions led to discontinuation. One child developed a lupus-like reaction and one severe infection, with no deaths. 10 (13%) proceeded to adalimumab. 12 children (all CD) had adalimumab, with a median (range) of 20 (4–38) doses and all with moderate–severe IBD. Five entered remission, three responded and four had no response. All proceeded to maintenance and six (50%) required escalation of therapy. 11 had pain at the injection site and none had reactions leading to discontinuation. One child developed leucopaenia and one had a severe viral infection, with no deaths. Two children with CD had natalizumab, both in a trial, and both proceeded to infliximab after the agent was withdrawn.

**Conclusions:** Biological agents are effective in severe IBD in the clinical setting, but there are significant chances of the need for dose escalation or multiple biological usage and there are safety issues.

### G34 LIFE-THREATENING SEPSIS DURING HOME PARENTERAL NUTRITION MAY BE AN INDICATION FOR FOSTER CARE

V Zamvar, G Lazonby, J Puntis. *Leeds General Infirmary, Leeds, UK*

While offering an improved quality of life, home parenteral nutrition (HPN) burdens parents with major responsibilities. Although recurrent life-threatening catheter-related bloodstream infection (CRBSI) is an indication for intestinal transplantation (ITx), it may also reflect unrecognised parental difficulty with management compliance.

**Aims:** To review HPN patients with life-threatening CRBSI and assess the impact of a change of carers on clinical progress.

**Methods and Results:** A case note review revealed that out of 37 children enrolled into an HPN programme, two had frequent and

severe CRBSI requiring repeated admission to the paediatric intensive care unit (PICU). After full assessment, both were recommended for ITx. An 8-month-old girl with small bowel sepsis (SBS) secondary to complicated gastroschisis was discharged home on parenteral nutrition. Both parents were willing to undertake home care and were judged technically competent after training. There were complex social and financial issues in the family, and although well supported by hospital nutrition and community nurses, there was little input from social services. Over the next 3 years she had 32 episodes of CRBSI, with three admissions to the PICU for cardiorespiratory support and haemofiltration on one occasion. The parents appeared slow at recognising signs of sepsis, did not visit during hospital admissions and eventually admitted to not being able to cope. Subsequently discharged into foster care, there has been only one episode of CRBSI in 3 years, managed simply with antibiotics. Her overall general progress is excellent. A 3-month-old girl with SBS secondary to neonatal volvulus was discharged on HPN. Her single mother was willing and competent to take on this responsibility, and over the first 15 months there were five episodes of CRBSI. During the next 15 months she had 16 episodes of CRBSI, with four admissions to the PICU. Following discussions with the family and social services, the child went into voluntary foster care with the grandparents. Six months later, there have been no further episodes of CRBSI and she is doing well.

**Conclusion:** Life-threatening CRBSI is a major complication of HPN; strict adherence to care protocols reduces the risk. Carers may appear technically competent when formally assessed, but the burden of responsibility compounded by other family difficulties may result in adverse outcomes. Comprehensive assessment and social work support should be integral to an HPN service. Change of carer may be more appropriate than ITx.

**G35 EFFECTIVENESS OF OMEGAVEN IN REDUCING CONJUGATED BILIRUBIN DURING LONG-TERM PARENTERAL NUTRITION**

V Zamvar, D Hartigan, J Puntis. *Leeds General Infirmary, Leeds, UK*

Intestinal failure-associated liver disease (IFALD) is a major cause of morbidity and mortality in children requiring long-term parenteral nutrition (PN). It has been suggested that fish oil emulsion (omega 3 fatty acids) ameliorates IFALD by improving bile flow, inhibiting steatosis and through an immunomodulatory effect.

**Aims:** To review experience of the effectiveness of Omegaven in IFALD in a regional intestinal failure unit.

**Methods:** Retrospective case note review over 30 months (March 2006 to September 2008) of patients with severe IFALD (conjugated bilirubin >100 µmol/l) who failed to respond to treatments including ursodeoxycholic acid, reduction in parenteral fat intake, substitution of Clinoleic (olive oil based) for Intralipid (soya based) fat emulsion. Omegaven (10% fish oil emulsion) was given at a dose of 1 g/kg per day together with 1 g/kg 20% Clinoleic. The effect on plasma conjugated bilirubin was assessed.

**Results:** Among 20 patients who received PN for more than 3 months during this period (14 home PN, six hospital), nine had severe IFALD (bilirubin 100–200 µmol/l, n = 6; bilirubin >200 µmol/l, n = 3) and were treated with Omegaven. Soon after the commencement of treatment one patient underwent small bowel transplantation and another was transferred to a different hospital, both being lost to the study. A further infant died from liver failure without showing a fall in bilirubin. There was a marked fall in conjugated bilirubin in six patients; of those four who remained PN dependent, bilirubin fell to normal in three and to less than 50 µmol/l in one. There were no adverse side effects noted with the use of Omegaven.

**Conclusions:** Our experience is in accordance with published reports that the introduction of fish oil emulsion into PN for children with IFALD appears to be safe, and may be associated with a fall in the

plasma bilirubin concentration. A prospective randomised trial will be necessary to evaluate fully the role of this nutritional intervention in the prevention or management of IFALD.

**G36 CAN PAEDIATRIC PROFESSIONALS RELIABLY IDENTIFY PALE STOOL?**

<sup>1</sup>B Vadamalayan, <sup>1</sup>M Akindolie, <sup>2</sup>A Sutcliff, <sup>1</sup>A Baker. <sup>1</sup>*Kings College Hospital, London, UK;* <sup>2</sup>*University College London Hospital, London, UK*

**Introduction:** Biliary atresia is an important surgically remediable cause of neonatal cholestasis. Early recognition by the identification of abnormal (pale) stool colours allows earlier surgery and better results. Unfortunately, there are no objective means of identifying abnormal stools. Before designing a measurement device, we wished to know how reliably trained professionals can recognise pale stools.

**Methods:** Following ethical approval, stools were collected from normal and cholestatic infants and photographed against a white background with a colour calibration card. The colours were standardised by computers to allow for ambient light. Photographs of five normal, three indeterminate and four acholic stools were chosen and were shown to professionals with a questionnaire asking them to classify each stool as “healthy” or “suspect”.

**Results:** A total of 81 questionnaires was completed by 36 paediatric doctors and 45 paediatric nurses in three London teaching hospitals, one of them is a national referral centre for paediatric liver disease (see table).

**Abs G36 Table Results**

Stool	Normal	Suspect
Hospital “A” (referral centre)		
Correct	69/100 (69%)	93/139 (66.9%)
Incorrect	31/100 (31%)	46/139 (33.1%)
Hospital “B”		
Correct	121/205 (59.0%)	186/287 (64.8%)
Incorrect	84/205 (41%)	101/287(35.2%)
Hospital “C”		
Correct	70/95 (73.7%)	72/133 (54.1%)
Incorrect	25/95 (26.3%)	61/133 (33.1%)

**Conclusions:** There were no significant differences between the three institutions or between doctors and nurses in identifying pale stools, but doctors were better than nurses at identifying normal stools (71.5% vs 58.5%). Professionals can not recognise suspect stools to the level of reliability required for identification of biliary atresia. There is a need for objective methods of identifying stool colour.

**G37 IS TAUROLOCK THE ANSWER TO RECURRENT CENTRAL VENOUS CATHETER INFECTIONS?**

<sup>1</sup>B Krishnamurthy, <sup>1</sup>J Puntis, <sup>2</sup>R Tomar, <sup>3</sup>V Zamvar, <sup>1</sup>G Lazonby, <sup>2</sup>J Brind, <sup>2</sup>V Horn, <sup>2</sup>S Hill. <sup>1</sup>*The General Infirmary, Leeds, UK;* <sup>2</sup>*Great Ormond Street Hospital for Children, London, UK;* <sup>3</sup>*The Calderdale Royal Hospital, Halifax, UK*

**Introduction:** Sepsis is a major complication of the use of central venous catheters (CVC). The main source of catheter-related bacteraemia (CRB) and subsequent septicaemia is the bacterial biofilm within the catheter lumen. Leaving a solution containing antibiotic-anticoagulant in the CVC when not in use may prevent CRB. One such substance is TauroLock (Bio-Implant HealthCare, Winsen, Germany) containing 1.35% taurolidine, a derivative of the amino acid taurine.

**Aim:** To review the effect of TauroLock in reducing the number of septic episodes in children on long-term home parenteral nutrition (HPN) administered via CVC.

**Methods:** Six patients aged 18 months to 10 years with intestinal failure on HPN with recurrent sepsis were studied. The incidence of line sepsis 6 months before and up to 6 months after starting Taurolock was studied. CVC were instilled with 0.7–2 ml Taurolock daily after disconnecting the parenteral nutrition infusion.

**Results:** The number of septicemic episodes 6 months before starting Taurolock was 11 (nine bacterial and two candida) and there has been one episode after starting it. A second child has had positive cultures for candida via the CVC, but no systemic illness. One patient had had 11 CVC inserted from September 2005 to February 2008 with 24 positive blood cultures (12 coagulase-negative staphylococci, seven Gram-negative sepsis, five candida). Since starting Taurolock in January 2008 there have been no positive blood cultures. None of the children had an underlying immunodeficiency. No significant side effects to Taurolock were noted.

**Conclusion:** The use of Taurolock reduced the number of episodes of catheter-related sepsis without causing side effects. Further larger studies on the use of Taurolock are warranted.

### G38 ANAPLASTIC LARGE-CELL LYMPHOMA IN A CHILD WITH COELIAC DISEASE: A CASE REPORT

J Sharp. Alder Hey Hospital, Liverpool, UK

Coeliac disease is an autoimmune condition reported to occur in up to 1% of the population. The association between coeliac disease and lymphoma in the adult population is well recognised. However, in children with coeliac disease, reported cases of lymphoma (either intestinal or extra-intestinal) are unusual.

We report a case of extra-intestinal anaplastic large-cell lymphoma (ALCL) occurring in a 10-year-old girl, previously diagnosed with insulin-dependent diabetes at the age of 6 years. She had been referred to a tertiary unit for further investigation after presenting to her local hospital with weight loss, following which it was discovered a previous coeliac screen had been positive, 4 years earlier. A diagnosis of lymphoma was suspected when it emerged the young girl had clinical features that could not be fully explained by coeliac disease alone. As well as having the diagnosis of coeliac disease confirmed, an inguinal lymph node biopsy showed the presence of a T-cell non-Hodgkin lymphoma, specifically ALCL.

