Abstracts

Plenary sessions

P1 INVASIVE FUNGAL INFECTION IN VLBW INFANTS: NATIONAL SURVEILLANCE STUDY

L. Clerihew[1], T. Lamagni[2], P. Brocklehurst[3], A. Balfour[4], W. McGuire[1], on behalf of the UK Neonatal Fungal Infection Surveillance Group. [1]*Tayside Institute of Child Health, Ninewells Hospital, Dundee;* [2]*Health Protection Agency (CDSC), London;* [3]*National Perinatal Epidemiology Unit, Institute of Health Sciences, Oxford;* [4]*Royal Hospital for Sick Children, Glasgow, United Kingdom*

Background and Aims: Invasive fungal infection is an increasingly common cause of mortality and morbidity in very low birth weight (VLBW: <1500 g) infants. The development and evaluation of improved strategies for treatment and prevention would be assisted by the availability of national epidemiological data in an unselected population of VLBW infants.

Methods: National prospective surveillance study; each month paediatricians notify cases using the British Paediatric Surveillance Unit (BPSU) reporting system. In parallel, the Health Protection Agency and Scottish Centre for Infection and Environmental Health identify cases via laboratory surveillance. These are reconciled with BPSU reports to validate case ascertainment.

Findings: 38 confirmed cases of invasive fungal infection in VLBW infants were identified during the first six months of the study, consistent with an incidence of ~10/1000 live births. The median age at diagnosis was 11 days (range 1–126 days), and the median birth weight 800 g (520–1200 g). 34 (89%) of the infants were of extremely low birth weight (ELBW: <1000 g), giving an estimated incidence of 46/1000 live births in this population. *Candida albicans* was identified in 55% of cases, and *C parapsilosis* in 23%. The organisms were isolated from blood in 73% of cases, central line tips in 53%, and urine in 23%. 3 infants (8%) had evidence of meningitis. 36% of cases had received prophylactic antifungal therapy. The antifungal treatment regimens used were: amphotericin B (18%); liposomal amphotericin (58%); fluconazole (44%); and flucytosine (26%). 55% of infants received more than one drug. We have identified one case of drug resistance (fluconazole resistance in a non-albicans *Candida* spp). 22 of the 32 infants for whom outcome data were available were alive at 37 weeks post-conceptional age.

Conclusions: The vast majority of cases occurred in ELBW infants, suggesting that preventative strategies should be focused on this population. Organisms, predominantly *Candida* spp, were isolated most commonly from the bloodstream and urinary tract. Short term mortality was high (>30%). Antifungal resistance does not appear to be a major problem at present.

P2 GP ANTIBIOTIC PRESCRIBING FOR CHILDREN IN ENGLAND HAS HALVED IN PAST DECADE

H. E. Kendall[1], S. Holdsworth[1], M. Sharland[2]. [1]*Prescription Pricing Authority, 152 Pilgrim Street, Newcastle upon Tyne;* [2]*Paediatric Infectious Diseases Unit, St George's Hospital, London*

Aims: The link between increasing use of antimicrobials and bacterial resistance has been a concern for a number of years. The paediatric sub group of the Specialist Advisory Committee on Antimicrobial Resistance (PSACAR) wanted to determine the trend in community prescribing of antibiotics by GPs over the past decade.

Methods: Details of prescription items for antibacterial drugs prescribed in general practice in England each year 1993–2002 were obtained from the PPA Prescribing Analysis and Cost database. The items were categorised into paediatric and adult preparations based on the strength and formulation. The data were then standardised using the Office for National Statistics mid-year population estimates of children aged 0–14.

Results: Prescribing of antibacterial paediatric preparations decreased by almost 50% between 1993 and 2002 from 12.4 million to 6.5 million items (1328 to 709 items per 1000 children aged 0–14 per year). This change is not uniform across the 10 most commonly prescribed drugs. Use of the top three antibiotics for children—amoxicillin, erythromycin, and phenoxymethylpenicillin—reduced by 42% (5.7–3.3 million items), 62% (2.2 to 0.8 million items), and 47% (1.2 to 0.6 million items), respectively. Ampicillin and co-trimoxazole use both reduced by over 95% (0.3 and 0.5 million to 10 000 and 7000 items, respectively) whereas flucloxacillin use markedly increased by 114% from 0.3 to 0.5 million items.

Conclusions: Antibacterial prescribing for children has fallen in the past 10 years with a much greater decrease in prescribing in children than for the whole population. The cause of this sharp fall is unclear.

P3 VALIDATION OF AN ALGORITHM FOR MANAGING CHILDREN WITH A NON-BLANCHING RASH

L. Jones[1], J. Clark[2], F. A. I. Riordan[3]. [1]*School of Clinical Medical Sciences (Child Health), University of Newcastle;* [2]*Newcastle General Hospital, Newcastle;* [3]*Department of Child Health, Birmingham Heartlands Hospital, Birmingham*

Background: Paediatricians are concerned that children who present with a non-blanching rash may have meningococcal disease (MCD). An algorithm to help identify which children with a non-blanching rash have MCD has been devised.

Aim: To evaluate the algorithm and identify significant clinical characteristics.

Methods: The algorithm was applied retrospectively to three cohorts of children who had presented with non-blanching rashes. The algorithm was also used prospectively in four hospitals.

Results: The retrospective cohort included 103 children with confirmed or possible MCD out of 331 with non-blanching rashes. Between 38% and 66% of children were treated with antibiotics. The algorithm correctly identified all those with MCD. The prospective cohort included 296 children presenting with non-blanching rashes. The protocol was followed in 60–63% of these children. The algorithm identified all 46 children with confirmed or possible MCD. However, one child with MCD did not receive immediate antibiotic treatment, despite this being suggested by the algorithm. This child developed shock, but survived after treatment on PICU. Median ages of those with or without MCD did not differ (2.4 *v* 2.5 years). Clinical features suggesting MCD with $p<0.001$ were: presence of purpura (OR 4.1), meningism (OR 9.8), capillary refill >5 seconds (OR 25.2), lethargy (6.9), irritability (5.2), and progressing rash (4.8). However, fever was not associated with MCD. The laboratory results suggesting MCD ($p<0.001$) were WCC <5 or >15 (4.9), abnormal clotting (4.5), and CRP >5 (7.3).

Conclusion: The algorithm identified all 149 children with MCD out of 629 with non-blanching rashes. The only significant delay in treatment of MCD occurred when the algorithm was not followed. Many paediatricians do not want to treat all children presenting with non-blanching rashes with intravenous antibiotics. The algorithm may help paediatricians select those with MCD. It should now be refined and further validated.

