Plenary

P1 CASE–CONTROL STUDY OF EPIDEMIOLOGICAL RISK FACTORS FOR CHILDHOOD-ONSET INFLAMMATORY BOWEL DISEASE

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Background and aims: The incidence of inflammatory bowel disease (IBD) is increasing among children in Scotland yet the aetiology of IBD remains largely unknown. Genetic and environmental risk factors have been implicated. We have shown (1) that the phenotype of childhood-onset IBD is more extensive than adult-onset IBD in Scotland, and also (2) that the carriage of variants of genes implicated in IBD susceptibility does not differ between these Scottish IBD populations. We aimed to investigate the influence of a range of potential environmental factors in the development of paediatric IBD.
Methods: 126 cases of paediatric IBD (diagnosed <17 years of age; median age at diagnosis 9.8 years (Q1–Q3: 7.5–11.7)) were each matched with one control subject by age, sex and geographical location (to match for socio-economic status); controls were obtained by the general practitioner of each case. Children with IBD and their parents were interviewed face-to-face to obtain data on breastfeeding, immunisation history, surgical and medical history and family history (FH). Control data were obtained via postal questionnaire. Unifactorial analyses using the χ^2-test and multifactorial analysis using binary logistic regression were performed.
Results: FH of IBD was associated with IBD (OR 3.34; 95% CI 1.70 to 6.56; p = 0.0003). History of asthma (OR 2.48; 95% CI 1.28 to 4.78; p = 0.005), eczema (OR 2.83; 95% CI 1.50 to 5.36; p = 0.001) and food allergy (OR 2.98; 95% CI 1.04 to 8.54; p = 0.03) show a significant association with paediatric IBD and Crohn's disease. There were no significant differences between cases and controls regarding breastfeeding (52% vs 55%, p = 0.71). On multivariate analysis the significant factors were FH of IBD, bowel cancer and history of asthma and eczema (p<0.001, 0.033, 0.045 and 0.015, respectively). In contrast with findings on unifactorial analysis, no association of IBD with parental smoking during pregnancy, at birth and currently was found in the multifactorial analysis.
Conclusions: We have shown an association between atopy and paediatric IBD but none with breastfeeding practices. FH of IBD or bowel cancer is associated with IBD. Our epidemiological data are especially noteworthy in the context of the increasing number of genetic associations related to common inflammatory pathways identified in IBD and cancer.

P2 DEVELOPMENTAL CO-ORDINATION DISORDER AND ASSOCIATED DEVELOPMENTAL TRAITS: MORE THAN JUST AN EXPRESSION OF IQ

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Background: An overlap between developmental co-ordination disorder (DCD) and difficulties in attention, language and social communication has been reported in clinical samples. However, there has been limited research analysing these associations in a population-based sample accounting for confounding factors, most notably IQ.
Aim: To analyse the association between DCD and inattention, poor verbal and non-verbal skills, and impaired social communication in childhood.
Method: Analysis of prospectively collected data (n = 6990) from the Avon Longitudinal Study of Parents and Children (ALSPAC), a representative UK birth cohort. Motor co-ordination was assessed at 7.5 years using sub-tests derived from the Movement ABC. Developmental traits assessed between 7.5 and 8.5 years included: inattention (Development and Well-Being Assessment, DAWBA), IQ (Wechsler Intelligence Scale for Children III), expressive language (subtests from the Wechsler Objective Language Dimensions, WOLD), non-verbal skills (Diagnostic Analysis of Nonverbal Accuracy, DANVA) and social communication (the Social and Communication Disorders Checklist, SCDC). A series of multivariable regression models explored the associations between DCD and the developmental traits accounting for confounding factors, including IQ and socio-economic factors.
Results: 341 children met DSM IV criteria for DCD (4.9%). There were significantly more symptoms of inattention/hyperactivity and worse verbal, non-verbal skills, and social communication in children with DCD compared with controls (p<0.001 on all measures). (Table P2.) Multivariable analysis demonstrated this association remained after controlling for confounding variables.
Conclusions: Children with DCD have difficulties in associated developmental traits, after controlling for IQ, in a population-based sample. These associated difficulties should be considered during assessment and intervention.

P3 A RETROSPECTIVE REVIEW OF NUCLEAR IMAGING IN CHILDHOOD URINARY TRACT INFECTIONS PRIOR TO THE INTRODUCTION OF THE 2007 NATIONAL INSTITUTE OF HEALTH AND CLINICAL EXCELLENCE GUIDELINES; WILL RENAL SCARS BE MISSED?

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Background: There is ongoing debate as to the optimum management of childhood urinary tract infections (UTI). The introduction of new National Institute for Health and Clinical Excellence (NICE)

Abstract P2 Odds of significant difficulties in associated developmental traits in children with DCD compared with controls

	Significant difficulties			
	DAWBA	WOLD—expressive	DANVA	SCDC
	Any severe attention symptoms	Lowest 15th centile	Cut off ⩾7 errors Faces subtest	Cut-off scores ⩾9
DCD compared with controls OR (CI)	2.01 (1.39 to 2.93)**	1.84 (1.28 to 2.63)*	1.90 (1.37 to 2.65)**	2.42 (1.53 to 3.83)**

**p<0.001; *p = 0.001.
DANVA, Diagnostic Analysis of Nonverbal Accuracy faces subtest; DAWBA, Development and Well-Being Assessment; DCD, developmental co-ordination disorder; SCDC, Social and Communication Disorders Checklist; WOLD, Wechsler Objective Language Dimensions expressive language subtest.