Since the 1980s there have been less than 25 cases of malignancy in children with coeliac disease documented in the literature, only a proportion of these were lymphomas. In adult patients there is a well recognised association between gastrointestinal lymphoma and coeliac disease, and an increasing recognition of an association between coeliac disease and non-gastrointestinal lymphomas. ALCL, in particular, is 24 times more common in adult patients with coeliac disease compared with controls. However, strict compliance with a gluten-free diet is known to protect against this increased risk of malignancy. As well as identifying a further case of malignancy in a child with coeliac disease, the case raises questions regarding the use of gluten-free diets, malignancy and whether or not being on such a diet has the same significance in children as it does in adult patients; that is, was the delay in the diagnosis of coeliac disease, and hence a delay in starting a gluten-free diet, somehow associated with the patient developing ALCL.

### G39 PAINFUL CENTRAL VENOUS CATHETERS

V Zamvar, G Lazonby, J Puntis. Leeds General Infirmary, Leeds, UK

Central venous catheters (CVC) are used for patients who require long-term chemotherapy or parenteral nutrition (PN). Commonly recognised mechanical complications include misplacement, occlusion, migration and fracture.

**Aim:** We report two cases of children with intestinal failure and indwelling CVC who complained of severe pain under the arm or in the neck on flushing the catheter. Radiological investigation revealed CVC fracture in each case, with fluid leakage into the skin tunnel in one, and venous backflow probably related to sleeve thrombus in the other.

**Case 1:** An 8-year-old boy with chronic intestinal pseudo-obstruction needed eight CVC over 6 years for PN. Difficulties with venous access meant that the ninth CVC was inserted via the left axillary vein; 3 months after its placement he complained intermittently of sharp pain under his arm each time the catheter was flushed. Blood could be aspirated without difficulty and PN infused well; examination revealed no subcutaneous swelling. This symptom had initially developed after playing on a “fireman’s pole”. Initial chest x ray (CXR) following through CVC injection of contrast showed no abnormality, but when symptoms persisted, a second CXR showed that contrast leaked into the subcutaneous tunnel. The CVC was removed and a fracture was found just distal to the cuff, where the external diameter of the CVC tapered. It is likely that the CVC was weakened by chronic repetitive kinking at this point, finally being ruptured during vigorous play.

**Case 2:** A 6-year-old girl with short bowel syndrome secondary to gastroschisis had multiple replacements of CVC used for PN. Her 13th broviac CVC was inserted into the left subclavian vein with the line tip in the right atrium. Two weeks later it was difficult to withdraw blood but flushed well; 3 weeks later she complained of neck pain each time the CVC was flushed. CXR following contrast injection into the catheter showed an intravascular CVC fracture, with retrograde flow of contrast, probably related to a sleeve thrombus; the fracture is likely to have been related to intermittent external compression by neighbouring bony structures (“pinch-off syndrome”).

**Conclusion:** Pain on flushing a CVC indicates catheter fracture. Different mechanisms may be involved, but CVC replacement is required. Initial CXR should involve contrast injection and visualisation of the entire CVC from the skin exit point to the catheter tip.

### G40 PRESCRIBING TRENDS OF PROKINETICS IN CHILDREN IN THE UK 1990–2006

<sup>1</sup>N Croft, <sup>5</sup>S Mt-Isa, <sup>3</sup>A Sutcliffe, <sup>4</sup>S Tomlin, <sup>6</sup>P Williamson, <sup>2</sup>M Underwood, <sup>5</sup>D Ashby, <sup>1</sup>Barts and the London School of Medicine, Queen Mary, London, UK; <sup>2</sup>Warwick Medical School Clinical Trials Unit, Warwick University, Warwick, UK; <sup>3</sup>Institute of Child Health, University College London, London, UK; <sup>4</sup>Guy’s and St Thomas’ NHS Foundation Trust, London, UK; <sup>5</sup>Imperial College School of Medicine, London, UK; <sup>6</sup>Clinical Trials Unit, Medicines for Children Research Network, University of Liverpool, Liverpool, UK

**Objective:** Drugs are frequently prescribed to children in the absence of a licence or good evidence for efficacy. The aims of this study were to investigate the trends of prescribing of the three prokinetic medications used in gastro-oesophageal reflux (cisapride, metoclopramide and domperidone) in the UK over the period 1990–2006 focussing on the under or over 2 years age group.

**Methods:** The general practice research database UK collects information on approximately 5.5% of the UK population. We extracted data for patients who had been prescribed with cisapride (n = 2005), domperidone (n = 11 369) or metoclopramide (n = 22 610) under the age of 18 years between 1990 and 2006.

**Results:** There was a small increase in the percentage of all children prescribed one of these three medications from 0.09% (1990) to 0.11% (2006). Use in children under 2 years increased from 0.4% to 0.75%, whereas in those over 2 years it decreased from 0.5% to 0.35%. From 1992 the percentage of children under 2 years receiving cisapride increased rapidly until 1999, falling to 0 by 2001 after cisapride was withdrawn. Between 1999 and 2006 there has been a dramatic increase in the proportion of children receiving domperidone, most of this due to a sixfold increase in those under 2 years

of age. There has been a steady reduction in the number of patients receiving metoclopramide at all ages. Differences in regions within the UK were noted with regard to these changes, suggesting different prescribing recommendations.

**Conclusion:** These data show marked changes in the use of cisapride and then domperidone in under 2 year olds despite the lack of either a licence or published evidence to support these changes. This demonstrates the importance of clinical trials and evidence to ensure the appropriate use of medication in children, particularly for off-label use.

#### G41 COLONIC STRICTURES IN PAEDIATRIC CROHN'S DISEASE: A SCOTTISH TERTIARY CENTRE EXPERIENCE

D Basude, K Hassan, G Haddock, P McGrogan. *Royal Hospital for Sick Children, Glasgow, UK*

The incidence and prevalence of paediatric Crohn's disease in Scotland is approximately 3 and 13.7 per 100 000, respectively, with a rising trend. Approximately 24% of these children develop stricturing complications, of which one-third affect the large bowel, presenting with obstructive symptoms. Most of them require elective or even emergency surgery. Despite recent advances, there has been little change in the surgical resection rates. The knowledge of stricture pathogenesis remains relatively limited. The economic burden of Crohn's disease in the UK is £300 million per year and 49% of this is inpatient costs. It is estimated that 40% of this is for surgical intervention and 50% of this is for strictures. We conducted a retrospective study of all children with Crohn's disease requiring surgery over a 15-year period (1991–2006) in the largest Scottish tertiary referral centre. 31 cases were identified, of which nine (30%) had colonic strictures and 19 (61%) had strictures in the terminal ileum. Distal rectal or anal strictures amenable to anal dilatation were not included. All colonic strictures were left sided. The majority (six) had limited resection and three required total colectomy. The mean age at diagnosis was 11.4 years. Typically, the strictures developed 36.8 months after the diagnosis. The induction treatments required were 1.5 per year and six (67%) were steroid dependent. All were on maintenance treatment before developing the stricture. The majority (88%) had poor growth despite optimising the treatment. 88% also had persistent ulcers on repeat colonoscopy in the rectosigmoid region. The exacerbation of symptoms was on average for 6.9 months before the diagnosis of the stricture, with abdominal pain and loose stools being the commonest symptoms. In summary, colonic stricture in children with Crohn's disease in our population is a significant complication, with a higher economic burden. It occurs on the left side of the colon 3 years after diagnosis. The majority are steroid dependent and have poor growth and thus require a high index of suspicion. A better understanding of the pathophysiology and disease characteristics is required to prevent the development of this complication and thus reduce the associated morbidity and costs of surgery.

#### G42 TOTAL PARENTERAL NUTRITION IN PRETERM AND EXTREMELY LOW BIRTH WEIGHT INFANTS: ARE WE PROVIDING ADEQUATE NUTRITION?

L McGrory, J Mallon, C Mayes. *Regional Neonatal Unit, RJMH, Belfast, Northern Ireland, UK*

**Aims:** A comparison of calories provided by total parenteral nutrition (TPN) with and without the use of insulin, against Tsang standards. A review of calorie delivery when established on enteral feeds and associated growth velocity.

**Methods:** We retrospectively identified infants from the neonatal intensive care unit (NICU) admission book with birth weights of less than 1000 g, throughout 2007. Each infant's TPN and fluid prescriptions were reviewed and calorie delivery at days 0, 1 and

#### Abs G42 Table Number of infants in each subgroup

	Day 0–1* (%)	Transition† (%)	Full feeds‡ (%)	Growth velocity§ (%)
Below range	11 (44)	0	0	8 (32)
In range	12 (48)	3 (12)	24 (96)	10 (40)
Above range	2 (8)	22 (88)	1 (4)	7 (28)

\*40–60 kcal/kg per day; †75–100 kcal/kg per day; ‡105–150 kcal/kg per day; §15–25 g/kg per day.

transition (defined as 50% of fluid requirement tolerated enterally) was calculated. For babies requiring insulin, daily calorie delivery was calculated. The day of first feed, type of milk commenced and time to establish full enteral feeds were noted. Once full enteral feeds had been established for one week, we calculated calorie delivery and growth velocity.

**Results:** A total of 40 babies was identified. Of these, 15 were excluded (nine deaths, two transfers in, two transfers out and two unknown). This left 25 infants. As day 0 can be of variable length, we averaged calorie delivery over days 0 and 1 (see table). 13 infants (52%) required insulin. All infants met the minimum calorie target, with a mean calorie prescription of 95 kcal/kg per day. Enteral feeds were commenced between days 1 and 16 with 100% use of human milk. Days to establish full feeds ranged from 10 to 45.

**Conclusions:** Appropriate nutrition must be a priority in the NICU. We postulate that 44% of infants did not meet their energy requirements on days 0–1 as they would usually commence 10% dextrose on admission to the NICU. There can be a variable length of time before TPN is started and lipids are not always commenced on day 0. We must ensure that the prescription of both is prompt and appropriate. Hyperglycaemia is being treated with insulin while providing adequate calories. Our disappointing growth velocity statistic may reflect the variation at which full enteral feeds were achieved.

#### G43 HEPATIC OSTEODYSTROPHY IN CHILDREN WITH PROGRESSIVE FAMILIAL INTRAHEPATIC CHOLESTASIS

S Ross, P McClean, S Rajwal, S Davison. *Children's Liver and GI Unit, St James's University Hospital, Leeds Teaching Hospitals NHS Trust., Leeds, West Yorkshire, UK*

**Aim:** Progressive familial intrahepatic cholestasis (PFIC) encompasses a group of autosomal recessive disorders caused by the defective transport of bile salts from the hepatocyte into the canaliculus. Some children have severe bone disease resulting in fractures whereas others escape this complication. The aim of this small pilot study was to examine possible factors associated with severe bone disease.