P4 ADENOSINE DEAMINASE ACTIVITY AS A DIAGNOSTIC TEST IN CHILDHOOD TUBERCULOUS MENINGITIS

S. Jakka, S. Veena, A. Rao. *Rangaraya Medical College, India*

Aim: The study was aimed to evaluate the usefulness of serum and CSF adenosine deaminase (ADA) activity as a diagnostic test in tuberculous meningitis (TBM) in children.

Methods: A prospective single blind study evaluating ADA activity was performed in 92 children admitted with various central nervous system infections. The study group included 26 children with tuberculous meningitis, 20 with bacterial meningitis, 14 with viral encephalitis, and 12 with cerebral malaria. 20 children who presented with a first episode of febrile seizure and had a lumbar puncture done were taken as the control group. The ADA activity was estimated by Colorimetric method (Galanti & Guisti). The personnel performing the ADA analysis were blinded to the study.

Results: The mean CSF ADA level in TBM was 13.58 U/L (normal value 0–4 U/L). The CSF ADA activity was significantly higher in TBM compared with other infections including bacterial meningitis ($p<0.001$), viral encephalitis ($p<0.001$), cerebral malaria ($p<0.001$), and control group ($p<0.001$). The serum ADA values in TBM were also significantly higher than in bacterial meningitis ($p<0.001$), viral

encephalitis ($p<0.001$), cerebral malaria ($p<0.001$), and the control group ($p<0.001$). The sensitivity and specificity of CSF ADA and serum ADA in the diagnosis of TBM were 100% and 78.26%, respectively. However, a specificity of 95.65% was obtained when combined with other CSF variables like protein, glucose, and cell count. The ADA levels were noted to fall in the few weeks following effective therapy. Persistently high levels were seen in TBM associated with complications like hydrocephalous, hemiparesis, and cranial nerve palsies.

Conclusions: ADA activity is a rapid, simple, and sensitive diagnostic test and also a prognostic indicator in childhood TBM. Early diagnosis of TBM using ADA activity could help in earlier institution of appropriate treatment and thereby prevent mortality and complications.

P5 A RANDOMISED, CONTROLLED TRIAL OF DIVISION OF TONGUE-TIE IN INFANTS WITH FEEDING PROBLEMS

D. M. Griffiths, C. Westcott, M. Hogan. *Wessex Regional Centre for Paediatric Surgery, Southampton General Hospital, Southampton SO16 6YD*

Introduction: Before the 1950s, tongue-ties in the United Kingdom were routinely divided. Subsequently, the advice has been that they do not affect feeding, that referral to an infant feeding specialist was enough (medical management), and that bottle feeding was as good as breast feeding. Recent publications have questioned this approach. An ethics committee approved, randomised, controlled trial comparing referral to a lactation consultant with immediate division was undertaken in infants with feeding problems.

Method: Between March and July 2002, all babies in our District with tongue-ties were followed up to see if they had any feeding problems. If they developed problems, the mothers gave written consent and were randomised to 48 hours of intensive lactation consultant support (control) or immediate division.

Results: 201 babies had a tongue-tie, of whom 88 had problems feeding. 31 were not enrolled, so 57 were randomised (mean age 20 days). Of the 29 controls, 1 improved and breastfed for 8 months, but 28 did not. At 48 hours, these 28 were offered division, which all accepted, and 27 improved and fed normally (74% immediately and 18% within 48 hrs). One baby's breastfeeding did not improve, but his bottle feeding did, Of the 28 babies who had immediate division, 27 improved and fed normally (85% immediately, and 15% within 48 hrs). One remained on a nipple shield. Overall, division of the tongue-tie resulted in normal feeding in 54/57 babies. Control *v* division: $p<0.001$.

Conclusion: This randomised, controlled trial has clearly shown that tongue-ties can affect feeding. Immediate division is successful and improved feeding for mother and baby significantly better than the intensive skilled support of a lactation consultant, the current medical recommendation.

P6 NEONATAL VENTILATION WITH INHALED NITRIC OXIDE (iNO) *V* VENTILATORY SUPPORT WITHOUT iNO FOR TERM AND NEAR TERM INFANTS WITH SEVERE RESPIRATORY FAILURE: THE INNOVO MULTICENTRE RANDOMISED CONTROLLED TRIAL

P. Hardy, D. Field, R. Grieve, on behalf of the INNOVO Trial Collaborating Group. *Medical Statistics Unit and Health Services Research Unit, LSHTM Department of Health Science, University of Leicester, and 15 clinical centres (UK, Ireland, Finland, and Belgium)*

Aims: Previous trials have shown iNO for mature infants with severe respiratory failure leads to short term improvement in oxygenation and reduction in ECMO use, without evidence of mortality reduction. The aim of the INNOVO randomised controlled trial was to assess longer term effects.

Methods: Ventilated term infants (≥34 weeks gestation) not responding to conventional care were eligible for the trial. Telephone randomisation was used with minimisation by hospital of care, principal diagnosis, severity of respiratory disease, and postnatal age at trial entry. Infants were allocated to have 20 ppm iNO added to the ventilator gases or not to use iNO. No blinding was attempted. The primary outcome was death or severe disability as assessed by the child's local paediatrician at one year (corrected).

Results: 60 infants were recruited; 29 allocated to iNO (25 received it), 31 to no iNO (6 received it). They were well matched in terms of birthweight (iNO mean 3090 g, SD 815; no iNO mean 3180 g, SD 603) and gestation (iNO mean 37.7 weeks, SD 2.3; no iNO mean 38.4 weeks, SD 2.5). 15 infants died (7 in the iNO arm and 8 in the no iNO arm). Formal follow up assessments at 1 year (corrected age) were available for 44 children (45th known to be alive and ''normal''). 24/45 survivors had signs of some impairment or disability (4 classified as severely disabled). 9/29 infants in the iNO arm died or were severely disabled at 1 year compared with 10/31 in the no iNO arm (RR = 0.96, 95% CI 0.46 to 2.03; p 0.86). Although 3 infants in the iNO arm had ECMO compared with 8 in the no iNO arm, the relative risk for death or ECMO was 0.76 (95% CI 0.27 to 2.14; p 0.85). The mean total costs of hospitalisation were similar in the iNO (mean £15 071) and no iNO groups (mean £15 301).

Conclusions: These results provide little evidence of benefit but numbers are small and the results need to be added to the Cochrane Review. None of the 7 deaths in the iNO arm were referred for ECMO, supporting concerns that use of iNO may distort referral patterns inappropriately and reduce use of a proven effective therapy. A four year follow up is in progress.