guidelines in 2007 has been met with controversy. These guidelines advocate a decrease in the amount of investigations previously being performed and many question if scars will be missed.
Aims: To identify, by implementing new NICE guidelines, would there be sufficient detection of those individuals having renal scars previously identified by applying the 1991 Royal College of Physicians recommendations.
Methods: This study looked at patients who underwent DMSA scans for UTI in the 3-year period prior to 2007 while attending the paediatric outpatient department in a district general hospital. These scans were performed under the recommendations of the Royal College of Physicians. The patient notes were examined to determine which patients would have had scans performed under the NICE guidelines and whether renal scarring would be missed.
Results: A total of 155 children (43 boys, 112 girls) were studied all of whom met our inclusion criteria and received DMSA scans. In total, 23 abnormalities were detected by DMSA scans, which represented 14.8% of the total sample population. All scarring was unilateral and 74% were identified after a first UTI while 26% identified following recurrent UTI. When the sample was analysed using NICE guidelines the number of scarred kidneys declined by 48%, with only 11 of the 23 abnormal cases being identified. This suggests that under NICE guidelines 52% of affected individuals would have missed scars. The new guidelines would have resulted in only 43 patients undergoing DMSA scans; a reduction of 72%. The percentage of missed scars varied by age group (<6 months 75%, 6 months–3 years 50% and >3 years 45%).
Conclusions: The new NICE guidelines have helped standardise existing practice for the management of UTI and will reduce the burden placed on radiological departments as fewer investigations will be requested. However, if the detection of renal scarring is felt critical by paediatric nephrologists with potential significant morbidity, then these guidelines are inadequate and cases of renal cortical scarring will be missed.

P4 IMPROVED ENGRAFTED SURVIVAL AND METABOLIC RATES FOLLOWING HAEMOPOIETIC STEM CELL TRANSPLANT FOR MPS-IH (HURLER SYNDROME): IMPLICATIONS FOR CELLULAR THERAPY IN MPS-1H AND SIMILAR LYSOSOMAL STORAGE DISORDERS

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Aims: Haemopoietic stem cell transplant (HSCT) is the treatment of choice for MPS-1H (Hurler syndrome) while milder MPS-1 phenotypes are managed with enzyme replacement therapy (ERT). HSCT outcomes have been greatly altered in recent years by better donor matching, improved supportive care and use of umbilical cord blood (UCB) donors. In this abstract we aim to (1) describe the changing outcome of HSCT for MPS-1H in a single large UK transplant centre, and (2) compare the metabolic outcome of patients treated with ERT and HSCT.
Methods: We selected the last 21 patients transplanted in Manchester for MPS-IH, since the current transplant protocol was introduced in 2004. This is a full intensity protocol. End points for analysis were death or graft loss and the engrafted survival rates were compared with patients transplanted previously in this same centre. We determined reduction of substrate achieved—expressed as dermatan sulphate (DS):chondroitin sulphate (CS) ratio—in donor cell engrafted, enzyme-expressing recipients. We compared this ratio between unrelated donors, heterozygous family donors and patients treated with ERT.
Results: Of 21 patients transplanted using the current protocol 13 were from unrelated cord donors, six from family donors and two from unrelated adult donors. 20 patients are alive and engrafted after a first procedure (95%) with a median follow-up of 26 months (range 2–50 months). In previous protocols the engrafted survival rate was 50% and 13 of 40 patients required a second transplant procedure for graft failure. The DS:CS ratio was significantly reduced in unrelated donors (0.44; range 0.2–0.8) compared with heterozygous donors (0.7; 0.5–0.9) and patients treated with ERT (1.0, 0.54–1.6) ($p<0.0001$).
Conclusions: The results of HSCT for MPS-1H are markedly better in the last years in this single centre experience. This reflects use of UCB as a donor source, better conditioning therapy and improved supportive care. We demonstrate that metabolic correction is significantly improved for unrelated donors compared with family donors as a consequence of better donor enzyme levels and improved enzyme delivery to residual deficient recipient tissues. Patients treated by HSCT have a lower residual substrate than patients treated with ERT. These data will influence the selection of patients for HSCT.

P5 WHAT ARE THE CHARACTERISTIC RETINAL FINDINGS SEEN AS A CONSEQUENCE OF CHILD ABUSE AND ACCIDENTAL TRAUMA? A SYSTEMATIC REVIEW

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Aims: Classic descriptions are given for the ''diagnostic'' features of abusive retinopathy, yet young children may also sustain retinal haemorrhages (RH) as a consequence of accidental trauma. We aim to systematically review the literature to define the distinguishing characteristics of RH in abusive vs accidental trauma (AT).
Methods: We searched 11 databases, references and conference abstracts from 1950–2007 identifying 7894 potential studies, 315 undergoing independent reviews by two paediatricians, ophthalmologists or pathologists, using standardised critical appraisal. Inclusions were primary studies of live children <11 years with RH, due to explicitly confirmed abuse or trauma, examined by ophthalmologist. Exclusions were mixed adult/child data, management or outcome. Studies were ranked by confirmation of abusive/accidental aetiology and level of detail of retinal examination.
Results: We included 55 studies, including five comparative studies of children <3 years, where prevalence of RH in abuse was 95 of 129 (74%) vs 13 of 225 (6%) accidental. Total (comparative+non-comparative) abuse data showed: 407 (98%) with intraretinal haemorrhages, 209 (50%) pre-retinal haemorrhages and 69 (17%) subretinal haemorrhages, all three layers 11%. Other features seen included vitreous haemorrhage, perimacular retinal folds and retinoschisis. The RH were unilateral in 25% cases, with 79% of these having subdural haemorrhages (SDH) and 35% fractures. Among abuse cases 19 had no intracranial haemorrhage, but eight of 19 had other neuropathology. Among all those with RH due to AT (26), 17 of 21 had unilateral RH, 25 of 26 in posterior pole/arcades. Seven cases had only a single haemorrhage. One child with crush injury had peri-macular retinal folds but schisis cavities were not seen in AT. Coexistent intracranial injury and fractures occurred in two-thirds of AT cases.
Conclusions: The characteristics of abusive RH are varied, and do not conform to a precise pattern. However, the majority have bilateral RH, with the commonest recorded lesions being intra-retinal and pre-retinal. Those abused children with unilateral RH, had multiple coexistent injuries. In contrast, accidental trauma is a rare cause of RH, and when present they are frequently unilateral, few in number and predominantly restricted to the posterior pole.