**Methods:** Case notes of all children with PFIC attending a supraregional paediatric liver unit were reviewed.

**Results:** 23 children were included in the study. Median age at presentation to hospital was 7 weeks (range 2–68). Mean birth weight was 3.1 kg (95% CI  $\pm 0.2$ ) and mean gestation at birth 38<sup>+5</sup> weeks (95% CI  $\pm 0.67$ ). 74% were Asian. 14 (61%) children presented with neonatal jaundice. Other modes of presentation included failure to thrive (17%), abnormal liver function without jaundice (22%), hypocalcaemia (13%), late onset jaundice (8.7%) and pruritus (4.3%). Nine children had fractures. In eight the lower limb was involved and in five there were multiple fractures. There was no difference in the sex ratio, ethnicity, mean birth weight, median age at presentation and number of children needing a liver transplant between the two groups. Of the nine children with fractures, seven had x rays available and all had features of rickets. All nine children with fractures had episodes of hypocalcaemia but six (67%) required treatment with intramuscular vitamin D and/or prolonged courses of intravenous calcium. Of the 14 children

without fractures, x rays were available in 11 children, six (55%) of whom had evidence of rickets. Five (36%) patients in this group required intramuscular vitamin D and/or intravenous calcium therapy. The weighted  $z$  score at 6 months of age was significantly worse in the fracture group. Thereafter, up to 6 years follow-up, there was no significant difference in the weighted  $z$  score between the groups. Genetic mutations and immunohistochemistry studies were only available for 17 children and did not seem to distinguish between the two groups.

#### G44 INVESTIGATION OF BABIES WITH PROLONGED NEONATAL JAUNDICE: AUDIT OF LOCAL PRACTICE AND DESIGN OF ELECTRONIC SOFTWARE TO AID THE IMPLEMENTATION OF A SIMPLIFIED PROTOCOL

MO Ogundele, S Jones. *Royal United Hospital, Bath, UK*

Prolonged neonatal jaundice (NNJ) is defined as jaundice persisting beyond 2 weeks of age in term babies and 3 weeks in preterm babies. Biliary atresia is the main liver disorder that benefits from early diagnosis, but other conditions can also be detected. The Children's Liver Disease Foundation together with the Department of Health have launched the "Yellow alert" campaign to promote awareness of the early identification of liver disease in infants and appropriate referral. Several audits of local clinical practice have confirmed that there is insignificant yield from routine screening of babies with prolonged jaundice with a battery of tests including the thyroid function test and full blood count. Many paediatric departments in the UK have now adopted a new protocol of selective screening with split bilirubin levels and urine testing, supplemented with others based on clinical grounds.

**Aims:** We aimed to design an easy-to-use, user-friendly desktop Windows application for general practitioners and paediatricians as a quick reference for the investigation of children with prolonged NNJ based on the local protocol. It aims to provide a rational basis for the cost-effective choice of investigations and a high index of suspicion for identifying babies who require more detailed assessment.

**Methods:** We have conducted a local audit of our protocol based on clinical-based risk assessment and rationalised investigation procedures. The designed software is based on Windows Microsoft Access, which is widely available in most hospitals.

**Results:** After 2 years of implementation, the local protocol was found to be cost effective and safe. No patient with any serious liver disease was missed. The software provides a list of important information required during the clinical assessment of the patient including feeding history and ethnicity, a list of recommended investigations depending on the clinical status, guidance on when a senior review or specialist follow-up is required. It is intuitively easy to use and requires no advanced computer skills.

**Conclusion:** We have designed an easy-to-use simple electronic assistant with an intuitively easy-to-use interface for implementing a rationalised protocol for the investigation of babies with prolonged neonatal jaundice.

#### G45 CHILDREN WITH CANCER HAVE HIGH NEEDS FOR NUTRITION SUPPORT

<sup>1</sup>AL Koh, <sup>1</sup>HM Lee, <sup>1</sup>L Stewart, <sup>2</sup>A Edgar, <sup>1</sup>DC Wilson. <sup>1</sup>*Child Life and Health, University of Edinburgh, Edinburgh, UK;* <sup>2</sup>*Haematology-Oncology, Royal Hospital for Sick Children, Edinburgh, UK*

**Background and Aim:** Nutritional issues are a major concern in the management of children with cancer. Undernutrition increases the risk of comorbidities and infection, affects tolerance to chemotherapy or radiotherapy and influences overall survival; obesity is common in survivors. Assessing nutrition and identifying patients at risk of malnutrition is often poorly done and a

universally accepted screening system to detect undernutrition in these children is not yet available. We aimed to identify specific parameters that would assess the degree of nutritional risk in children with cancer, with the need for nutritional support used as a proxy of nutritional risk.

**Methods:** This is a retrospective cohort study of children (<18 years) diagnosed with cancer between November 2001 and November 2006 in a regional centre serving 1.25 million people. We reviewed the need for nutritional support of children—oral protein calorie supplements, enteral tube feeding (via nasogastric or percutaneous endoscopic gastrostomy tube) and total parenteral nutrition (TPN). We analysed growth data at four time points (premorbid; diagnosis; off-treatment and last review).

**Results:** 69 of the 147 patients were male (47%), with a median age (range) at diagnosis of 5.6 years (0.1–17.7). The overall survival rate was 77% ( $n = 113$ ). Nutritional support was received by 63 patients (43%), of whom 40 had solid tumours and the remainder had haematological malignancies. 55%, 64% and 78% of children with central nervous system tumours, bone tumours and acute myeloblastic leukaemia (AML), respectively, required nutritional support. Of 63 patients who received nutritional support, 65%, 71% and 44% received calorie supplements, enteral tube feeding and TPN, respectively. Body mass index centiles could not be determined due to missing height data. Weight centiles demonstrated an overall increase in the numbers of both obese and undernourished patients at four time points (premorbid; diagnosis; off-treatment and last review).

**Conclusions:** Almost half of children undergoing treatment for cancer required nutritional support. Children with central nervous system and bone tumours and AML appear to have a high risk of requiring nutritional support, probably reflecting more intensive treatment regimens. Further evaluation of the data gathered in this study will be used to develop a scoring system to identify children at low, medium or high risk of malnutrition who will need nutritional support.

#### G46 CONDITIONS ASSOCIATED WITH RECTAL PROLAPSE IN CHILDREN: A SYSTEMATIC REVIEW

JL Sharp, S Loganathan, SK Sampath, DH Casson, MKH Auth. *Alder Hey Children's Hospital NHS Foundation Trust, Liverpool, UK*

**Background:** Rectal prolapse is a self-limited condition most common in children below 3 years of age. Chronic constipation, acute diarrhoea and cystic fibrosis are described as the most frequent aetiologies in developed countries; however, there are few data about the frequency of other underlying factors. Therefore, we reviewed the experience of patients referred with rectal prolapse to our hospital during the past 7 years.

**Methods:** A retrospective analysis of all cases of rectal prolapse referred to our hospital from 2000 to 2007 was performed by systematic review of outpatient summary letters and records of the hospital information system.

**Results:** 65 patients were identified with rectal prolapse. The age at presentation ranged from 1 to 17 years, the median being 4 years. 67% (43 cases) of patients were male and 33% (22 cases) were female. Associated diagnoses recorded in the correspondence included constipation (62%,  $n = 40$ ); chronic diarrhoea (6%,  $n = 4$ ); colonic polyp (2%,  $n = 1$ ); rectovaginal anomaly (2%,  $n = 1$ ); enterobius vermicularis infestation (5%,  $n = 3$ ); ulcerative colitis (2%,  $n = 1$ ); coeliac disease (2%,  $n = 1$ ); cystic fibrosis (2%,  $n = 1$ ) and no other factor identified (17%,  $n = 13$ ). Investigations included rectal biopsy ( $n = 4$ ), lower gastrointestinal endoscopy with biopsy ( $n = 12$ ), sweat test ( $n = 26$ ), coeliac screening ( $n = 8$ ), examination under anaesthesia ( $n = 3$ ). In all patients with chronic constipation (62%), laxatives were consistently prescribed, in contrast to 38% ( $n = 25$ ) of patients without constipation. A causal therapy was applied in 16/25

of these patients according to the disease identified. 11/65 of patients underwent a surgical procedure.

**Conclusion:** Although constipation was identified as the most common association, it was not defined as a feature in 38% of patients. A possible causal factor was identified in 16/25 of non-constipated children. This review will form the basis of future work to understand and manage this painful and distressing condition.

#### G47 CLINICAL OUTCOME OF PATIENTS WITH COMPLICATED MECONIUM ILEUS AT 5, 10 AND 15 YEARS

V Krishnappa, M Thomson, D Campbell, N West, C Taylor. *Sheffield Children's Hospital, Sheffield, UK*

**Aims:** Meconium ileus is a form of neonatal intestinal obstruction caused by an abnormal thickened meconium within the terminal ileum. Meconium ileus is the presenting symptom in 20% of patients with cystic fibrosis (CF). Approximately half of these patients present with complicated meconium ileus. The aims of the present study were to assess the clinical outcomes of patients with complicated meconium ileus at 5, 10 and 15 years.

**Methods:** Clinical records of CF patients with complicated meconium ileus admitted to our hospital from 1987 to 2003 were examined and the date of birth, gestational age, weight, height, genotype, type and extent of surgery and duration of parenteral nutrition were recorded. Also annual review records were accessed to determine clinical status at 5, 10 and 15 years.

**Results:** Clinical records of 17 patients (five females) were reviewed. All but four were term. 13 were homozygous to  $\Delta F508$ . Patients received parenteral nutrition for a median of 24 days (10–120 days). The median weight, height, forced expiratory volume in 1 s, forced vital capacity, Schwachman score, at 5 years were 16.9 kg (13.6–23), 105 cm (102–120), 82% (36–121), 82% (36–121) and 82 (58–93); at 10 years were 30.4 kg (25–39), 134 cm (127–140), 76% (66–72), 76% (42–98) and 85 (65–87); and at 15 years were 52 kg (28–65), 161 cm (135–170), 77% (63–104), 80% (77–99) and 71 (57–79). Increased echogenicity on ultrasound implying abnormal liver function was observed in 36%, 70% and 85% of patients at 5, 10 and 15 years, respectively.

**Conclusion:** This study presents the clinical outcome in patients with complicated meconium ileus. Further studies comparing the outcome of CF patients with complicated meconium ileus with those having simple meconium ileus as well as those without meconium ileus are needed in order to provide better prognostic information, and facilitate the search for modifier genes.

#### G48 ASSESSMENT OF USE OF MODIFIED STROBEL FORMULA IN PH CATHETER PLACEMENT: A PROSPECTIVE STUDY

S John, P Ambadkar, M Bagha, B Bhaduri. *Maidstone General Hospital, Maidstone, UK*

**Introduction:** Gastro-oesophageal reflux is a common disorder seen in infancy and childhood. Early diagnosis and intervention is essential for the prevention of complications and management. Oesophageal pH monitoring is the gold standard technique for the detection of acid gastro-oesophageal reflux episodes, and correct placement of the catheter is crucial. The Strobel formula ( $0.252 \times \text{height} + 5$ ) is frequently used as a guide to determine distance from the nostrils to the lower oesophageal sphincter in term infants. Our experience showed that pH catheter placement was overestimated using the Strobel formula. A study using a modified Strobel formula was carried out to assess accuracy. The modified Strobel formula was calculated as follows: (1) infants <12 months ( $\text{height} \times 0.252 + 2$  cm); (2) older children >12 months ( $\text{height} \times 0.226 + 4.6$ )  $\times$  0.87 cm.