P7 OUTCOME AT 24 MONTHS IS UNAFFECTED BY MODE OF VENTILATION IN INFANTS <29 WEEKS

S. A. Calvert[1], N. Marlow[2], A. Greenough[3], E. S. Limb[1], L. Marston[1], J. L. Peacock[1], for the UKOS Study Group. *[1]St Georges Hospital Medical School, London; [2]University of Nottingham; [3]Kings College Hospital Medical School, London*

Background: Numerous trials have compared the short term effects of high frequency oscillatory ventilation (HFOV) and conventional ventilation (CV) with conflicting results, but few have reported longer term outcomes.

Objective: To determine the health status of children randomised to the UKOS trial at 2 years of age corrected for prematurity.

Methods: Outcome was ascertained by a local paediatrician using health status and respiratory questionnaires. Because no formal developmental score was undertaken, parents also completed a modified PARCA questionnaire.

Results: Of 797 babies entered into the study, 585 children survived to 2 years of age. Information on 408 (70%) was available at >22 months age corrected for prematurity (HFOV 205; CV 203). The two study groups were well matched for a range of perinatal, neonatal, and sociodemographic variables. Severe disability was reported in 8% of children who received HFOV compared with 9% in the CV group (RR 0.90 (95% CI 0.72 to 1.13); other disability was present in 36% and 40%, respectively; and 218 parents returned developmental questionnaires: similar proportions scored <49 (equivalent to a Bayley MDI of <70: 43% and 38%, respectively). Boys were independently more likely to have disability than girls (RR 1.35 (1.07 to 1.70) but there were no significant differences in rates of disability between babies born at 23–25 weeks gestation compared to 26–28 weeks. Rates of re-hospitalisation were similar in HFOV and CV groups for respiratory reasons (43% *v* 42%), surgical admissions (22% *v* 22%), or ICU admissions (8% *v* 10%). Frequent respiratory symptoms (>once per week) were similarly distributed between groups (cough: 27% *v* 35%, RR 0.76 (0.48 to 1.20); wheeze: 30% *v* 30%, RR 1.01 (0.58 to 1.73)) as was bronchodilator use at 24 months (37% *v* 43%, RR 0.86 (0.66 to 1.11)) and use of inhaled steroids (22% *v* 26%, 0.83 (0.57 to 1.21)).

Conclusions: Early use of HFOV in very preterm infants has no advantage over CV in terms of functional, developmental, or respiratory outcomes at 2 years.

P8 ATOMOXETINE IN THE LONG TERM PREVENTION OF RELAPSE IN ADHD

V. Harpin, S. Prasad, S. Zhang, D. Michelson. *Eli Lilly and Company Limited, Hampshire, UK*

Aims: Atomoxetine is a selective norepinephrine (noradrenaline) reuptake inhibitor that has recently been licensed for the treatment of attention deficit hyperactivity disorder (ADHD) in the US. ADHD is a chronic neurodevelopmental disorder, and patients are typically treated for extended periods. The efficacy of pharmacotherapy has mainly been demonstrated in acute settings. The clinical development programme for atomoxetine however, included a large, international, 9 month relapse prevention study to assess its efficacy during chronic treatment.

Method: Patients aged 6–15 who met DSM-IV criteria for ADHD were treated for approximately 12 weeks with atomoxetine to an initial target dose of 1.2 mg/kg/day and a maximum dose of 1.8 mg/kg/day. Patients whose symptoms remitted were randomised to 9 months of continuation therapy with atomoxetine or to placebo under double blind conditions. Efficacy was monitored by assessing core ADHD symptoms using the ADHD Rating Scale and Clinical Global Impressions. Quality of

life was assessed using the Child Health Questionnaire (CHQ). Growth was also monitored.

Results: 604 patients entered the study and received atomoxetine. Of these, 416 met response criteria and were randomised to continued atomoxetine or placebo. After 9 months, 52.6% of patients assigned to placebo compared with 29.7% of patients assigned to atomoxetine had a worsening ⩾50% in symptom severity post-randomisation ($p<0.001$). Psychosocial functioning was also superior in the atomoxetine group as assessed by the CHQ. Safety and tolerability were similar to those observed in acute treatment trials. There was minimal effect on growth over this period.

Conclusion: Data presented here provide evidence of the efficacy of atomoxetine compared with placebo in maintaining treatment responses for up to 9 months following an initial 3 month treatment period. This finding supports the usual clinical practice of maintaining treatment for extended periods in patients whose symptoms respond to an initial treatment trial.

P9 ADULT OUTCOMES OF LOOKED AFTER CHILDREN

R. M. Viner, B. Taylor. *Department of Child Health, Royal Free & University College Medical School, London*

Aims: Looked after children are known to suffer poorer physical and mental health outcomes in childhood. We used longitudinal data from the 1970 British Birth Cohort Study (BCS70) to examine the adult outcomes of being looked after in childhood.

Methods: The BCS70 were surveyed at birth (1970), 5, 10, 16, 26, and 30 years (2000). Data on having ever been looked after (LA) by 10 years of age was gathered by parental interview at 5 and 10 years. Adult outcomes were obtained by interview at 30 years.

Results: 497 (3.3%) of 15 012 had ever been looked after by 10 years. 10 407 (70%) of the total group also had data at 30 years. Group differences and associations adjusted for socioeconomic status at 30 years are shown in the table.

Conclusions: Those looked after in childhood have significantly poorer educational, legal, and mental health outcomes in adulthood, even when controlled for adult socioeconomic status. Physical health appears unaffected. Further research is needed to identify whether timing or placement of care affects long term outcomes in looked after children.

P10 THE AETIOLOGY AND INCIDENCE OF CONVULSIVE STATUS EPILEPTICUS IN CHILDREN

R. F. M. Chin, B. G. R. Neville, C. Peckham, H. Bedford, A. Wade, R. C. Scott, for the NLSTEPSS Collaborative Group. *Institute of Child Health, UCL Medical School, London*

Aims: Despite its reported associated morbidity and mortality, population based studies on CSE are limited. To date, all such studies have been primarily or exclusively based on adult populations. Only one study has reported the effect of ethnicity and none has reported the effect of socioeconomic deprivation (SDI) on the incidence of CSE. Through an ongoing population based study, which primarily addresses CSE in a paediatric population, the North London convulsive STatus EPilepticus in childhood Surveillance Study (NLSTEPSS), we aimed to determine the aetiology and incidence of CSE, and to characterise the effect of age, SDI, and ethnicity on the incidence of CSE.