P6 PREVALENCE AND CLINICAL FEATURES OF NEWLY DIAGNOSED CONGENITAL ADRENAL HYPERPLASIA IN THE UK

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Background: Congenital adrenal hyperplasia (CAH) is due to recessively inherited enzyme deficiencies in cortisol production and affects an estimated one child in every 10 000–20 000 born.

Children may present with a life-threatening adrenal or salt wasting crisis in the newborn period, or with incorrect sex assignment, hypertension, short stature or precocious puberty. Girls may be more readily diagnosed due to associated signs of virilisation. Newborn screening for CAH is not currently offered in the UK, reflecting uncertainty regarding disease burden.
Aim: To report the prevalence of newly diagnosed CAH, age and clinical features at presentation, child sex, ethnicity and CAH subtype.
Methods: Active surveillance through the British Paediatric Surveillance Unit for 25 months from August 2007 of newly diagnosed CAH in any child $\leqslant$16 years with clinical features of CAH and elevated 17-hydroxyprogesterone. Cases were reviewed by an expert panel and assigned as ''definite CAH'', ''probable CAH'' or ''not CAH''. Clinician reports of ethnicity based on UK census categories were grouped as white, black, Asian, and mixed/other.
Results: Data are from the first 12 months of surveillance: 67 of 71 notified children were assigned as definite/probable CAH of the following subtypes: 21-hydroxylase deficiency (n = 59), 11β-hydroxylase deficiency (n = 3), 3β-hydroxysteroid dehydrogenase deficiency (n = 1) (four children not yet classified). 19 of 67 (28%) were Asian compared with 4% of the UK child population and 36 of 67 (54%; 95% CI: 42 to 65%) were girls. 35 of 67 (52%; 17 boys) presented in the first year of life: estimated birth prevalence 0.96 (95% CI 0.16 to 5.59) per 10 000 live births. One boy died aged 9 days due to an adrenal crisis (2.9% mortality in infancy). All those diagnosed in the first year of life had presented by 30 days, 12 (34%; 11 boys) after day 13; the age at which screening results would generally be available in the UK.
Conclusions: CAH is of similar birth prevalence to other conditions for which newborn screening is currently offered. Our findings suggest boys and girls are equally affected but that boys present with more severe manifestations in infancy when one-third of children may benefit from newborn screening. While CAH mortality is consistent with recent estimates from other countries, deaths may be under-ascertained if based on British Paediatric Surveillance Unit methodology alone.

P7 DETECTION OF UNCULTURED ORGANISMS IN PAEDIATRIC BONE AND JOINT INFECTIONS BY A MULTIPLEX REAL-TIME POLYMERASE CHAIN REACTION PANEL

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Background and aims: In paediatric osteoarticular infections (OAI), treatment is often started and continued empirically due to the low sensitivity of conventional blood and tissue culture in these patients. Complex cases are more likely to undergo surgery. Better and more rapid microbiological diagnostic techniques could ensure more accurate therapy in order to reduce morbidity and overall (patient and financial) costs of treatment. This study investigated the use of real-time multiplex polymerase chain reaction (PCR) in paediatric OAI to increase the speed and accuracy of diagnosis and to demonstrate the potential clinical impact of the new test.
Methods: A new real-time PCR diagnostic protocol was developed to identify the presence of the most common organisms known to cause paediatric OAI (identified from both the literature and local microbiology database). A real-time PCR panel (comprising two triplexes+one single PCR) was developed using three different reporter dyes (one for each target). DNA extraction was carried out using the MagNA Pure platform (Roche). Real-time PCR was carried out using a Rotor-gene 6000 (Corbett). The detection limit was found to be 10^3–10^2 CFU/ml (assay is detecting five genomic copies per PCR reaction as microlitre samples are being tested). Research Ethics Committee approval was obtained to link clinical and laboratory data.
Results: 55 paediatric bone and joint samples were assayed from 32 patients (age range 270 days to 192 months). 18.2% of PCR samples were positive for pathogenic bacteria on day 1 (21.8% by day 4 of culture). Pathogenic bacteria detected by PCR were six *Staphylococcus aureus*, two *Kingella kingae*, one *Streptococcus pneumoniae*, one Group A Streptococcus and three Group B Streptococcus). Three samples were PCR and conventional culture +ve, 20 PCR +ve but culture –ve, and 30 PCR and culture –ve. No samples were culture positive for organisms tested by PCR. The diagnostic yield of pathogenic bacteria by culture alone was two of 32 patients (6%) increasing to 13 of 32 patients (41%) using PCR. The potential clinical impact is demonstrated by collated case examples (data not shown).
Conclusions: We have developed a new, rapid (same day) method for detecting uncultured pathogens direct from paediatric bone and joint samples. Case examples demonstrate the clinical benefit of the technique. Work is ongoing to establish the clinical value and cost-effectiveness of the technique prior to introduction into routine clinical practice.

P8 DOES A HUNGRY BABY GO ON TO BECOME AN OBESE CHILD?