**Aim:** To compare the accuracy of Strobel formula and modified Strobel formula measurements in the correct placement of the catheter.

**Subjects and Methods:** Prospective data on 15 patients were collected between November 2006 and July 2008. The total number

of investigations studied was 16 as one patient had two pH studies done (aged 44 days and 273 days). The double sensor and single sensor probe was used in 13 and three studies, respectively. The double sensor probe was changed to single sensor during the course of the study, as the manufacturing company had changed double sensor probe production to single sensor probe. The length of catheter was calculated using Strobel and modified Strobel formulae. Catheter placement was done using the modified Strobel formula in 15 patients and the Strobel formula in one patient. The standard was a radiological check of the catheter tip position between T8 and T10. The probe position was checked by x ray in each case by an experienced radiologist. Comparison was made between the two calculated lengths for each patient and the most accurate length was identified. The probe was adjusted if the tip was outside T8–T10 to T9.

**Results:** The 15 patients included in this study ranged in age from 3.5 weeks to 64 weeks (male  $n = 7$ , female  $n = 8$ ). The mean age was 19.3 weeks and median age was 13.4 weeks. Two subjects (32 + 2 weeks) entered the study at a corrected gestational age of 35 + 6 weeks. 10/16 (62.5%) catheter placements had x ray confirmation between T8 and T10. Seven catheters needed no repositioning and three catheters, although placed between T8 and T10, were slightly readjusted. Six catheters (37.5%) needed repositioning. The modified Strobel formula (12/16) was identified as more accurate (75% of cases) than the Strobel formula (four/16) in obtaining the correct placement of the catheter.

**Summary and Conclusion:** This study showed that the modified Strobel formula was more accurate than the Strobel formula in probe placement. The data are inadequate to show accuracy in children aged more than 12 months. Radiographic confirmation of the catheter position must be considered when using any formula.

#### G49 A DECADE OF COELIAC DISEASE IN A DISTRICT GENERAL HOSPITAL: CHANGING CLINICAL PATTERNS?

U Kumbattae, N Ayub. *University Hospital North Staffordshire, Staffordshire, UK*

**Aims:** To determine the pattern of the clinical presentation of coeliac disease in a district general hospital over a decade.

**Methods:** A retrospective study on the clinical presentation of coeliac disease in children at the Shrewsbury and Telford Hospitals over two periods: 1996–2000 and 2001–5.

**Results:** The total number of subjects was 51, of whom 20 were diagnosed in the first 5 years (1996–2000) and 31 in the next 5 years (2001–5). A family history of coeliac disease was common in the first study period (50%) but relatively low (16%) in the next period. The majority of children (80%) were less than 7 years old at diagnosis in the first study period compared with the latter period (45%). There was no significant difference in the clinical presentation of these patients over the two study periods. Anaemia, diarrhoea and failure to thrive were the commonest presentations, but recurrent abdominal pain and even constipation were found in up to 20% and 5% of patients, respectively.

**Conclusion:** The diagnosis of coeliac disease has increased over a decade, with children being diagnosed at an older age but the classical symptoms of anaemia, diarrhoea and failure to thrive remain common. Significantly, recurrent abdominal pain and constipation is not uncommon in coeliac disease.

#### G50 CURRENT PHARMACOLOGICAL MANAGEMENT OF GASTRO-OESOPHAGEAL REFLUX IN CHILDREN: AN EVIDENCE-BASED SYSTEMATIC REVIEW

<sup>1</sup>M Tighe, <sup>2</sup>N Afzal, <sup>2</sup>A Bevan, <sup>2</sup>RM Beattie. <sup>1</sup>Poolle Hospital NHS Trust, Dorset, UK; <sup>2</sup>Southampton University Hospitals NHS Trust, Hampshire, UK

**Aim:** To review systematically the evidence base for the medical treatment of gastro-oesophageal reflux in children.

**Method:** We searched PubMed, Adis, Medline, Embase and then hand-searched reviews from the past 5 years for the key words "gastro-oesophageal (or gastroesophageal), reflux, oesophagitis, and child\$ (or infant) and drug\$ or therapy". Articles included were in English and had an abstract. We used the levels of evidence adopted by the Centre for Evidence-Based Medicine in Oxford to assess the studies for all reported outcomes that were meaningful to clinicians making decisions about treatment. This included the impact of clinical symptoms, pH study profile and oesophageal appearance at endoscopy.

**Results:** 507 articles were reviewed, of which 56 papers were original, relevant clinical trials. These were assessed further. Many of the studies considered had significant methodological flaws, although based on available evidence the following statements can be made. For infant gastro-oesophageal reflux disease: (1) Ranitidine and omeprazole and probably lansoprazole are safe and effective medications, which promote symptomatic relief and endoscopic and histological healing of oesophagitis. (2) Gaviscon infant (sachets) are safe and can improve symptoms of reflux. (3) There is less evidence to support the use of domperidone or metoclopramide. (4) More evidence is needed before other antireflux medications can be recommended. For older children: (1) Acid suppression is the mainstay of treatment. (2) The largest evidence base supports the early use of H<sub>2</sub>-receptor antagonists or proton pump inhibitors.

#### G51 ACHALASIA: A RARE CAUSE OF FAILURE TO THRIVE

P Gallagher, F Sharif. Midlands Regional Hospital, Mullingar, Ireland

**Case Report:** A 10-year-old girl was referred with an 8-week history of increasing weight loss and vomiting. Her weight had crossed two centiles from 25th to 3rd over the previous year. She was now vomiting two to three times per day after most meals and had also started to vomit in her sleep. There was no diarrhoea. A detailed physical examination was normal except for the loss of subcutaneous fat. Investigations including: full blood count, renal, liver and bone profile, thyroid function, coeliac screen, stool for *Helicobacter pylori*, sweat test and computed tomography scan of the brain were normal. A barium swallow revealed a very dilated proximal oesophagus with a smooth tapered stricture distally typical of achalasia. The diagnosis was confirmed on manometry. Despite optimising nutrition she continued to lose weight, which dropped to less than the 0.4th centile. Oesophageal balloon dilatation was unsuccessful. Subsequently a Heller's cardiomyotomy and Nissen's fundoplication were simultaneously performed 4 months after presentation. An excellent postoperative recovery was made and she regained 9 kg within a 2-month period (<25th centile).

**Discussion:** Achalasia is an uncommon disorder that has an annual incidence of approximately one per 100 000 population. Only 10% of these cases occur in the paediatric population. It results from the idiopathic inflammatory degeneration of inhibitory neurons in the oesophageal wall. This leads to an inability of the lower oesophageal sphincter (LOS) to relax. Typical signs and symptoms include: dysphagia for solids and liquids, weight loss, regurgitation and heartburn. A barium swallow is the main diagnostic test. The diagnostic accuracy of this is approximately 95%, typically showing a dilated oesophagus that terminates in a "bird beak-like" narrowing. Elevation of LOS pressure demonstrated by manometry confirms the diagnosis. Treatment options include: medical therapy (calcium antagonists); pneumatic dilatation; surgery and botulinum toxin injection. Most children with achalasia will require an operation (Heller's cardiomyotomy) for long-term relief.

#### G52 EXPERIENCE OF TROPICAL PYOMYOSITIS IN THE TERAI REGION OF NEPAL: RETROSPECTIVE STUDY OF 28 CASES IN THE PAEDIATRIC POPULATION

<sup>1</sup>TK Banerjee, <sup>2</sup>A Banerjee. <sup>1</sup>Universal College of Medical Sciences, Bharatpur, Nepal; <sup>2</sup>Northern Deanery, Newcastle, UK

**Background:** Tropical pyomyositis is commonly seen in malnourished paediatric populations in tropical developing countries and presents with quite variable non-specific clinical signs and symptoms.

**Aims:** To identify common and uncommon clinical presentations, complications, treatment and outcome of this condition in the rural paediatric population of a developing country with limited health resources.

**Materials and Methods:** This is a retrospective study of 28 paediatric patients in a rural population of the Terai region of Nepal. All patients with disseminated pyogenic infection without clinical signs of tropical pyomyositis at presentation were excluded.

**Results:** Among 28 patients, 42% (n = 12) presented with acute onset of fever (38.2 ± 0.8°F), malaise, poor energy level with loss of appetite. 21.42% (n = 8) had a non-specific maculopapular rash lasting for a day. 64.28% (n = 18) presented with swelling with tenderness, 28.57% (n = 8) with swelling alone, whereas 7.14% (n = 2) presented with only tenderness. A history of blunt trauma was present in 78.57% (n = 22). Lower limb musculature was involved in 20 patients (71.42%), 16 of them presented with limping (80%). Among other associated findings malnutrition was prevalent in 92.85% (n = 26), iron deficiency anaemia in 85.71% (n = 24) and ascaris lumbricoids infestation in 64.28% (n = 18). Anaemia (92.85%) and leucocytosis were the most common laboratory findings (85.71%) followed by raised C-reactive protein (64.28%) and eosinophilia (50%). Very high creatine kinase (CK) was noted in 57.14% (n = 16), borderline elevation in 17.85% (n = 5) and normal CK in 25% (n = 7). On pus culture *Staphylococcus aureus* was the most common organism (57.14%) followed by Gram A streptococcus (14.28%), pneumococcus (3.57%) and sterile pus culture in 21.43% (n = 6). Only five (17.87%) had positive blood culture. All patients were treated successfully with surgical evacuation of pus and triple antibiotics for the first 48 h followed by oral cloxacillin and metronidazole for 10 days. The mean duration of hospital stay was 48 h. None of the patients was methicillin-resistant *S aureus* positive.

**Conclusion:** This study highlights the variable clinical presentation of tropical pyomyositis and its association with malnutrition, a preceding history of trauma and superficial chronic suppurative infection.

#### G53 USE OF COWS' MILK PROTEIN ANTIBODY (IGE RADIOALLERGOSORBENT TEST) MEASUREMENT IN CHILDREN WITH CHRONIC CONSTIPATION

<sup>1,2</sup>A Sarmah, <sup>1,2</sup>S Ullah, <sup>1,2</sup>K Leung. <sup>1</sup>Queen Elizabeth the Queen Mother Hospital, Margate, Kent, UK; <sup>2</sup>East Kent University Hospitals NHS Trust, Margate, Kent, UK

**Background:** Constipation has been reported as an allergic manifestation of cows' milk and may be IgE mediated.

**Aims:** To identify children with chronic constipation who need specific antibody (IgE radioallergosorbent test (RAST)) measurement against cows' milk protein who are then likely to benefit from an exclusion diet (dairy free).