Methods: In NLSTEPSS, all children aged 29 days to 15 years with CSE within north London are identified using a multi-tiered notification system. Data from Census 2001 were used to determine population denominators for estimation of incidence rates, SDI status, and ethnic group categories. Poisson multivariate regression was conducted to assess the association between age, SDI, ethnicity, and incidence of CSE.

Results: In the first year, 102 children (median age 2.0 years, range 0.07–15.9 years, 57 males) with a life time first (incident) episode of CSE were identified. The incidence of CSE was 19/100 000/year (95% CI 17 to 21/100 000/year). The risk of incident CSE increases 3% per unit worsening of SDI ($p=0.000$). The incidence relative risk (IRR) was 2.0 for black (95% CI 1.2 to 3.5), 2.1 for Asian (95% CI 1.3 to 3.5), and 3.9 for mixed/oriental (95% CI 1.2 to 3.4) ethnicity compared with white ethnicity. The IRR was 0.1 (95% CI 0.1 to 0.2) for children in age group 5–15 compared with the 0–4 age group. Among aetiologies, 33% of were prolonged febrile convulsions (PFC) and 11% were epilepsy related.

Conclusions: More than 2000 children per year in the UK will have a lifetime first episode of CSE. Children of non-white ethnicity are at greater risk compared with those of white ethnicity, and lower socioeconomic status increases the risk of CSE. PFC is a significant cause for CSE. Most cases of CSE are not epilepsy related.

P11 HYPOVITAMINOSIS D AMONG HEALTHY ADOLESCENT GIRLS

G. Das[1], S. Crocombe[2], M. McGrath[1], J. L. Berry[3], M. Z. Mughal[2]. [1]*Central Manchester Primary Care Trust;* [2]*Saint Mary's Hospital for Women & Children, Manchester;* [3]*University Department of Medicine, Manchester, UK*

Background: There has been a resurgence of vitamin D deficiency rickets among toddlers in the UK and we have recently observed an increase in the number of adolescents presenting with symptomatic vitamin D deficiency.[1] This cross-sectional study was designed to determine the prevalence of hypovitaminosis D among healthy adolescent schoolgirls.

Methods: Fifty one (28%) out of 182 girls (13 white Caucasian (WC) and 38 non-white (NW)); median15.3 years and range 14.7 to 16.6 years) attending year 10 of an inner city multiethnic girls' school took part in the study. We assessed their serum concentration of 25-hydroxyvitamin D (25OHD; a reliable marker of vitamin D status) and related it to dietary intake of vitamin D, estimated duration of sunshine exposure (SE), and the percentage of body surface area exposed (% SAE).

Results: Thirty seven (73%) girls were vitamin D deficient (25OHD concentrations <12 ng/ml) and 9 (17%) were severely deficient (25OHD concentrations <5 ng/ml). The median 25OHD concentration of WC girls (13.2 ng/ml; range 7.3 to 29.3) was significantly higher ($p<0.001$) than that of NW girls (5.9 ng/ml; range 2.3 to 17 ng/ml). The estimated intake of vitamin D in WC and NW groups was 1.9 μg/day and was not related to 25OHD concentration. For the whole group, 25OHD concentration was related to the estimated SE ($r=0.38$; $p=0.007$) and % SAE ($r=0.41$; $p=0.003$). In WC girls the estimated SE and % SAE were significantly higher than that of NW girls, $p=0.003$ and $p=0.001$, respectively.

Conclusions: Hypovitaminosis D is common among healthy adolescent girls; NW girls were more severely deficient. Reduced sunshine exposure rather than diet explains the difference in vitamin D status of WC and NW girls. Because vitamin D is essential for bone mass accrual during adolescence, vitamin D supplements should to be given to girls with reduced sunshine exposure.

1. Crocombe, *et al. Calcified Tissue International* 2002;**7**:372.

Abstract P9

Outcomes at 30 years	Ever LA % (95% CI)	Never LA % (95% CI)	p Value	p Value*
Professional/managerial occupation	27 (22 to 33)	37 (26 to 38)	0.001	–
Ever excluded from school	5 (3 to 9)	2 (1 to 2)	<0.0001	0.02
Has conviction (civil/criminal)	24 (19 to 30)	13 (13 to 14)	<0.0001	0.001
Literacy problems	9 (6 to 14)	3 (3 to 4)	<0.0001	0.001
Current psychiatric caseness on Rutter Malaise Inventory	20 (16 to 26)	12 (12 to 13)	0.0003	0.006
Ever had a mental disorder	33 (28 to 39)	26 (25 to 26)	0.006	0.03
General health rated ''poor''	20 (15 to 25)	15 (14 to 15)	0.03	NS
Pregnancy ⩽18 years of age	2 (1 to 5)	3 (3 to 4)	NS	NS
Has a long standing condition	26 (21 to 32)	23 (23 to 24)	NS	NS
Overweight (BMI ⩾25 kg/m^2)	40 (34 to 47)	42 (41 to 43)	NS	NS

*p for difference adjusted for socioeconomic status at 30 year; NS, not significant.

P12 UMBILICAL CORD AMYLIN IS RAISED IN INFANTS OF DIABETIC MOTHERS

V. Kairamkonda[1], A. Deorukhkar[1], R. Coombs[1], R. Fraser[1], A. Mayer[2]. [1]*Department of neonatal intensive care, Jessop Wing, Sheffield;* [2]*Department of paediatric intensive care, Sheffield Children's Hospital*

Introduction: Amylin, a polypeptide hormone, is co-secreted with insulin from the pancreas. As a potent inhibitor of gastric emptying it plays an important role in carbohydrate absorption. Feed intolerance is common in infants of diabetic mothers (IDM). We hypothesise that amylin may be responsible for this observed feed intolerance. Therefore, we aimed to establish whether umbilical cord (arterial or venous) amylin levels are raised in IDM as compared with infants born to mothers without diabetes.

Method: Fifty nine cord samples were collected prospectively. Amylin levels were assayed by a monoclonal antibody based sandwich immunoassay. Exclusion criteria included infants with congenital anomalies; <24 weeks gestation; chorio-amnionitis; placental abruption; and severe pre-eclampsia.

Results: Cord Amylin levels were significantly higher in infants born to mothers with diabetes compared with infants of non-diabetic mothers (Mann Whitney).

Where matched venous and arterial cord samples were available (n=16) no difference in amylin levels was observed; 6.5 (2.5–11.4) pmol/L *v* 6.1 (2.7–15.1) pmol/L, r=0.94, p<0.0001.

Conclusions: Cord amylin levels are significantly higher in infants of diabetic mothers when compared to controls. This may explain the observed feed intolerance in IDM. Either venous or arterial blood may used to assay amylin in newborn infants.