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Background and aims: Early childhood has been proposed as a period when obesogenic eating patterns may be established, but there are no standardised measures of eating behaviour in infancy. We have constructed an infancy eating score and related it to growth and adiposity in childhood.
Method: The Gateshead Millennium study recruited 1029 children at birth and has now tracked them to age 7 years. All 32 variables from parent questionnaires at age 1 year describing eating behaviour (n = 619) were explored using regression methods to identify variables that were significant independent predictors of conditional weight gain from birth to 1 year. The multivariable GLM regression coefficients of these six variables were then summed to create an eating score. Participants were measured aged 1 year (n = 846). At 7 years a range of anthropometric and body composition measures were collected (n = 591), including biolectrical impedance (BIA), which was expressed as lean and fat indices adjusted for height, gender and age. Skinfolds, fat index and waist were combined (using principal components analysis) into an adiposity index.
Results: At 1 year the eating score was more strongly correlated with BMI ($r = 0.26$, $p<0.001$) than length ($r = 0.14$, $p<0.001$); it was weakly related to maternal BMI ($r = 0.105$, $p = 0.012$) but not to paternal BMI ($r = -0.021$, $p = 0.7$). At age 7 years the infancy eating score was still significantly predictive of BMI ($r = 0.14$, $p = 0.003$) height ($r = 0.11$, $p = 0.025$) and lean index ($r = 0.10$, $p = 0.033$) but it was not of any measures of adiposity once adjusted for height (adiposity index $r = 0.04$, $p = 0.44$; skinfolds $r = 0.08$, $p = 0.2$; fat index $r = 0.06$ $p = 0.3$; waist $r = 0.03$, $p = 0.5$).
Conclusions: This suggests that eating behaviours that relate to weight gain in infancy may be driven more by growth than a tendency to adiposity.

P9 EPICURE 2: SURVIVAL FOLLOWING EXTREMELY PRETERM BIRTH BY HOSPITAL DESIGNATION

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Objective: To determine whether survival to discharge from hospital following extremely preterm birth in England differs in hospitals of different designations.

Methods: Clinical details were collected for all births (n = 2590) of gestation 23^{+0}–26^{+6} weeks in English hospitals (n = 182) in 2006. Hospital designations were obtained from neonatal network clinical leads: level (L)1 special care; L2 high dependency; L3 intensive care. A further categorisation of units as low, medium or high activity was made using the days of respiratory support and number of consultants with >50% dedicated neonatal sessions collected as part of the EPICure data set.
Results: Of 1836 live births, 1097 (60%) were in hospitals with L3, 588 (32%) with L2 and 151(8%) with L1 neonatal units. Of these 933 (85%), 460 (78%) and 104 (69%) survived the first 24 h (p = <0.001) and 648 (59%), 293 (50%) and 68 (45%) (p<0.001), survived to discharge. After adjusting for gestational age the OR of death before discharge for babies born in hospitals with L2 compared with L3 neonatal units was 1.28 (95% CI 1.02 to 1.60, p = 0.035), and for those born in hospitals with L1 units was 1.43 (95% CI 0.98 to 2.10, p = 0.067). Of the babies born in hospitals with L3 neonatal units, death for those born <25 weeks (n = 417) was significantly more likely: OR 1.96, 95% CI (1.28 to 3.00), p = 0.002, for those in neonatal units with moderate activity (1–3 ''neonatologists'' and 500–1999 days respiratory support) than those with high activity (⩾4 neonatologists and ⩾2000 days respiratory support).
Conclusions: Despite the development in England of neonatal networks, 40% of live births at 23^{+0}–26^{+6} weeks gestation in 2006 took place in hospitals without a L3 neonatal unit. Survival is higher for babies born in hospitals with neonatal units designated by networks as L3 and, for those born before 25 weeks, in those L3 units with ''high activity'' as defined for this study.

P10 KAWASAKI DISEASE: PRESENTATION IN THE OLDER CHILD

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Background: Kawasaki disease (KD) is usually diagnosed in children from 1–5 years old. However, older age at presentation has been reported infrequently.
Aims: To identify patterns of presentation, treatment and outcome in patients who are diagnosed with KD at age 8 years or more.
Patients: 73 children aged 8 years and over with KD were retrospectively reviewed. Data were obtained from patient questionnaires distributed by the Kawasaki Support Group, with informed consent.
Results: 62% (n = 45) were male. Median age at diagnosis was 9.95 years (range 8–20). There was an average delay of 8 days (range 5–21) until diagnosis was made. Patients on average spent 7 days (range 2–76) in hospital. Alternative diagnoses were suggested, including virus infection, meningitis, allergy and tonsillitis. 88% or more patients experienced each of the characteristic symptoms associated with KD. In addition, 21 patients reported arthralgic symptoms, 28 patients reported lethargy, weakness or depression and seven patients experienced symptoms of meningism. 28 patients experienced gastrointestinal symptoms including loss of appetite, weight loss and vomiting. Complications included nose bleeds, aseptic meningitis, respiratory failure and transient deafness. Many patients were diagnosed too late to treat, with only 45 of 64 (70%) of patients receiving immunoglobulin therapy, but 49 of 52 (94%) receiving aspirin. Echocardiography was normal in 42 of 63 (67%) of cases, with dilatation or aneurysms detected in 17 of 63 (27%). After resolution, six of 15 (40%) experienced continued peeling, five of 12 (42%) experienced eczema or dry skin and nine of 17 (53%) experienced joint problems, including arthritis. In addition, 17 reported changes in personality or behaviour, including irritability, bad temper and moodiness.
Conclusions: Although much more common in a younger population, it is important to recognise KD as a possible diagnosis in the older child. Older children experience a wide range of symptoms that may lead to a late diagnosis and subsequent delay in treatment. In addition, they may experience long-standing complications, most notably changes in personality and behaviour. They may require additional help and treatment to cope with the complications that often follow the disease.

P11 MORTALITY FOLLOWING ANTIEPILEPTIC DRUG USE IN CHILDREN AND ADOLESCENTS

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Aims:
- To identify cases and causes of death in a UK cohort of children with epilepsy who have been prescribed an antiepileptic drug (AED).
- To calculate standardised mortality ratios (SMRs).
- To perform a causality assessment to determine the likelihood of the AED being responsible.