**Methods:** Data for different characteristics including total serum IgE, specific IgE RAST against cows' milk, atopic features related to skin and respiratory systems were collected. These data were collected retrospectively from the notes of children attending constipation clinics. The review period was one year. Children with a chief complaint of chronic constipation and who were tested for IgE RAST for food antibodies were included.

**Results:** 31 children were identified. 19 (61.3%) were boys and 12 (38.7%) were girls. The age range was from 1 to 14 years with a mean of 7.4 years. Total serum IgE was raised in 14 (45.2%) of children (IgE >80 ku/l). Total IgE reference values for different age groups showed that three of 11 (27.3%), seven of 11 (63.6%) and seven of nine (77.8%) children aged 1–5 years (IgE <52 ku/l), 6–11 years (<63 ku/l) and >11 years (>80 ku/l), respectively, had raised total serum IgE. After this age correction 17/31 (54.8%) had raised total IgE. IgE RAST for cows' milk was positive in three (9.6%) children. Only one of 17 of these children who had high total serum IgE had positive IgE RAST for cows' milk. The other two children with positive IgE RAST for cows' milk had normal total IgE. The majority of the children in our review had no documented atopic skin (74.2%) or respiratory (96.8%) symptoms. Five of 31 (16.1%) children had associated eczema, two of 31 (6.5%) had dry skin and one of 31 (3.2%) had urticaria. Only one of 31 (3.2%) had asthma.

**Conclusions:** Significant numbers of children in our review had high total IgE, although IgE RAST for cows' milk was also positive in two of three (67.5%) in which total IgE was not raised. Total IgE is non-specific and may show atopic tendency, although interestingly only a few in our review had other documented atopic features. Our review does not support the routine use of IgE RAST against cows' milk in children with chronic constipation (only 9.6% positive IgE RAST), but we were unable to determine the characteristics to identify children with constipation who will benefit from a RAST test. A prospective study with larger numbers is recommended, which should also consider other characteristics such as family history of atopy/cows' milk allergy and the presence/absence of anal fissures.

#### G54 A SURVEY OF EPIPEN TRAINING AND PARENTAL CONFIDENCE IN MANAGING ACUTE ALLERGIC REACTIONS IN THEIR CHILDREN

P Katta, R Elder, N Brathwaite. *Kings College Hospital, London, UK*

**Aims:** To determine the knowledge of indications of use, training received and subsequent comfort level in administering an adrenaline auto-injector (Epipen) of parents of children prescribed with an Epipen.

**Method:** An anonymous questionnaire was sent retrospectively to parents/carers of children who were prescribed Epipen in a paediatric allergy clinic between July 2005 and July 2007. The questionnaire was sent to 359 families to be returned in a prepaid addressed envelope. Questions addressed the training received by parents, children, school/nursery, knowledge of indications of Epipen administration and steps taken after administration. Parents were requested to mark comfort level on a visual analogue scale.

**Results:** 186/359 (51%) responded to the questionnaire. 83/186 (44%) children in the study group (0–17 years) were over 8 years. 153/186 (82%) were trained by an allergy nurse, 15 by other health professionals and 13 denied receiving any training. 106 (56%) trained within 2 years of the study. 138/186 (74%) were trained with an Epipen trainer and 131/186 (70.9%) had a written management plan. 166/186 (89.2%) read the instruction leaflets. 83.8% (156) parents were confident of administering Epipen after the initial training but 41.3% (77) wanted a refresher course. Of the 79/186 who were confident, only 19/79 (24%) felt comfortable in administering Epipen when required. Only 14 (7%) parents correctly answered all the indications for use. 152 children (81.7%) had a set of Epipen kept at school/nursery. 180/186 (96.7%) parents said that the school/nursery were aware of their child's allergy but only 99/180 (55%) were sure that the teachers were trained. 50% (42/83) of parents of children over the age of 8 years were confident that their child can self-administer Epipen in

an emergency. 122 (65.59%) children take Epipen when visiting friends. Only 18 (9%) parents had administered Epipen. 12 of them attended A&E after use. 5.9% (nine) of the parents did not have any concerns and felt well supported by family and friends.

**Conclusion:** Despite adequate training, only 14 parents could correctly answer all the indications for administering Epipen and only 22/186 parents were comfortable in administering Epipen. The comfort level in parents was very low in spite of extensive training. Regular training and repeated emphasis of the need for Epipen may improve the confidence and comfort level in parents.

#### G55 REAL-TIME PCR FOR DETECTION OF METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS COLONISATION IN NEWBORNS: A COMPARISON WITH CULTURE-BASED TESTING

<sup>1</sup>S Francis, <sup>1</sup>A Trever, <sup>1</sup>S Rawal, <sup>1</sup>H Roberts, <sup>2</sup>P Riley, <sup>2</sup>T Planche, <sup>1</sup>N Kennea. <sup>1</sup>St Georges Hospital, Neonatal Unit, London, UK; <sup>2</sup>St Georges Hospital, Microbiology and Infection Control, London, UK

**Aims:** To evaluate the effectiveness of real-time PCR-based methods of detection for methicillin-resistant *Staphylococcus aureus* (MRSA) colonisation and infection and compare this with traditional culture-based methods on our neonatal unit.

**Methods:** Paired nasal swabs were collected from infants on our neonatal unit over a 12-month period (September 2007–8). One swab was cultured and the other was tested with a commercially available PCR method. The results were compared. Data were collected on numbers of infants colonised and infants with MRSA bacteraemia/sepsis.

**Results:** 696 paired nasal swabs were taken (range 0–15 per infant). Three infants were colonised with MRSA at the beginning and were included. There were positive PCR results from 12 infants. Five of these infants cultured MRSA from a nasal swab at the same time. The culture result took 1–2 days longer than the PCR result. No infants were culture positive for MRSA when the PCR was negative (sensitivity 100%, specificity 99% compared with culture). Five infants had positive PCR results and isolated a sensitive *S aureus* by culture. This organism gave a false-positive PCR result. Following the introduction of PCR methods of detection and topical decolonisation, there was a reduction in MRSA acquisition on our neonatal unit. Decolonisation led to negative PCR and culture in four of five infants to discharge.

**Conclusions:** This study demonstrates that PCR methods are sensitive and specific for the detection of MRSA colonisation in newborn infants, with results 1–2 days before culture. This gives prompt infection control information and has contributed to a reduction in MRSA acquisition on our unit.

#### G56 NEONATAL MORBIDITY FOLLOWING CHIKUNGUNYA VIRAL FEVER IN PREGNANCY

<sup>1</sup>MP Senanayake, <sup>1</sup>M Senanayake, <sup>1</sup>K Vithanage, <sup>2</sup>S Gunasena. <sup>1</sup>University of Colombo, Colombo, Sri Lanka; <sup>2</sup>Medical Research Institute, Colombo, Sri Lanka

Chikungunya viral fever swept through several Indian Ocean islands in 2006, in epidemic proportions. The following summer over 150 cases were reported from north east Italy signifying its potential of becoming a global health problem. However, knowledge on the transplacental transmission of chikungunya is limited.

**Aim:** To describe the clinical and serological findings of a cohort of infants born to mothers who had serologically confirmed chikungunya infection during pregnancy or in the peripartum period.

**Method:** A prospective descriptive study on pregnant women with clinical features and serological confirmation of chikungunya infection. Timing of febrile illness, pregnancy outcome, and neonatal details of birth weight, gestational age, congenital abnormalities and health were recorded. Chikungunya-specific

IgM antibodies were tested for in the cord or peripheral blood of newborns.

**Results:** 43 chikungunya-positive, dengue-negative women were enrolled from antenatal clinics and one from a labour ward when she developed fever shortly after delivery. The timing of febrile illness was first, second and third trimesters in 41%, 41% and 18%. Pregnancy outcomes were two abortions, one stillbirth, two preterm and 38 term births. All 37 infants in whom maternal infection occurred distant to the date of delivery were healthy. Mean ( $\pm$ SD) birth weight was 2.93 kg ( $\pm$ 0.5). Localised skin pigmentation that resolved spontaneously was the only abnormality and was seen in 10 infants. Seven infants, from all three trimesters, tested positive for chikungunya IgM antibodies. The four infants born during the acute phase of infection showed serious illness: extreme prematurity and respiratory distress, meningo-encephalitis, heart failure due to myocarditis and generalised pigmentation and severe failure to thrive.

**Conclusion:** Vertical transmission occurs in all three trimesters. Neonatal morbidity is high among infants born during the acute viral phase of maternal infection but infection occurring distant to the date of delivery is relatively harmless. Myocarditis and generalised pigmentation were the clinical features seen in serologically confirmed perinatal chikungunya infection.

### G57 POPULATION SURVEY OF 12–14 YEAR OLDS' REPORTED ADVERSE REACTIONS TO DRUGS, FOOD, BEE AND WASP STINGS AND SEVERE ALLERGIC REACTIONS

P Standing. *Princess Elizabeth Hospital, St Peter Port, Guernsey, UK*

**Aim:** To establish the reported prevalence and incidence of adverse reactions to medication, food, bee and wasp stings, and reported severe allergic reactions in 12–14 year olds.

**Method:** A specific subsection of questions attached to the ISAAC III survey was put to all year 8 and 9 pupils in schools in November 2001 in a geographically defined, stable population. The question format followed that of the ISAAC III questions using a check box response. The questionnaire asked whether the young person had ever been stung by a bee or wasp and the nature of the reaction, whether they had ever had a reaction to a food within minutes of eating it and the nature of the reaction. Other questions asked were if the young person was allergic to medications, and if they were, whether they knew what the medicine was. Further to this they were asked if they had ever experienced a severe allergic reaction, the nature of the reaction and whether they carried an adrenaline pen. In addition, there were supplementary questions about whether the above events/reactions had occurred in the past 12 months.

**Results:** There were 1050 completed questionnaires of the 1384 enrolled in the schools (76% response rate) (see table).

**Discussion:** The questionnaire survey gives some important epidemiological data on reported and therefore perceived adverse reactions experienced by young people. This is helpful in viewing the risk for young people with allergies to bee and wasp stings, drug reactions and their response to adverse reactions. It also provides some indication of the incidence of these events, which could be monitored over time.