Abstract P12

	IDM (n=11)	Controls (n=48)	
Amylin (pmol/L)	41 (33.1–41.5)	5.8 (2.5–9.3)	<0.0001
Gestation (weeks)	39 (36.5–39.5)	38 (37.0–39.2)	0.86
Weight (kg)	3.51 (3.36–3.79)	3.10 (2.88–3.45)	0.06
M:F	1.2:1	1.8:1	

Expressed as median and (interquartile range).

P13 XENON IS NEUROPROTECTIVE WHEN COMMENCED AFTER A HYPOXIC ISCHAEMIC INSULT IN THE NEWBORN RAT

J. R. Tooley[1], M. Thoresen[1], R. C. Eagle[1], J. Dingley[2]. [1]*Department of Clinical Science, South Bristol (Child Health), University of Bristol;* [2]*Department of Anaesthetics, Morriston Hospital, Swansea*

Background: Newborn infants born after hypoxia-ischaemia (HI) are at risk of permanent brain injury. Xenon is an inert anaesthetic gas with mechanisms of action including glutaminergic NMDA receptor antagonism. Studies in vitro and on adult in vivo models of neuronal injury have found a neuroprotective effect of xenon.[1]

Aim: To determine in a neonatal rat model of unilateral HI whether 3 hours of xenon inhalation initiated after HI is neuroprotective.

Methods: Left common carotid ligation was performed in 44 seven day old rats followed by exposure to 8% oxygen for 90 min at normothermia. Rats were then randomised for exposure to either 1) a gas mixture of xenon 50% and oxygen 30% for 3 h (n=22) or 2) 30% oxygen for 3 h (n=22). After this period all animals were returned to the dam. After 1 week the brains were perfusion fixed, weighed, and macroscopic cerebral damage in the left hemisphere was assessed in a blinded fashion (MT) using a 9 step pathology score (0: no damage, 4.0: max damage).

Results: Rats exposed to 30% oxygen after the HI injury had a median pathology score of 2 (interquartile range (IQR) 0.5–3.0). Rats exposed to the xenon mixture had a median pathology score of 0.13 (IQR 0–1.5). This amounted to a profound and significant reduction in cerebral damage in the group treated with xenon (p=0.045). The brain weight of animals exposed to 30% O_2 after the HI insult was significantly lower than those exposed to xenon (median 1.19 g (IQR 1.15–1.28) *v* 1.27 g (IQR 1.19–1.38) p 0.042).

Conclusions: Xenon anaesthesia commenced after HI in the neonatal rat offers profound neuroprotection. This experimental finding has important implications in the management of the hypoxic or asphyxiated baby.

1. Wilhelm S, Daqing M, Maze M, *et al.* Effects of xenon on in vitro and in vivo models of neuronal injury. *Anaesthesiology* 2002;**96**:1485–91.

P14 ANTENATAL STEROID THERAPY FOR ELECTIVE CAESAREAN SECTION AT TERM

P. R. Stutchfield[1], M. Zbaeda, L. Furneaux[1], J. Satelle[1], P. Banfield[1], N. J. Bickerton[1], D. Cameron[1], R. Whitaker[2], I. Russell[2]. [1]*Glan Clwyd Hospital, Conwy and Denbighshire Trust, Rhyl;* [2]*Institute Medical and Social Care Research, University of Wales, Bangor*

Aim: To determine whether antenatal steroids can reduce the incidence of respiratory distress in term babies >37 weeks gestation born by elective caesarean section, reducing admission to SCBU.

Method: A multicentre randomised control trial was established with mothers randomised on entry to receive two doses of 12.5 mg betamethasone intramuscularly within 48 hours of delivery. Local ethical committee and MREC approval was obtained. A maternal and neonatal datasheet were completed prospectively in the neonatal period recording the outcome.

Results: 998 women were randomised into the trial from 10 participating maternity units. No forms were received on outcome for 29, 7 mothers delivered before 37 completed weeks, and 20 had twin deliveries, leaving 467 in the treatment group and 475 in the control group in the intention to treat analysis of singleton deliveries. Of these, 51 (5.4%) were delivered by emergency caesarean section, 24 (2.5%) by normal vaginal delivery. No betamethasone was given in 34 in the treatment group. This left 373 in the treatment group and 446 in the control group for analysis by treatment received. There was no difference in gestational age, birthweight, or sex between the two groups. 7 (1.5%) were admitted with respiratory distress in the treatment group with 21 (4.4%) in the control group. p 0.04 by intention to treat analysis, p 0.02 by treatment received analysis. Overall 28 babies were admitted with respiratory distress giving an incidence of 34.2/1000. The incidence of respiratory distress in the treatment and control group was 18.7 *v* 47.1/1000 respectively.

Conclusion: This study provides evidence that antenatal betamethasone can reduce the admission to SCBU with respiratory distress in those delivered by elective caesarean section beyond 37 weeks gestation.

P15 GASTROSTOMY TUBE FEEDING AND THE RISK OF RESPIRATORY MORBIDITY

J. S. Morrice, A. Vernon-Roberts, M. Eltumi, H. Grant, P. B. Sullivan. *Department of Paediatrics, University of Oxford, Oxford OX3 9DU*

Introduction: Gastrostomy feeding in children with cerebral palsy improves growth and caretaker quality of life. Strauss *et al*,[1] however, found a relative risk of mortality associated with feeding tube of 2.1. This was attributed to increased pulmonary disease secondary to overly vigorous nutrition and subsequent aspiration. The aim of this investigation was to examine the occurrence of respiratory morbidity before and after gastrostomy tube insertion.

Methods: We investigated 138 children in two separate studies: 1) a retrospective case note analysis of children (n=81) receiving gastrostomy between Jan 97 and Nov 02 (documented chest infections ± hospital admissions were recorded for 6 months prior to and 12 months following gastrostomy insertion; 2) a prospective study of different children (n=57) with severe neurological disabilities receiving gastrostomy between Nov 00 and Dec 02. Parents completed a questionnaire prior to (visit 1) and 6 and 12 months (visits 2 and 3) following the gastrostomy detailing the number of chest infections that required antibiotics and/or hospital admission.

Results: 1) In the retrospective study 34/81 (42%) had a proven unsafe swallow; 25/81 (31%) proven GOR; and 30/81 (37%) had fundoplication. Following gastrostomy there was a reduction in documented chest infections from 37/81 (45.7%) to 26/81 (30.9%) (p 0.58). There was no difference in the number of hospital admissions for chest infection (11.1% *v* 12.3%). Four died with two deaths directly attributable to chest infection. 2) In the prospective study the mean number of chest infections requiring antibiotics was 1.8 on visit one and 0.9 on visit 3 (p 0.07), with hospital admissions for chest infections falling significantly from 0.5 to 0.09 (p 0.04).