Methods: The general practice research database (GPRD) was used to identify cohort of children aged 0–18 years who were prescribed AEDs during the study period (1993–2005). Subjects who had died were identified; GPs completed questionnaires and death certificates were obtained. SMRs (95% CI) were calculated using UK general population mortality rates from the Office for National Statistics. A consensus panel performed causality assessments.
Results: A total of 6190 subjects (54% male) in cohort contributing 26 890 person-years was examined. 151 subjects died (57% male) with mean age of death 8.7 years. Crude mortality rate was 5.62 per 1000 person-years. The majority of subjects who died had severe underlying disorders. Cause of death was attributable to epilepsy in 18 of the 151 subjects, nine of which were due to sudden unexplained death in epilepsy (rate of 3.3 per 10 000 person-years). The overall SMR was 22.36 (18.93, 26.22). Subjects prescribed newer or both AEDs had higher SMRs of 30.21 (15.08, 54.06) and 32.51 (25.09, 41.43) respectively compared with conventional AEDs 17.33 (13.65, 21.69). The AEDs were probably (n = 2) or possibly (n = 3) associated with death in only five subjects, suggesting they are not a major cause of death.
Conclusions: This large cohort study has shown that children prescribed AEDs for epilepsy have an increased risk of mortality compared with the general population. Although most of the deaths were in children with a severe underlying disorder, a small number of SUDEP cases were also identified. Subjects prescribed a newer AED or polytherapy appear to be at greater risk of death; due to relatively small numbers prescribed a newer AED the reason for this higher risk remains uncertain but it may be related to the severity of the epilepsy or underlying disorder.

P12 LOW BONE MASS IS RELATED TO REDUCED CALCIUM INTAKE AND EXERCISE OVER TIME IN OBESE CHILDREN. THE ROLE OF PARENTAL AND SOCIAL FACTORS

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Background: We have recently demonstrated that obesity is associated with a lower total body and regional bone mass for body size and an increased fracture risk. We hypothesised that reduced calcium intake and exercise may contribute to low bone mass in obese children.
Methodology: We recruited 103 children aged 5–16 years in two groups; obese and non-obese. At 1 year 66 children returned. Total body (less head) bone mineral content (BMC), bone area (BA) and bone mineral density (BMD) and total body fat mass were measured using DXA. Body size adjusted bone Z-scores were created based upon non-obese children without previous fracture. Calcium intake (mg/day) was assessed by questionnaire. Physical

activity was assessed using scores for total activity (TAS), weight bearing (WBS), non-weight bearing (NWS) and inactivity (IS). Parental attitudes were assessed using scores for positive attitude (PAS), negative attitude (NAS), limiting factors (LFS) and bone health awareness (BHAS).
Results: Total body bone area ($p = 0.02$) and BMC ($p = 0.04$) Z-scores were related to calcium intake at baseline. Parental BHAS positively predicted calcium intake at baseline ($p = 0.001$). Calcium intake (mg/day) was reduced in obese children at baseline (1061 ± 700 vs 1430 ± 530, $p = 0.004$) and at follow-up (764 ± 442 vs 1278 ± 647, $p = 0.0002$). Bone area Z-score was associated with TAS and WBS, and BMC Z-score was associated with WBS at baseline. Following correction for gender and skeletal maturity, TAS (17 ± 5 vs 21 ± 5, $p = 0.002$) and WBS (12 ± 4 vs 15 ± 4, $p = 0.001$) were lower at baseline and TAS (19 ± 6 vs 22 ± 6, $p = 0.04$) was lower at follow-up in obese children. Limiting factor score (LFS) was lower (greater limitations to activity) in obese children at baseline (28 ± 6 vs 33 ± 7, $p<0.0001$) and follow-up (28 ± 7 vs 33 ± 4, $p = 0.005$). NAS was higher for parents of obese children at baseline (15 ± 4 vs 12 ± 3, $p = 0.003$). Total body fat mass was negatively related to TAS, WBS and LFS at baseline and follow-up.
Conclusions: Obese children are less active and take less calcium, which may contribute to the lower bone mass in this group. Lifestyle limitations and negative parental attitudes are related to a reduction in physical activity in obese children. Inadequate bone health awareness may reduce calcium intake. These are important considerations for bone health and weight loss programmes.

P13 CARDIOVASCULAR ABNORMALITIES IN DOWN SYNDROME: THE SPECTRUM OF MALFORMATIONS AND MANAGEMENT OVER 22 YEARS

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Background: The incidence of cardiovascular abnormalities in Down syndrome (DS) is well described; however, there are few data on the spectrum, management and survival. We aimed to describe this in a defined population over a 22-year period.
Methods: Data on all live births and live births with DS from 1985 to 2006 were obtained from the Northern Congenital Abnormality Survey. The regional paediatric cardiology database provided information on all cardiovascular malformations and management.
Results: There were 754 486 live births in the population from 1985 to 2006. 821 infants were live born with DS (1.08 per 1000 live births with no change in live birth prevalence over time). 343 (41.7%) had a cardiovascular malformation, 124 complete atrioventricular septal defect (CAVSD) (36%), 106 ventricular septal defect (VSD) (31%), 48 atrial septal defect (ASD) (14%), 22 partial atrioventricular septal defect (6%), 17 patent ductus arteriosus (PDA) (5%) and 16 Tetralogy of Fallot (5%). Two patients had defects with single ventricle physiology (unbalanced CAVSD and tricuspid atresia). 21% had more than one defect, the commonest additional defect being a PDA. 219 patients had corrective surgery, seven transcatheter interventions for ASD/PDA, 24 did not require treatment for small VSDs/ASDs/PDAs that spontaneously closed. The two patients with single ventricle physiology underwent successful completion of Fontan circulation. Two patients were transplanted for anthracycline-related cardiomyopathy. 17 (5%) have developed pulmonary hypertension. There were 66 deaths with 70% of these under 1 year of age. 1 year survival with a cardiac diagnosis improved from 78% in 1985–1995 to 91% in 1996–2006.
Conclusions: The proportion of babies with DS who have a cardiovascular malformation and the spectrum of these malformations have remained largely unchanged over 22 years. Treatment options are now different with corrective surgery offered to the majority, but single ventricle palliation and cardiac transplantation are now able to be considered and DS in itself is not a contraindication to any form of management. Survival has improved over time.