#### Abs G57 Table Responses to questionnaire

Ever "stung by a bee or wasp" (past 12 months)	69.9% (31.0%)
Ever had immediate reaction, within minutes to food (12 months)	11.7% (8.9%)
Ever "allergic to any medicines"	13.7%
Know "what medicine you are allergic to"	68.8%
Ever had "a severe allergic reaction" (past 12 months)	12.7% (5%)
Have an adrenaline pen	0.7%

### G58 ANALYSIS OF A NEW LOCAL MICROBIOLOGY DATABASE TO INVESTIGATE INVASIVE NEONATAL INFECTION AND ANTIBIOTIC RESISTANCE PATTERNS IN INFANTS UNDER 44 WEEKS' GESTATION IN A UK TERTIARY NEONATAL AND PAEDIATRIC CENTRE FROM 2003 TO 2008

<sup>1</sup>D Jolley, <sup>1</sup>S Rees, <sup>2</sup>D Browning, <sup>3</sup>M Hall, <sup>3</sup>A Pallett, <sup>1</sup>S Faust. <sup>1</sup>University of Southampton, Southampton, UK; <sup>2</sup>Health Protection Agency, Southampton, UK; <sup>3</sup>Southampton University Hospitals NHS Trust, Southampton, UK

**Aims:** To use a new local microbiology database to ascertain local incidence and trends of culture-positive infections in neonates and to investigate antibiotic resistance levels to current empiric antibiotic regimes for neonatal sepsis.

**Methods:** The local Health Protection Agency has recently developed a new computer database to analyse all local trust microbiology data from 2003 onwards. The database was populated with all positive culture results from infants on the neonatal and paediatric wards and was supplemented with gestational age and birth weight data from the HICCS and SEND neonatal information systems. The completed dataset was filtered to include only infants under 44 weeks' gestation and analysed with descriptive statistics. Antibiotic sensitivity data quoted are by breakpoint testing.

**Results:** The January 2003 to March 2008 dataset included 5156 isolates from 3164 infants under 44 weeks' corrected gestation. Of these, 386 were positive blood cultures from 321 infants. The incidence of positive blood cultures taken during the early onset sepsis (EOS) timeframe (0–72 h) was 5.6/1000 live births. The incidence in the late onset sepsis (LOS) timeframe (72 h–31 days) was 8.9/1000 live births. Only nine cerebrospinal fluid samples were culture positive in the study period. Cefotaxime resistance in Gram-negative organisms (key markers for EOS) was 21% (3/14) and was not increasing over time. Teicoplanin resistance in coagulase-negative staphylococci (CoNS, marker for LOS) was 24% (27/115) overall, whereas resistance to gentamicin (67%, 77/115) and flucloxacillin (70%, 80/115) was much higher. 55 CoNS isolates were from day 1 of life, 29 fully or mostly sensitive to all antibiotics tested.

**Conclusions:** The database is an effective tool for investigating and tracking complex microbiology data and highlighting areas for research. The local incidence of positive blood cultures during EOS/LOS timeframes is low and decreasing over time. Cefotaxime, used locally for EOS, remains an appropriate empiric choice in EOS in our population. In LOS, flucloxacillin and gentamicin have high resistance patterns and should not be used alone to cover CoNS empirically. Meningitis was probably underdiagnosed due to the few lumbar punctures performed before the initiation of antibiotics. The high numbers of CoNS blood isolates on day 1 are likely to be sample contaminants, possibly indicating an inadequate venesection technique.

### G59 ANTIBIOTIC PRESCRIBING DURING PREGNANCY IN UK PRIMARY CARE BETWEEN 1992 AND 2007

<sup>1</sup>I Petersen, <sup>2</sup>R Gilbert, <sup>3</sup>A Ridolfi, <sup>4</sup>S Evans, <sup>1</sup>I Nazareth. <sup>1</sup>UCL, Primary Care and Population Health, London, UK; <sup>2</sup>UCL, Institute of Child Health, London, UK; <sup>3</sup>MRC, General Practice Research Framework, London, UK; <sup>4</sup>London School of Hygiene and Tropical Medicine, London, UK

**Aims:** To describe antibiotic prescribing in primary care during pregnancy and identify factors associated with prescribing.

**Methods:** We analysed data from The Health Improvement Network (THIN), a primary care database of approximately 4% of patients' UK primary care records. We identified 114 734 pregnant women between the ages of 15 and 45 years who were registered with their GP throughout their pregnancy. Trends in antibiotic prescribing during pregnancy were examined over the period from 1992 to 2007 and were categorised by class of drugs for each month of pregnancy.

**Results:** Overall, 37 494 (33%) women received at least one antibiotic prescription during pregnancy. The majority (65%) of these women received just one prescription and less than 5% received more than three prescriptions. The most common antibiotics prescribed were broad-spectrum penicillins (48%), followed by cephalosporins and other betalactams (21%). Erythromycin comprised 7% of all prescriptions issued and was similarly prescribed throughout the pregnancies. Trimethoprim, tetracyclines and quinolones, and metronidazole were prescribed in the first 4 weeks of pregnancy, but the number of prescriptions of these antibiotics declined substantially thereafter. In the 4 weeks before delivery, 3041 (8%) women received an antibiotic prescription and 337 (1%) women received erythromycin. The level of antibiotic prescribing declined from nearly 40% in 1997 to just above 30%, but in recent years antibiotic prescribing has increased and in 2007 antibiotics were prescribed to 35% of pregnant women. Younger women were most likely to receive antibiotics during pregnancy, 39% of those aged below 24 years compared with 30% in those aged 30 years and above. Social deprivation was also a determinant for antibiotic prescribing (relative risk 1.34, 95% CI 1.29 to 1.38, women in the most deprived vs the least deprived areas, adjusted for age).

**Conclusions:** Antibiotic prescribing is common in pregnancy and reflects the overall prescribing pattern in the general population, although this may be higher than actual usage. Further research into the prescribing of antibiotics in primary care during pregnancy is urgently needed in view of emerging evidence that maternal antibiotics can potentially affect long-term neurological outcomes, gut flora and immune development in children.

#### G60 HOW DO CHILDREN WITH HIV PRESENT IN NORTHWEST ENGLAND AND NORTH WALES?

<sup>1</sup>A Riordan, <sup>2</sup>T Tan, <sup>3</sup>P McMaster. <sup>1</sup>Alder Hey Children's NHS Foundation Trust, Liverpool, UK; <sup>2</sup>Pennine Acute Trust, Manchester, UK; <sup>3</sup>University Hospital North Staffs, Stoke, UK

**Aims:** Increasing numbers of HIV-infected children are being seen in the UK, particularly outside London. We wanted to review how children with HIV were diagnosed in the northwest of England and north Wales.

**Methods:** A case note audit was performed of HIV-infected children who had been seen in the Northwest Paediatric and Perinatal HIV Network (NWPPHN). Information was obtained on age at diagnosis, the main reason for HIV testing, where the test had been done and who had done the test.

**Results:** 115 HIV-infected children had been seen in NWPPHN; 42 were born in the UK. Most children were of African ethnicity (n = 83; white 16, mixed race 13). Median age at diagnosis was 5 years (range 1 month–16 years). 15 children were diagnosed in Africa. In the UK, maternal HIV infection was the main reason for HIV testing for 51 children. Six other asymptomatic children were tested as part of health screening (pre-adoption). These children were mostly diagnosed by HIV paediatricians (32), local paediatricians (16) or adult genitourinary physicians (four). 47 children were HIV tested because of clinical features: pneumocystis/cytomegalovirus pneumonitis (17); recurrent respiratory infections (nine); failure to thrive/diarrhoea (five); lymphadenopathy/hepatosplenomegaly (five); parotid swelling (three), raised IgG (two), severe chickenpox (two), tuberculosis (one). 16 children presented to the paediatric intensive care unit (PICU). Most of these children were tested by paediatricians in secondary (16) or tertiary (17) care; haematology, respiratory, PICU. 14 were diagnosed by HIV paediatricians and one by a general practitioner.

**Conclusion:** Children with HIV present at all ages in the northwest. Half are tested because of their mother's HIV status, mostly by HIV paediatricians. Many of these children were asymptomatic; highlighting the importance of testing all children

born to HIV-infected women. However, over 40% of children were the first person diagnosed with HIV in their family. They presented with clinical features suggestive of HIV and were diagnosed in primary, secondary and tertiary care, often by non-HIV specialists. All paediatricians should be able to obtain informed consent for an HIV test in children with clinical features suggesting HIV.

#### G61 AUDIT OF BLOOD ASPERGILLUS PCR USE IN A CHILDREN'S HOSPITAL

L Coxon, A Riordan. Alder Hey Children's NHS Foundation Trust, Liverpool, UK

**Aims:** Invasive fungal infections are an increasing problem in immunocompromised children. Early diagnosis is important but is often difficult, particularly for invasive aspergillosis. PCR has been reported to detect aspergillus species. However, few of these PCR assays have been tested in body fluids in children with invasive aspergillosis. Blood aspergillus PCR was available for any clinician to request in our children's hospital. We aimed to audit the use and clinical relevance of this test.

**Methods:** Results of all blood aspergillus PCR assays sent between April 2005 and March 2008 were obtained from the microbiology database. These were compared with a list of aspergillus isolates for the same time period. Clinical, radiological and laboratory information was obtained for children with positive results.

**Results:** 251 samples for blood aspergillus PCR were sent from 53 children, thought to be at risk of invasive fungal infection by their clinician. The median number of tests per child was seven (range 1–14). Four children had a blood aspergillus PCR taken at the same time as a significant growth of aspergillus was obtained from clinical samples (lung biopsy, endotracheal aspirate). All four of these blood aspergillus PCR were negative. Only six blood aspergillus PCR were positive, from five children. A positive blood aspergillus PCR result did not change the clinical management of these five children; three were not given antifungal agents and had a negative PCR when it was repeated, one child was treated for confirmed disseminated mycobacterial infection and one had computed tomography changes suggestive of aspergillus and had already been started on antifungal treatment. Subsequent blood aspergillus PCR were negative in this boy, despite continued neutropenic fever and later confirmation of aspergillus in lung tissue.

**Conclusion:** Blood aspergillus PCR did not alter management in routine clinical practice. Most results were negative, even in children with confirmed invasive aspergillosis. Positive results were either assumed to be false positives or occurred when there were other clinical features suggesting invasive aspergillosis. Blood aspergillus PCR methods require further validation before their introduction into routine clinical use.

#### G62 LEISHMANIASIS IN THREE IMMIGRANT CHILDREN FROM YEMEN AND AFGHANISTAN

<sup>1</sup>C Seagrave, <sup>1</sup>S Hackett, <sup>1</sup>H Goodyear, <sup>2</sup>C Moss, <sup>2</sup>M Ogboli, <sup>1</sup>S Welch. <sup>1</sup>Birmingham Heartlands Hospital, Birmingham, UK; <sup>2</sup>Birmingham Childrens Hospital, Birmingham, UK

**Background:** Leishmaniasis caused by *Leishmania major* or *Leishmania tropica* is frequently reported in soldiers and travellers recently returning from Afghanistan and the Middle East. We report three children with cutaneous leishmaniasis presenting up to 5 years after entry into the UK.