Conclusion: These studies of 138 children provide no evidence for an increase in respiratory morbidity following insertion of gastrostomy.

1. Strauss D, Kastner T, *et al.* Tubefeeding and mortality in children with severe disabilities and mental retardation. *Pediatrics* 1997;**99**(3):358–362.

P16 USE OF THE KETOGENIC DIET TO TREAT CHILDHOOD EPILEPSY—A RANDOMISED CONTROLLED TRIAL

E. G. Neal, H. M. Chaffe, M. Lawson, R. Schwartz, J. H. Cross. *Institute of Child Health, Great Ormond Street Hospital for Children NHS Trust, Central Middlesex Hospital, London and National Centre for Young People with Epilepsy, Lingfield*

Aim: To examine the efficacy of the ketogenic diet in the treatment of children with drug resistant epilepsy, as part of a comparative trial between the classical and medium chain triglyceride dietary protocols.

Methods: Children were randomised to start the diet immediately or after a 3 month control period. Seizure frequency was assessed after 3 months on the diet, and compared with that after 3 months in the control group. EEG recording, parental questionnaire, and blood ketone levels were monitored.

Results: Preliminary results are presented on 31 children who had followed the diet for at least 3 months, and 22 who provided control data. After 3 months, mean seizure frequency as a percentage of baseline was significantly lower in the diet group (80.1%) than in the control group (114.3%) (p 0.016). 13 of the diet group had a greater than 50% reduction in seizures (42%), compared with 2 of the controls (9%) (p 0.009). 6 of the diet group had a greater than 75% reduction in seizures (19%), compared with none of the controls (p 0.028). 36 sets of parents of children on the diet provided questionnaire data after 3 months: improved alertness (n = 25, 69%), awareness (n = 26, 72%), and responsiveness (n = 25, 69%) were reported in the majority. Improvements in EEG were seen but tended to be when improvement in seizure frequency was reported. Mean serum acetoacetate, β-hydroxybutyrate, and total ketone body levels were significantly higher in the diet children with greater than 50% seizure reduction than those with less than 50% seizure reduction (p 0.007, 0.018, and 0.011, respectively).

Conclusion: These preliminary data from the first randomised controlled trial of the ketogenic diet support its successful use as a treatment for children with epilepsy. Benefits are seen not only in seizure control, but also alertness, awareness and responsiveness. Although the exact mechanism of its action is unclear, higher serum ketone body levels appear to be of importance in seizure control. Further data are required and data collection is ongoing.

P17 COMPARING SCREENING STRATEGIES TO IDENTIFY CONGENITAL HEART DEFECTS IN NEWBORN BABIES

R. Knowles[1], I. Griebsch[2], J. Brown[2], C. Bull[3], C. Wren[4], C. Dezateux[1]. *[1]Paediatric Epidemiology, ICH, London; [2]MRC Health Services Research Collaboration, Bristol; [3]Great Ormond Street NHS Trust; [4]Freeman Hospital, Newcastle upon Tyne*

Introduction: Congenital heart defects (CHD) affect six in every 1000 live born infants and most are asymptomatic at birth. Early recognition is important because clinical presentation and deterioration may be sudden. However, despite routine newborn examination, infants with treatable defects collapse or die before diagnosis. Pre-operative collapse is likely to be associated with higher post-operative mortality and adverse neurological sequelae. We report the findings from a review of the effectiveness and cost effectiveness of screening strategies to identify CHD in the newborn period.

Method: A probabilistic decision analysis model was developed to compare screening using clinical examination alone (CE), clinical examination with pulse oximetry (PO), and clinical examination with screening echocardiography (Echo) in the first 24 hours after birth. Six types of CHD (transposition of the great arteries, aortic stenosis, pulmonary atresia, hypoplastic left heart, coarctation of the aorta, and total anomalous pulmonary venous connection) were defined as life threatening and likely to benefit from presymptomatic identification. The primary outcome was a ''timely diagnosis'', attributed to a newborn infant with a positive screening test, a confirmed diagnosis of a life threatening CHD, and in whom there was no pre-operative collapse. The clinical impact and cost effectiveness of screening strategies were compared, using probabilities from published literature, unpublished datasets, and expert opinion, with assessment of the range of uncertainty associated with the results.

Results: Estimated timely diagnoses per 100 000 infants were 33.8 (CE), 70.7 (PO), and 71.3 (Echo). Estimated total costs of screening 100 000 infants were £263 953 (CE), £448 504 (PO) and £3 488 517 (Echo). An additional timely diagnosis costs £5000 with PO (relative to CE) and £5.5 million with Echo (relative to PO).

Conclusions: Clinical examination with pulse oximetry is cost effective relative to clinical examination alone for detecting life threatening CHD in newborn babies if society is willing to pay £5000 for each additional timely diagnosis. Screening echocardiography is unlikely to be cost effective on the grounds of cost, effectiveness, and specificity. Further research is now needed to evaluate the implementation of pulse oximetry as a neonatal screening strategy for CHD.

P18 A RANDOMISED CONTROLLED TRIAL (RCT) EVALUATING THE IMPACT OF AN EDUCATIONAL COMPUTER PROGRAMME FOR CHILDREN WITH ASTHMA

A. McPherson[1], C. Glazebrook[2], D. Forster, C. James, I. Crook[3], D. Crook, A. Smyth[2]. *[1]Behavioural Sciences, University of Nottingham; [2]Department of Paediatrics, Nottingham City Hospital; [3]Showme Multimedia*

Introduction: Children with asthma have been shown to know little about their condition, despite the importance of trigger avoidance, symptom awareness, and timely treatment for successful asthma self management. It is also desirable that children feel a sense of control over the illness.

Hypotheses: Using an educational, interactive computer programme will improve asthma knowledge, increase perceived control over asthma, and promote self management.

Method: 101 children aged 7–14 years and receiving asthma treatment from outpatients clinics were recruited for an RCT. After 1 month, children received an information booklet about asthma (n = 50) or received the booklet and used ''The Asthma Files'' computer programme (n = 51). The programme uses a ''secret agent'' theme to deliver information about the causes, treatments, and self management of asthma and was developed by a multidisciplinary team. Outcome measures were asthma knowledge, perceived asthma control, FEV_1, PEF, steroid use, and school absence. Children were interviewed 1 month post-intervention and parents interviewed by telephone after 6 months to obtain proxy clinical data. Ethical approval had been obtained.