P14 ANALYSIS OF THE COMMUNICATION STATION WITHIN THE MRCPCH CLINICAL EXAM: IS IT A GOOD PREDICTOR OF OVERALL EXAM PERFORMANCE?

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Aims: The Royal College of Paediatrics and Child Health (RCPCH) 10 station OSCE style clinical examination includes two 9-min communication stations (CS), that aim to test the candidates' ''ability to communicate appropriate, factually correct information in an effective way within the emotional context of the clinical setting''. Candidates are provided with a written scenario, a brief case history and their task; performance is scored against generic anchor statements and agreed standard for each scenario. This analysis aims to determine the importance of the CS as a predictor for overall exam performance.
Method: Data were collated from 994 candidates taking the MRCPCH clinical exam in UK centres in 2008 (three exams). Descriptive data identified pass rates using the χ^2 test to analyse differences between groups. Spearman's ρ (rs) correlation coefficient was used to correlate candidate's performance in the communication stations with total exam scores.
Results: The overall pass rate across the three 2008 clinical exams was 31.9%. The pass rate for those candidates who passed both CS was 53.9%; the pass rate for those candidates who failed both CS was 16.3%. This suggests that the CS act as a good discriminator between good and poorly performing candidates ($\chi^2 = 156.70$; $df = 1$; $p = 0.001$). There is also a significant correlation between candidates' scores on each of the CS and their total exam score (CS 1 $rs = 0.520$; $p = 0.001$; CS 2 $rs = 0.523$; $p = 0.001$), indicating that better performance on the CS is associated with a higher total score and higher chance of examination success, with a coefficient of determination (r^2) of over 25%. Similar correlations are found when analysis is broken down in UK graduates and overseas graduates: results are pertinent to each group.
Conclusions: Assessment of candidates' communication skills is of paramount importance. The communication skills displayed on these stations, are a good indicator of well and poorly performing candidates. The observation that the CS is good predictor of overall performance in the clinical exam may have implications for examination development and training.

P15 THE EPIDEMIOLOGY OF BIRTH ASPHYXIA IN RURAL BANGLADESH

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Background: WHO ascribes 25% of neonatal deaths in low income countries to birth asphyxia. In a South Asian hospital population 5–10% of newborns require resuscitation, 2/1000 die and 1/1000 survive with impairments. The condition of infants born at home in low income countries is largely unknown.
Aim: To determine maternally reported birth asphyxia rates and associated resuscitation efforts in a large community cohort in Bangladesh.
Method: We monitored all births among the resident population of half a million in three districts and interviewed all mothers 1 month after delivery.
Results: We ascertained 26 173 *home* deliveries in our study areas (of a reported total of 31 967). 25 492 infants were liveborn, 681 stillborn and 833 died (SBR 26/1000, NMR 32/1000) as did 58 mothers (MMR 221/100 000). 3186 (12.5%) of infants were reported not to breathe immediately. Half of these infants (1683 (53%)) were resuscitated. At 5 min of age many (1217 (38%)) remained blue peripherally with poor breathing and movement (of

whom 206 died and 29 developed fits but survived) and 59 (2%) remained centrally cyanosed (''bluebody'') with no movement at 5 minutes (of whom 14 died and one developed fits). Of the 22 302 infants who cried immediately, 159 (0.7%) were compromised at 5 min. 42 of these infants died (41%) and none survived with fits. Overall, 262 of the 1435 infants compromised at 5 min died (fatality rate 18%) and 29 (2%) developed fits but survived.

Conclusions: In this setting 12.5% newborn infants do not breathe immediately, 7% are resuscitated, despite which 5% remain compromised at 5 min—of whom 18% will die contributing 31% of all neonatal deaths. In this population 10/1000 die in the neonatal period following ''birth asphyxia'' (five times that reported for a hospital delivering population) but only 1/1000 survive with evidence of severe neurological disturbance in the neonatal period predictive of significant impairment.

P16 PSYCHIATRIC AND BEHAVIOURAL DISORDERS AT 11 YEARS OF AGE IN CHILDREN BORN EXTREMELY PRETERM (THE EPICURE STUDY)

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Aim: To report the risk of psychiatric diagnoses at 11 years of age in children born extremely preterm.

Participants: Children born <26 weeks gestational age in the UK and Ireland from March through December 1995 were recruited to the EPICure Study. Of the 307 survivors at 11 years, 219 (71%) were assessed (mean age: 10 years 11 months). Controls were 153 classmates born at term and matched for age, sex and ethnic group (mean age: 10 years 11 months).

Method: Parents and teachers had structured psychiatric interviews using the Development and Well-Being Assessment (DAWBA). Psychiatric diagnoses were classified using DSM IV and ICD-10 by two clinicians. Information from parents or teachers was available for 219 (100%) preterm children and 152 (99%) classmates, and information from both respondents was available for 183 (84%) preterm children and 138 (90%) classmates.