**Case Reports:** Two children from Afghanistan and one from Yemen presented to UK paediatric dermatologists with chronic non-healing lesions of the face. All had been present before their entry to the UK ranging from 8 months to 5 years before presentation. Previous ineffective treatments included an intraleisional injection in Yemen in one case and a 3-week course of fluconazole in another. In all three cases skin biopsy demonstrated

granulomas with no organisms. PCR for *Leishmania* was negative in two cases and strongly positive in a child from Afghanistan, although the species was not identified. A clinical diagnosis of cutaneous leishmaniasis caused by *L tropica* was made in all three cases, both PCR negative and positive based on the chronicity and appearance of the lesions and the geographical distribution of this parasite. All three children were treated for 20 consecutive days with intravenous sodium stibogluconate at a dose of 20 mg/kg per day. All the lesions resolved, leaving only hyperpigmentation. Sodium stibogluconate was well tolerated in all three cases, with no renal or cardiac toxicity. One patient showed a transient rise in ALT, which settled while still on treatment. The improvement with treatment was documented photographically.

**Comment:** Cutaneous leishmaniasis is frequently considered in returning travellers from endemic areas, but all of these cases were long-term residents who had migrated to the UK, often some time before presentation. It is important to take a long-term travel history and consider the chronicity of a skin lesion in arriving at a likely diagnosis. Intravenous sodium stibogluconate was successful and well tolerated in this small case series.

### G63 FOOD ALLERGY-ASSOCIATED ANOREXIA NERVOSA

L Michaelis, H Brough, S Hill. *Great Ormond Street Hospital, London, UK*

**Background:** The distinction between patients with anorexia nervosa and food refusal secondary to food allergy is ill defined. Both may present with gastro-oesophageal reflux, intestinal dysmotility, diarrhoea, constipation and failure to thrive.

**Methods:** We present the case reviews of three children with a diagnosis of anorexia nervosa, who also had food allergies.

**Results:** Patient 1: 13-year-old girl with food refusal, eczema, diarrhoea, gastro-oesophageal reflux and oral allergy syndrome (OAS). Raised total IgE (4800 ku/l), wheat allergy and coeliac disease were found. Guided food introduction has proved beneficial. Patient 2: 13-year-old girl with epigastric pain, vomiting, weight loss, school refusal and depression after witnessing an anaphylactic reaction. History included infantile eczema, raised total IgE (135 ku/l), IgE-mediated milk and soya allergy, gastro-oesophageal reflux, OAS, IgA deficiency and seasonal allergic rhinitis (SAR). Investigations demonstrated foregut dysmotility and gastro-oesophageal reflux without oesophagitis. She responded to an exclusion diet of milk, egg, soya, wheat and fish. She has subsequently been re-established onto liquid elemental (EO28) jejunal feeds. She was recently diagnosed with Erhlos-Danlos (type 3) and is gaining weight. Patient 3: 13-year-old boy with abdominal pain, mucous stools and food refusal. Previous history included raised total IgE (1766 ku/l), IgE-mediated allergy to egg and cashew nut, cows' milk protein colitis, IgA deficiency, asthma, eczema, OAS and SAR. It has proved difficult to introduce solid foods due to his fear of food challenges.

**Conclusion:** Combined paediatric allergy, gastroenterology and psychology involvement is recommended. In susceptible children food allergy can trigger anorexia nervosa and interfere with diagnosis and management. A clear re-feeding programme with structured dietetic advice and food challenges under supervision is beneficial.

### G64 THE EFFECT OF DIETARY MANIPULATION ON PATIENTS PRESENTING WITH COMMON GASTROINTESTINAL SYMPTOMS

M Carneiro de Moura, L Michaelis, S Macdonald, S Hill. *Great Ormond Street Hospital, London, UK*

**Background:** Common gastrointestinal manifestations in children can be related to IgE and non-IgE-mediated atopic-related allergic

disease. This study analysed the response to the exclusion of common dietary constituents and audited how helpful the families found the dietitian's advice.

**Methods:** A questionnaire-based study was undertaken in 48 patients presenting to a general gastroenterology clinic with common gastrointestinal symptoms before and after starting an exclusion diet from 2000 to 2007. Children with coeliac disease and inflammatory bowel disease were excluded. Investigations included serum total and specific IgE levels and histological results of small intestinal and colonic mucosal biopsies.

**Results:** 26/48 (54%) were male with a mean age at diagnosis of 80 months (range 1 month to 17 years). Symptoms included: abdominal pain 24/48 (50%); diarrhoea 24/48 (50%); vomiting 18/48 (38%); constipation 16/48 (33%); poor weight gain 17/48 (35%); lethargy 11/48 (23%); abdominal distension 8/48 (17%) and irritability 8/48 (17%). Of the 42/48 (88%) patients investigated for total and specific IgE, 18/42 (42%) had raised total IgE and 6/42 (14%) positive specific IgE for one or more foods. Eosinophilic changes were present in 14/22 (67%) intestinal biopsies. Exclusion diets recommended included: 22/48 (46%) milk and egg free; 7/48 (15%) milk, egg and soya free; 12/48 (25%) milk, egg, soya and wheat free. After 6 weeks of dietary exclusion 36/48 (75.5%) felt the diet was beneficial. They found an improvement in diarrhoea (17/22; 77%), abdominal pain (17/24; 71%), vomiting (16/18; 89%), constipation (11/16; 69%), irritability (5/8; 63%), lethargy (7/11; 64%), poor weight gain (11/17; 65%) and abdominal distension (5/8; 63%). 46/48 (96%) of parents were satisfied with the dietetic service.

**Conclusion:** The use of exclusion diets, under dietetic supervision, is beneficial in improving common gastrointestinal manifestations associated with IgE and non-IgE-mediated allergic gastrointestinal disease.

### G65 EFFECTS OF PRENATAL PROBIOTIC TREATMENT ON INFANT IMMUNE RESPONSES AND COLONISATION PATTERNS

<sup>1</sup>R Boyle, <sup>2</sup>S Lahtinen, <sup>3</sup>L-J Mah, <sup>3</sup>S Kivivuori, <sup>3</sup>A Chen, <sup>2</sup>R Robins-Browne, <sup>3</sup>M Tang. <sup>1</sup>Department of Paediatrics, Imperial College, London, UK; <sup>2</sup>University of Melbourne, Victoria, Australia; <sup>3</sup>Murdoch Children's Research Institute, Melbourne, Australia

**Aims:** Observational studies suggest that microbial exposures may be important in preventing allergic immune responses. Intervention trials have identified the perinatal administration of probiotic bacteria such as *Lactobacillus rhamnosus* GG (LGG) as a promising approach for preventing allergic disease. We investigated the mechanisms of action through which LGG may prevent allergic disease. We evaluated the effects of LGG administration to pregnant women on infant immune responses and on infant intestinal microbiota composition.

**Methods:** In a randomised controlled trial of LGG treatment during pregnancy cord blood mononuclear cells from 73 participants were evaluated for markers of T-cell regulation, antigen-presenting cell phenotype, cytokine secretion and proliferative response to a range of in-vitro stimuli. Proliferative response, markers of T-cell regulation and antigen-presenting cell phenotype were also assessed in peripheral blood mononuclear cells from 11 healthy adults before and after LGG treatment. Rectal and vaginal swabs, faeces and breast milk samples from participants or their infants were evaluated for the presence of LGG by culture and strain-specific PCR. *Bifidobacterium* spp composition was evaluated in rectal swabs and faeces samples using terminal restriction fragment length polymorphism.

**Results:** In healthy adults LGG treatment was associated with a 30% reduction in CD4 T-cell proliferation to heat-killed LGG ( $p = 0.03$ ). Treatment of pregnant women with LGG was not associated with any change in cord blood mononuclear cell immune

responses. Treatment of pregnant women increased LGG detection in maternal rectal swabs taken at birth, but did not influence infant colonisation with LGG during the first 90 days. Prenatal LGG treatment increased *Bifidobacterium longum* colonisation in infants at 90 days (present in 82% of probiotic group, 61% of placebo group;  $p = 0.01$ ). In infants whose mothers received prenatal LGG the bifidobacterium microbiota more closely resembled that of healthy breast-fed infants.

**Conclusions:** Prenatal treatment with the probiotic LGG does not induce immune tolerance or priming by transplacental signalling to the human foetus. Treatment may, however, influence the infant intestine by promoting a healthy bifidobacterium microbiota.

**G66 UK PREMATURE INFANT VACCINE STUDY**

<sup>1</sup>EP Galiza, <sup>2</sup>N Andrews, <sup>1</sup>PT Heath. <sup>1</sup>Vaccine Institute, St George's, University of London, on behalf of the UK Premature Infant Vaccine Study Collaborative Group, London, UK; <sup>2</sup>Health Protection Agency, London, UK

**Introduction:** Preterm infants are a vulnerable group known to have lower responses to routine immunisations compared with term infants. The influence of neonatal factors such as gestational age, birth weight, maternal antibody concentrations, corticosteroid treatment, blood transfusions and intravenous immunoglobulin treatment in previous studies in the UK has been variable. This may partly reflect the small number of subjects in each study. By pooling such data we aimed to assess the effects of these factors on the vaccine responses of preterm infants.

**Methods:** Data from vaccination studies performed in premature infants in the UK were collected through collaboration with the relevant investigators. Background data, neonatal treatment factors and specific antibody concentrations were included and multivariate analysis of the influence of variables was performed for each vaccine studied (Hib, Men C, diphtheria, tetanus, pertussis).

**Results:** Nine datasets, comprising 681 preterm infants of less than 32 weeks' gestation were obtained. The median gestational age was 28 weeks (range 22–32) and the median birth weight was 1.022 kg (range 0.49–2.5). We demonstrated a significant increase in maternal antibody for tetanus with increasing gestational age and birth weight ( $p < 0.001$ ) and a significant increase in maternal antibody for filamentous haemagglutinin with increasing birth weight ( $p < 0.01$ ; gestational age  $p = 0.08$ ). Gestational age, birth weight and postnatal corticosteroid treatment had no significant effect on any vaccine responses. There were insufficient data to assess the effect of blood transfusions or immunoglobulin treatment.

**Conclusions:** In this large dataset overall vaccine responses among infants less than 32 weeks' gestation were not affected by gestational age, birth weight, or corticosteroid treatment. Pooling data from studies composed of a relatively small sample size will allow firm conclusions to be drawn regarding factors affecting vaccination responses in preterm infants.

**G67 BLOOD, SPIT AND PEE: THE MESSY WORK OF MONITORING VIRAL LOAD IN CONGENITAL CYTOMEGALOVIRUS**

<sup>1</sup>S Luck, <sup>1</sup>C Atkinson, <sup>2</sup>M Sharland, <sup>1</sup>P Griffiths. <sup>1</sup>University College London, London, UK; <sup>2</sup>St George's NHS Healthcare Trust, London, UK

**Introduction:** Early studies of ganciclovir treatment of babies with congenital cytomegalovirus (cCMV) infection showed an association between the suppression of virus in urine with better neurological outcomes. There are currently no published data relating to viral suppression in blood and subsequent sequelae. Although saliva has been used in many large studies for screening for cCMV there are no published data relating to quantitative viral load (VL) in cytomegalovirus-infected neonates.