Results: Follow up rates were 96% and 88% for 1 and 6 months, respectively. Use of The Asthma Files programme resulted in significantly greater increases in knowledge (mean difference 2.19, 95% CI 0.84 to 3.53) and perception of asthma control (mean difference 1.04, 95% CI 0.34 to 1.75) than the booklet only group. Lung function remained unchanged in both groups at 1 month, but after 6 months those in the book group were more likely to have had required steroids and/or days off school (OR 2.4, 95% CI 1.06 to 5.43). Ninety five per cent of children who used the programme reported it to be a good way to learn about asthma.

Conclusions: The Asthma Files was a popular method of education that was associated with greater knowledge levels and improved feelings of control. It is also likely that it is associated with longer term clinical improvements. It would be particularly appropriate for use in outpatient and GP clinics.

P19 DIAGNOSING PEANUT AND TREE NUT ALLERGY WITH SPT AND SPECIFIC IgE TESTING

G. Roberts[1], J. Golding[2], G. Lack[1]and the ALSPAC study team.[1]*Paediatric Allergy and Clinical Immunology, Imperial College School of Medicine at St Mary's, London; [2]ALSPAC Team, University of Bristol*

Introduction: Food allergy is very common in the paediatric population. Food challenges are currently the only reliable means of diagnosing food allergy. It has been suggested that the magnitude of a skin prick test (SPT) or specific IgE (sIgE) result can improve the diagnostic usefulness of these tests but there are few studies addressing this issue in this way (Sporik R 2000; Sampson H 2002).

Methods: All subjects aged up to 16 years who had been investigated with a peanut or tree nut food challenge at St Mary's Hospital between January 1995 and July 2000 were eligible for the study. All subjects with a history suggestive of food allergy were offered a challenge unless there was a history of anaphylaxis. All subjects had had SPT (ALK-Abello) and/or sIgE (Pharmacia CAP) measurements within the previous year. Details of challenges were prospectively recorded in a challenge logbook. Children were admitted to the ward for the food challenge. Doses were given at 20 minute intervals until there were definitive symptoms or signs of a type I hypersensitivity reaction or a typical daily portion (15 g) had been reached. Results were modeled using logistic regression using STATA version 6.

Results: There was a total of 287 peanut or tree nut challenges, for 140 and 151 there were skin prick and sIgE data available, respectively. Subjects with SPT or sIgE data were not significantly different to the others in terms of age, age of onset, number of reactions, or challenge result. There was a clear relationship between the probability of a positive challenge and both SPT and sIgE results. Neither age nor whether the food was tree nut or peanut affected this relationship. The

results suggested that a SPT result of at ⩾8 mm and a sIgE ⩾15 has a 94.7% (95% CI 74.0% to99.9%) and 91.7% (73.0% to 99.0%) positive predictive value for a positive challenge.

Conclusions: These data suggest that a SPT ⩾8 mm or a sIgE ⩾15 has a high predictive value for clinical peanut or tree nut allergy.

P20 DENTIST'S EDUCATION, EXPERIENCE, AND KNOWLEDGE OF CHILD PROTECTION PROCEDURES

R. R. Welbury, A. M. Cairns, J. Y. Q. Mok. *Glasgow Dental Hospital and School, Royal Hospital for Sick Children, Edinburgh*

Introduction: At least 60% of physically abused children have signs on the head, neck, and face that would be visible to a dentist.

Aims: To identify undergraduate and postgraduate training in child protection, knowledge of local child protection guidelines and referral pathways, the number of suspected cases of abuse seen in the past 5 years and the number of these referred, and the reasons for failure to refer to the child protection services.

Methods: Postal questionnaires were sent to 500 general dental practitioners (one quarter of the Scottish workforce). Dentists were randomly selected with equal distribution to 15 health board areas.

Results: 375 (75%) questionnaires were returned. Only 18.6% could remember any undergraduate training and 15.5% any postgraduate training in child protection. This training mainly related to the oro-facial signs of child abuse with little or no input from agencies involved in child protection. 28.5% of respondents had seen suspected cases, 19.5% in the past 5 years but only 7.2% of these had been referred on. No respondents had received copies of local ACPC guidelines on commencing work in the NHS within their health boards and only 14.6% had subsequently seen copies of any guidelines for dentists. No respondents were aware of who the lead clinician for child protection was in their area. Reasons for not reporting were as follows: impact on practice 10.9%; fear of family violence to child 60.8%; fear of violence to dentist 30.9%; fear of litigation 48%; fear of consequences to child from intervention of agencies 52.2%; lack of certainty about diagnosis 85%; and lack of procedural knowledge 70.9%.

Conclusions: Dentists in Scotland do not receive appropriate dental or interagency training in child protection; a number of children are failing to be referred where there is concern; increased referral may be achieved with interagency training and a better understanding of child protection procedures.

P21 THE EFFECT OF A PARTICIPATORY INTERVENTION WITH WOMEN'S GROUPS ON NEONATAL MORTALITY IN NEPAL: A CLUSTER, RANDOMISED CONTROLLED TRIAL

D. Osrin, D. Manandhar, B. Shrestha, N. Mesko, J. Morrison, M. Manandhar, H. Standing, K. Tumbahangphe, S. Tamang, D. Shrestha, S. Thapa, A. Wade, A. Costello. *Mother Infant Research Activities, Nepal & International Perinatal Care Unit, Institute of Child Health, University College London*

Introduction: Neonatal mortality accounts for 40% of under five mortality in developing countries. Strategies to reduce neonatal mortality rates (NMRs) must address the reality that 90% of deliveries in the poorest quintile of households occur at home. Our study evaluated a community based participatory intervention to improve the health of pregnant mothers and their newborn infants in Makwanpur district, Nepal.

Methods: Design: cluster randomised, controlled trial comparing outcomes in 12 intervention and 12 control village development committees (VDCs). Population: 5602 births within a cohort of 25 702 married women of reproductive age in a population of 169 776. Intervention: one woman facilitator per intervention VDC facilitated monthly meetings with nine women's groups (covering only 8% of the cohort) to address the issues of pregnancy, childbirth, and newborn health. Each group moved through a participatory planning cycle to explore perinatal care strategies and solutions. Outcomes: NMRs and stillbirth rates. Secondary outcomes included home care practices, health care seeking behaviour, morbidity, and maternal mortality.

Results: The mean NMR was 42 per thousand live births in control clusters and 26 in intervention clusters, a reduction of 38.1% (95% CI 13% to 63%). Stillbirth rates were similar in both groups. In intervention clusters there were significant increases in use of a birth attendant, hygienic cord cutting, and use of a clean home delivery kit. The mean maternal mortality ratio was 230 per 100 000 live births in control clusters and 77 in intervention clusters (p=0.078).