Results: Risk of psychiatric diagnosis was significantly higher in the preterm children than the classmates (26.8% vs 9.4%; OR 3.52 (95% CI 1.82 to 6.79); p = 0.000). Risk was significantly higher for autistic spectrum disorders (ASD) (8% vs 0%; p = 0.001) and for attention deficit hyperactivity disorder (ADHD) inattentive type (7.1% vs 0.7%; OR 10.48 (95% CI 1.35 to 81.09); p = 0.004) in preterm children compared with classmates. Risk of ADHD combined type (4.4% vs 2.2%; OR 2.06 (95% CI 0.54 to 7.90), general anxiety disorder (2% vs 0), phobic anxiety disorder (1.5% vs 0), depression (1.5% vs 0.7%; OR 2.16 (95%CI 0.22 to 21.00) and post-traumatic stress disorder (0.5% vs 0) was marginally but not significantly higher in preterm children. Risk of oppositional defiant disorder (5.0% vs 5.3%), Tourette's syndrome (1% vs 0.7%), separation anxiety disorder (2.5% vs 2.1%) and social phobia (0.5% vs 0) was similar between the two groups. Risk of conduct disorders (0.5% vs 1.4%) was marginally but not significantly lower in preterm children.

Conclusions: In this 11-year follow-up study, risk of psychiatric disorders in children born extremely preterm is significantly higher than their classmates born at term. Extremely preterm children are at greatest risk for ASD and ADHD inattentive type at this age.

P17 FEEDING SYMPTOMS, DIETARY PATTERNS AND GROWTH IN YOUNG CHILDREN WITH AUTISTIC SPECTRUM DISORDERS

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Aim: Using prospectively collected data, to investigate whether limited food preferences precede other autistic symptoms, and to describe the diet and growth patterns of children with autistic spectrum disorders (ASD).

Method: Data on feeding and food frequency were collected by questionnaires completed at 6, 15, 24, 38 and 54 months by participants in the Avon Longitudinal Study of Parents and Children (ALSPAC). A food variety score was created by summing the different types of food the child took at each age, and the content of the diet was measured by a dietary diary at 38 months. The feeding and dietary patterns of 86 children diagnosed from health and education records to have an ASD were compared with 11 402 typically developing children (controls).

Results: The median age of children with ASD at referral was 28 months, and at diagnosis was 45 months. Compared with controls, the infants with ASD were breast-fed for longer, were more likely to have late introduction of solids after 6 months (OR 3.22; 95% CI 1.35, 7.64; p = 0.004) and were described as slow feeders at 6 months (OR 1.66; 95% CI 1.02, 2.69; p = 0.04). From 15 to 54 months the children with ASD were consistently reported to be ''difficult to feed'' (p<0.003) and ''very choosy'' (p<0.02). No group differences were apparent in maternal diet in pregnancy, or infant food variety score at 6 months. From 15 months, the ASD group had a significantly less varied diet: by 38 months adjusted OR for 1 SD difference in variety score was 1.95 (95% CI 1.48, 2.95; p<0.01). The diet was least varied in cases of classical autism. Children with ASD were more likely to have different meals from their mother from 24 months, and by 54 months 8% of children with ASD were taking a special diet for ''allergy''. Compared with controls, the ASD group ate less vegetables, salad and fresh fruit but also consumed less sweets and fizzy drinks. The dietary diary data at 38 months showed no differences between children with ASD and controls in the reported intake of energy, total fat, carbohydrate and protein, but the ASD group consumed less vitamin C (p = 0.02) and vitamin D (p = 0.003) than controls. There were no group differences in weight, height or BMI at 18 months and 7 years.

Conclusions: Children in the ASD group demonstrated feeding symptoms from infancy and had a less varied diet from 15 months, but energy intake and growth were not impaired. Feeding behaviour in ASD reflects limited interests and difficulty in accepting change, and in an extreme form can present as a ''Pervasive eating disorder''.

P18 THE USE OF POLYMERASE CHAIN REACTION AS A DIAGNOSTIC TOOL IN THE DETECTION OF GROUP B STREPTOCOCCUS IN NEONATES

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Aims: The aim of this study was to prospectively evaluate polymerase chain reaction (PCR) as a diagnostic tool in the detection of group B streptococcus in neonates undergoing screening for sepsis in the first 72 h of life. It was hypothesised that PCR would be able to detect bacteraemia with a greater sensitivity and specificity than by blood culture. The diagnosis may also be established in hours rather than days, avoiding delay in treatment and inappropriate antibiotic use.

Method: Subjects were recruited from two UK level 3 neonatal units. Ethical approval was obtained prior to study commencement. All babies undergoing a septic screen in the first 72 h of life were eligible for inclusion. Septic screening involved the routine collection of blood for culture and a deep ear swab for microscopy and culture using standard microbiological methods. A second deep ear swab was stored in serum tryptone glucose glycerol broth at −20°C for PCR analysis. An additional aliquot of blood was stored in a sterile EDTA Eppendorf prior to DNA extraction and analysis. DNA extraction was performed using the Roche MagNA Pure DNA III kit and amplification using Lightcycler assays. The primers used

targeted cylB gene, which encodes a haemolysin specific to group B streptococcus.
Results: In total 71 babies were recruited. Only one baby was blood culture positive for group B streptococcus. Three babies were blood PCR positive for group B streptococcus, including the culture positive case; these three cases had overt clinical signs of sepsis. Six babies had culture positive deep ear swabs. Eleven ear swabs were PCR positive including five culture positive ear swabs. All three blood PCR-positive cases had PCR-positive ear swabs.
Conclusions: More babies were identified by PCR to have group B streptococcus in their blood than were identified by culture. This was also true for deep ear swabs. It appears the sensitivity and specificity of PCR in this setting is superior to culture-based techniques. These findings warrant further investigation and recruitment to this study continues. This molecular approach may limit inappropriate antibiotic use, identify those who should be considered for treatment in a timely fashion and improve our understanding of the true burden of neonatal group B streptococcal disease.