**Aims:** To compare quantitative VL in blood, urine and salivary swabs during treatment for cCMV.

**Methods:** Quantitative VL was measured using cytomegalovirus PCR following DNA extraction from samples of whole blood, urine and flocced salivary swabs. Data relating to blood and urine VL were available from samples received in our laboratories for diagnostic purposes and from data entered onto a national cCMV treatment registry. Blood, urine and salivary swabs were also collected serially from babies with cCMV infection as part of an ethically approved prospective study.

**Results:** 154 samples from 11 treated babies at 83 time points revealed that urine VL is approximately 2 log<sub>10</sub> higher than that in blood, with salivary VL being approximately 0.5 log<sub>10</sub> higher than that in urine. Blood VL often decreased rapidly in the first 2 weeks of treatment but remained detectable at a low level for the duration of treatment. Urine and saliva both decreased steadily and gradually during treatment, but rarely became fully suppressed during a standard 6-week treatment course. A rebound in VL was noted 7–28 days after the end of treatment in all body fluids, although not, on the whole, to the level seen before treatment. Some variability was observed in the amount of saliva absorbed onto swabs, based on weight, but VL was reasonably reproducible in the laboratory setting.

**Conclusion:** Obtaining saliva is less time consuming and distressing for babies, parents and clinicians alike. Preliminary results show that saliva may be as useful as urine and blood for monitoring viral response to treatment. The relevance of viral suppression in each of these body compartments and how they relate to VL in the central nervous system are yet to be determined.

**G68 EFFECT OF MULTIPLE AGENT INFECTION ON DISEASE SEVERITY IN CHILDREN UNDER 2 YEARS HOSPITALISED WITH BRONCHIOLITIS: A RETROSPECTIVE CASE-CONTROL REVIEW**

A Khatami, C Nwokoro, M Wacks, A Riddell, I Ushiro-Lumb, S Carr. *The Royal London Hospital, London, UK*

**Aim:** To determine whether children with bronchiolitis caused by multiple virus co-infections have increased morbidity compared with matched controls with single agent infections.

**Methods:** We identified children under 2 years who had more than one virus detected (from a panel of 10) on immunofluorescence or PCR on respiratory samples taken during the study period of 2004–8. Matched controls were identified in the same period who had single-agent infections. Notes were analysed for length of admission, oxygen requirement, intravenous or nasogastric hydration and ventilatory support.

**Results:** 53 cases and 53 controls (mean age 10.0 and 9.5 months, respectively) were identified. Baseline characteristics were similar in both groups with respect to age, gender and the presence of comorbidities. There were more samples from summer months in the co-infected group, but this difference was not statistically significant (16 versus 22). There was a trend towards longer admissions, duration of oxygen requirement and nasogastric hydration in the control group but these differences were not statistically significant. The duration of intravenous hydration and continuous positive airway pressure was longer in the control group ( $p = 0.002$  and  $p = 0.01$ ). Severe disease (ventilation required, or death) was more likely in the control group, but numbers were too small to analyse trends. Respiratory syncytial virus (RSV) infection was detected more frequently in the control group (24 versus 11,  $p = 0.01$ ). Other viruses were detected more frequently in the co-infected group, and this difference was significant for adenovirus ( $p = 0.004$ ), parainfluenza 2 ( $p = 0.01$ ), parainfluenza 3 ( $p = 0.005$ ), rhinovirus ( $p = 0.006$ ) and enterovirus ( $p = 0.0002$ ). The difference in length of admission for children who were co-infected with RSV

and another virus, compared with RSV alone, was not statistically significant, nor was the difference in the length of admission for children who were co-infected with RSV, compared with those who were co-infected with two or more viruses, but not with RSV. Children who had isolated RSV infections had longer admissions compared with children who had mono-infections with other viruses (median 109.5 h vs 65.5 h,  $p = 0.06$ ).

**Conclusions:** In this small sample, children who had bronchiolitis caused by two or more respiratory viruses did not have a longer duration of hospitalisation compared with children who had a single-agent infection. This may be partly due to the high rate of RSV mono-infection. Of note, children who were infected with RSV did not appear to have a worse outcome if they were also co-infected with another respiratory virus.

### G69 AN INNOVATIVE INTEGRATED CARE PATHWAY APPROACH TO NEONATAL HEPATITIS B IMMUNISATION

C Rodrick, A Qureshi, N Makwana. *Sandwell and City NHS Trust, West Midlands, UK*

**Aims:** To assess the efficacy of a public health immunisation practitioner-led service to deliver a neonatal hepatitis B programme. Concerns existed over compliance and the timely vaccination of babies under the existing standard programme, due to a number of factors.

**Methods:** A comparison of two audits of a neonatal immunisation programme. The vaccination programme of all neonates born to hepatitis B-positive mothers in a district general hospital was audited. The first with standard care, ie, hospital midwife and community health visitor-led care (23 babies) born during 2004–5. The second audit following the appointment of a public health immunisation practitioner using an integrated care pathway approach (12 babies) 2007 to date.

**Results:** The first audit conducted in 2005 demonstrated no infants having received the recommended dosing schedule (four doses at 0, 1, 2 and 12 months). 18% received three doses at correct time intervals (0, 1, 2 months), a further 43% received three doses but with delay and 39% received two or fewer doses. Using the integrated care pathway the second audit demonstrated that the public health immunisation practitioner achieved immunisation rates of 100%, ie, all babies received the recommended dosing schedule with only two babies receiving delayed immunisation.

**Conclusion:** Using an integrated care pathway and a dedicated practitioner, immunisation rates of 100% can be achieved with hepatitis B vaccination in the hospital and community setting, ensuring a significant improvement in this public health problem.

### G70 EUROPEAN GUIDANCE ON INCLUSION AND EXCLUSION OF CHILDREN WITH COMMUNICABLE DISEASES FROM SCHOOLS AND DAY CARE CENTRES: AN EVIDENCE-BASED APPROACH

<sup>1</sup>A Sharma, <sup>2</sup>MA Anjay, <sup>1</sup>J Hawker, <sup>3</sup>M Sharland, <sup>4</sup>M Richardson, <sup>1</sup>T Endericks, <sup>5</sup>H Bedford, <sup>6</sup>D Elliman, <sup>6</sup>D Levy-Bruhl, <sup>7</sup>P Bonnani, <sup>8</sup>Z Meszner, <sup>9</sup>M Tsolia, <sup>10</sup>V Usonis. <sup>1</sup>Health Protection Agency, London, UK; <sup>2</sup>Department of Paediatrics, James Paget University Hospital NHS Trust, Great Yarmouth, UK; <sup>3</sup>Department of Paediatric Infectious Diseases, St George's Hospital, London, UK; <sup>4</sup>Department of Paediatrics, Peterborough District Hospital, Peterborough, UK; <sup>5</sup>Institute of Child Health, London, UK; <sup>6</sup>Institut de Veille Sanitaire, Saint-Maurice, France; <sup>7</sup>Department of Public Health, University of Florence, Florence, Italy; <sup>8</sup>National Institute of Child Health, Budapest, Hungary; <sup>9</sup>Department of Pediatrics, University of Athens School of Medicine, Athens, Greece; <sup>10</sup>Centre of Pediatrics, Vilnius University, Vilnius, Lithuania

**Background and Aims:** Interrupting the transmission of infection in school and day care settings is an important element in the control of communicable diseases. International recommendations on exclusion from schools for communicable diseases vary widely and are often not evidence based. Previous published work summarising the evidence on incubation periods, periods of

infectiousness and exclusion periods is widely used in the UK to provide practical guidance for healthcare staff and parents.<sup>1</sup> A new collaborative project was set up, funded by the European Centre for Disease Prevention and Control (ECDC) and undertaken by the RCPCH and the Health Protection Agency, which aimed: to update the evidence base behind these guidelines based on a systematic literature search and review and to make recommendations that would be applicable to the whole of Europe.

**Methods:** 39 infectious diseases were identified as having potential for transmission in a school/day care setting. Primary parameters studied for each disease were: mode of transmission; incubation period; risk of transmission; period of infectivity; duration of shedding and serial interval. For each of these variables, the best available evidence was obtained by structured systematic searches of the medical literature including grey literature and unpublished outbreak investigations. The evidence obtained was critically reviewed by researchers and categorised into high, moderate or low quality using pre-established criteria and was then peer reviewed by experts. A UK steering group and a European expert panel considered the evidence as well as other factors including relevance of exclusion to a day care setting, public health importance of the disease and effectiveness of exclusion. Consensus recommendations were made for each disease that were categorised into “strong” or “weak”.

**Results:** The final guidance was presented to the ECDC scientific advisory forum after discussion by experts at a European level. European consensus was achieved on all diseases except typhoid fever and will be presented. It is acknowledged that high quality evidence is not available for all diseases.

1. Richardson M, Elliman D, Maguire H, *et al.* Evidence base of incubation periods, periods of infectiousness and exclusion policies for the control of communicable diseases in schools and preschools. *Pediatr Infect Dis J* 2001;**20**:380–91.

### G71 PAEDIATRIC ALLERGY SERVICE: AN AUDIT OF SERVICE PROVISION IN A DISTRICT GENERAL HOSPITAL

M Harrop, L Amegavie, AM Elbadri, J Anders. *St Helens and Knowsley Teaching Hospitals, Prescot, Merseyside, UK*

Allergic diseases are steadily increasing and rising health needs remain unmet, with limited tertiary services. With appropriate training and planning, we started a service for children with food allergies at our unit.

We performed a case review of all patients attending the service using an audit tool to review the service and study patient demographics. We also sought parental views by a standardised user satisfaction questionnaire.

148 clinical case records were identified and reviewed. There were 65 male patients and 83 female patients. A quarter of patients were seen by consultants other than those designated for the service. Record keeping was satisfactory in 98%. Allergens identified were peanuts in 41, mixed nuts in 28, egg in 20 and milk in five. A third of patients had multiple allergies. Allergy was classed as severe in 92 patients. Dieticians saw 75% of patients and 88% had medications per guidelines. An allergy nurse specialist saw all patients for home, school and nursery training, with two-thirds having home visits.

70 questionnaires were returned completed and were analysed. From questionnaires 85% were preschool children and the majority had associated atopic conditions. Half had one to two allergens and eight patients had more than five allergens. A consultant or allergy team member made the diagnosis in 75%. Of the 70 respondents, 63 out of 70 respondents had allergy tests, 40 blood, six skin prick tests and both tests in 16. Tests confirmed allergy in 84%. Results were explained to 94% of parents. Nearly all received written and/or verbal information, with 86% overall satisfaction. We conclude that food allergy is a common childhood problem. With the right setup, staffing and training can be managed satisfactorily in general district hospitals.