Conclusion: Birth outcomes in a poor, rural population of Nepal improved dramatically through a low cost, sustainable, and scalable participatory intervention with women's groups.

P22 RESPONSE TO AN Hib BOOSTER IN UK PRE-SCHOOL CHILDREN

N. Johnson, J. Ruggeberg, G. Balfour, P. T. Heath. *Department of Child Health and Vaccine Institute, St George's Hospital Medical School, Tooting, London SW17 0RE*

The Hib conjugate vaccine was introduced into the UK in 1992 and there was a significant decline (>95%) in the incidence of disease. However, since 1999/2000 there has been an increase in the number of confirmed cases of Hib disease in children of all ages, but particularly in those aged 1–4 years. This may be related to use of acellular pertussis/Hib combination vaccines in 1999–2001. In 2003 children between 6 months and 4 years of age have been advised to have a booster dose of Hib vaccine.

Aims: To document the prevalence of Hib pharyngeal carriage in children aged 2–4 years, the serum anti-PRP antibody concentration and their antibody response to a single conjugate booster. To correlate antibody concentrations with vaccine used.

Methods: Children aged between 2 and 4 years eligible to receive a booster dose of Hib vaccine were randomly selected from computerised immunisation records and parents were sent a letter inviting participation in the study. Families were visited at home and written consent obtained. A pharyngeal swab was obtained from the child and cultured on Hib anti-serum agar. A blood sample was obtained (following the application of AMETOP local anaesthetic cream) and a dose of Hib conjugate vaccine administered. The children were visited 4–6 weeks later for a further blood sample. Hib antibody concentrations were assayed using a standard ELISA.

Results: For 80 paired samples the serum geometric mean concentration of anti-PRP antibody pre-vaccination was 0.36 μg/ml (95% CI 0.25 to 0.50) and post-vaccination was 17.3 μg/ml (16.0 to 18.7; 79/80 >1.0 μg/ml). The pharyngeal carriage rate of Hib was 2% (0.7–5.8).

Conclusions: The prevailing antibody concentration in 2–4 year old UK children was very low (*v* 0.9 μg/ml in similar age children in 1997). The majority of children responded with a significant and protective antibody response regardless of prior vaccine used. Hib is still circulating among UK children.

P23 DO ADOLESCENTS WITH DIABETES MELLITUS HAVE HEALTHIER LIFESTYLES THAN THEIR PEERS

P. Barker, T. Bindal, A. Bagnell, J. C. Agwu. *Department of Paediatrics, Sandwell and West Birmingham Hospitals NHS Trust, West Midlands*

Introduction: Adolescents with diabetes receive regular health education both opportunistically and as part of their annual review. The aim is to provide them with advice to lead a healthy lifestyle and minimise health complications. The aim of this study was to ascertain whether adolescents with diabetes lead healthier lifestyles than their peers.

Methods: A case control study was performed. Adolescents, between the ages of 12–18 inclusive, were randomly selected from the diabetic clinic for the type I diabetes group and from a local school for the control group. All participants completed an anonymous questionnaire, which contained questions about smoking, alcohol, nutrition, and exercise. They also provided a saliva sample for cotinine analysis, to provide objective information on smoking habits.

Results: 54 adolescents with diabetes and 53 controls were recruited. More adolescents with diabetes smoked than controls (24% *v* 4%, p 0.002). Although there were no significant differences in exercise amount and the number of alcohol units drunk per week between the two groups, the adolescents with diabetes appeared to binge drink more (p 0.026). The adolescents with diabetes had less refined carbohydrate, considered their health more in deciding what to eat, and were less likely to miss breakfast (p 0.000). There were no significant demographic differences to account for these results. In both groups maternal smoking and reported smoking on the questionnaire were the most significant predictors of cotinine levels (p 0.000). Having a sibling, close friend, or mother who smoked increased the likelihood of being a smoker (p 0.006, 0.012, and 0.049). Statistically there was a reasonable degree of accuracy of questionnaire response (κ >0.55).

Conclusions: There are significant lifestyle differences between adolescents with diabetes and their peers. Adolescents with diabetes follow advice regarding their nutrition, but not in regard to smoking and drinking. Worryingly, more adolescents with diabetes smoked than controls in this study. Health education programmes need more effective strategies to address these issues.

P24 LONGITUDINAL EVALUATION OF AIRWAY FUNCTION 21 YEARS AFTER PRETERM BIRTH

I. Narang[1], M. Rosenthal[1], D. Cremonesini[1], M. Silverman[2], A. Bush[1]. [1]*Department of Respiratory Paediatrics, Royal Brompton Hospital, London;* [2]*Department of Child Health, Leicester Royal Infirmary*

Background: Longitudinal data on airway function of low birthweight preterm (LBP) babies are limited. A cohort of LBP babies (all <2.0 kg) were recruited in 1980. In mid-childhood these subjects showed evidence of airway obstruction[1] and increased airway hyperresponsiveness[2] (AHR) when compared with controls. Persistent airflow obstruction was associated with birthweight, treatment with oxygen (O_2), and positive pressure ventilation (PPV).

Aims: To assess respiratory symptoms and airway function in this original cohort at 21 years of age, to determine whether these abnormalities still persist.

Methods: 60 LBP subjects were compared with 50 controls of normal birthweight and gestation. A questionnaire, spirometry, methacholine challenge test for assessment of AHR, and exhaled nitric oxide levels (eNO) were performed.

Results: In early adulthood, there were no excess respiratory symptoms in the LBP compared with the control groups. The median (range) percentage predicted values for forced expiratory volume in one second (FEV_1), forced vital capacity (FVC), and mid expiratory flow ($MEF_{25–75}$) in the LBP group were 93 (56–115), 97 (66–127), and 78 (17–197), respectively and in the control group they were 94 (71–127), 96 (74–129), and 84 (48–134), respectively. The prevalence of AHR was 22% and 17% in the LBP and control groups, respectively. The median (range) of eNO in parts per billion (ppb), in the LBP and control group were 5.4 ppb (1.9–39.7) and 5.6 ppb (2.3–17.3). There were no statistically significant differences between the LBP and control groups in spirometry, AHR, and eNO. Further, in adulthood, birthweight, O_2, and PPV were no longer predictive of spirometry.

Conclusion: This large longitudinal follow up study shows evidence of normalisation of airway function in adulthood in LBP subjects.

1. *Arch Dis Child* 1989;**64**:1284–93.
2. *Arch Dis Child* 1989;**63**:905–10.

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Notes