P19 DEVELOPMENT AND EVALUATION OF A CHILDHOOD OBESITY INTERVENTION PROGRAMME IN A DEPRIVED INNER CITY AREA

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Aim: To develop and evaluate a service to support obese children and their families from the most deprived areas of an East Midlands city.
Introduction: Socially disadvantaged obese children are at high risk from adverse health due to both a higher prevalence of obesity and other coincident risk factors prevalent within their communities, including cardiovascular disease and smoking. Research in obesity intervention often aggregates all obese children with few studies focused on deprived populations. We developed a targeted intervention programme within the most deprived parts of an East Midlands city.
Method: The programme was based in leisure centres close to areas of urban deprivation and was flexible to cater for the needs of an ethnically and culturally diverse population. Phase 1 (P1; 2003–06) qualitatively explored family and child perspectives of ideal service delivery and piloted family-based intervention programmes. Phase 2 (P2; 2006–08) was a term-time weight control programme that integrated school nursing, leisure services, community paediatrics and dietetics. Body weight (BW), waist circumference (WC), height, body fat and fat free mass (FFM) were assessed at 6- or 7-week intervals and data were analysed using Wilcoxon and Spearman tests as appropriate.
Results: 71 children in two cohorts were observed within P2, children attended from deprived areas of the city (highest 10% deprivation index nationally). BW and WC increased during the programme (BW, $+2.0 \pm 0.4$ kg; WC, $+1.9 \pm 0.8$ cm; $p<0.05$). BMI and FFM remained stable.
Discussion: Increased BW was significantly correlated to increased FFM, suggesting increased muscle mass. There was no relationship between attendance and change in physiological measurements. Deprivation index was negatively correlated to change in waist circumference. We additionally report on how the programme evolved from a research-funded pilot to an NHS-funded service and offer practical tips to other centres who are contemplating developing locally flexible services.
Conclusions: This work illustrates the challenges faced in designing intervention programmes within a cost-effective, evidence-based framework for a large diverse area of urban deprivation. Future work will aim to improve attendance and concordance as well as assess self-esteem and physical activity.

P20 DESIGNING THE NEW UK–WHO GROWTH CHARTS

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Background: The WHO growth standards provide a unique worldwide standard for growth in all preschool children. The RCPCH was commissioned to design and implement new charts for the UK based on the WHO standard, for use from May 2009. Design changes to be incorporated included separation of preterm (UK 1990) birth centiles from the WHO chart starting at age 2 weeks, a disjunction at age 2 years when the WHO standard changes from length to height and the transition before the WHO standards cease at age 5 years. All charts had to be supported by clear, well evidenced instructions.
Method: Following team discussions and parental consultation a design specification was produced and designers appointed. New design aspects were tested with initial professional focus groups. The resulting prototypes and instructions were tested with further focus groups using mixed qualitative and quantitative methods, as well as stakeholder consultation, leading to further changes.
Results: The charts present preterm (using UK 1990 reference) and infant (WHO) charts separately, and stop at age 4 to ensure that at school entry all children are plotted using the same reference (UK 1990). The 50th centile has been de-emphasised to encourage parents and professionals to expect a wider range of normal growth. However, more subtle visual cues have been included to assist orientation when plotting. Other innovative features include a BMI look-up and an adult height predictor, which both avoid the need for calculation. The instructions have specified standardised plotting methods and terminology and aim to assist identification and assessment of growth parameters outwith the normal range. The question of how often to weigh and or measure length or height proved controversial.
Conclusions: The UK–WHO growth charts will be the first UK charts developed using an evidence-based approach worthy of the unique WHO data set. The charts will look and perform differently and paediatricians will need to familiarise themselves with the new charts prior to their launch in May 2009.

P21 AN IMPROVED TOOL TO PREDICT ADULT HEIGHT AND RELATE TO PARENTAL HEIGHT FOR THE NEW UK–WHO GROWTH CHARTS

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Background: Mid-parental height is commonly used to compare child's and parents' heights, and hence to test for a growth disorder. However, the calculation is both complex and statistically flawed as it does not adjust for regression to the mean. Moreover it provides a poor guide to the child's adult height, which is better predicted using their most recent height centile.
Aim: To produce a simple yet statistically valid tool for the new UK–WHO height chart that uses the current height centile to predict adult height, which can then be compared with parental height.
Methods: The relationship between current and adult height was modelled using correlation data from the Zurich Growth Study to

Abstract P21 Mean (SD) of adult height prediction error (cm) by sex and age at prediction

	Age 7	Age 11	Age 16
Boys	0.4 (5.1)	0.4 (4.8)	1.1 (4.4)
Girls	−0.4 (4.8)	−0.6 (5.1)	0.6 (2.5)

adjust for regression to the mean, applied to the UK 1990 reference and validated using data on approximately 11 000 subjects from the 1958 British birth cohort at 7, 11, 16 and 23 years. A nomogram was constructed to predict adult height from height centile at 3 years (assuming normal growth). It was tested as a plotting exercise by 78 NHS staff in seven focus groups and shown to 15 parents in three focus groups.

Results: From age 18 months the child–adult height correlation was 0.6–0.85 before puberty, depending on age and sex, implying a height prediction SD of 4–5 cm. The table shows the mean and SDs of the error involved in predicting height at 23 years in the 1958 cohort, which were very similar to the predicted SDs, with 80% of predictions within ±6 cm. In the focus groups, 85% of NHS staff read predicted height using the nomogram to within ±0.5 cm and 58% correctly interpreted the range of the prediction. The height predictor proved very popular with parents who described it as ''fabulous'', ''much easier'' and ''straightforward, simple and easy to understand''.

Conclusions: This simple tool can be placed on any growth chart and allows adult height prediction with no need for calculation; the predicted height can then be compared with the parental heights to detect discrepant growth.