

Abstract P68 Table

	Good response (n = 46)	Partial response (n = 23)	No response (n = 25)	p Value
Mean age, years	57.6 (±11.3)	56.5 (±11.2)	54.2 (±8.6)	0.43
Gender (% female)	68.0%	69.6%	60.0%	0.75
Median pretreatment cough rate (coughs/h)	12.0 (2.2 to 64.7)	16.5 (6.5 to 140.8)	16.7 (0.3 to 90.6)	0.36
Median posttreatment cough rate (coughs/h)	4.4 (0.4 to 25.7)	14.0 (0.8 to 71.5)	14.3 (0.5 to 24.0)	0.01
Median % change in cough rate	−65.5% (−93.0% to 18.4%)	−14.1% (−91.0% to 105.0%)	−14.1% (−60.0% to 66.7%)	0.001
Mean pretreatment LCQ	12.6 (±3.4)	12.3 (±2.3)	11.1 (±4.3)	0.23
Mean posttreatment LCQ	16.9 (±3.6)	14.3 (±2.8)	11.4 (±3.1)	0.001
Median change in LCQ	4.1 (−4.7 to 11.6)	2.0 (−1.2 to 23.2)	0.1 (−6.5 to 4.8)	0.001

LCQ, Leicester cough questionnaire.

then targeted to the relevant triggers (8 weeks). Cough monitoring (VitaloJAK, manual counting) and the LCQ were completed prior to investigation and posttreatment. Patients' global rating of response was categorised as: good response—disappearance/substantial reduction in cough; partial response—some improvement in cough; no response—cough at/above pretreatment levels

**Results:** All patients completed pretreatment measures. A global rating of response was available in 94 subjects with 82 completing LCQ scores and 43 cough recordings posttreatment. A good global response was reported by 46 (49%) patients, partial in 23 (24%) and no response in 25 (27%). There were no significant differences in age, gender or pretreatment measurements between these groups (see table). Statistically significant improvements in LCQ were seen in the good and partial responders (good > partial responders ( $p = 0.004$ ) and partial > no response ( $p = 0.01$ )). Cough rates only improved significantly in good responders. Cough rate improvements were greater in good than partial responders ( $p = 0.01$ ) but there was no difference between partial and non-responders ( $p = 0.91$ ). Improvement in cough rate correlated with improvement in LCQ ( $r = -0.68$ ,  $p < 0.001$ ).

**Conclusions:** Half of patients with investigation-based treatment trials reported a good response, with substantial improvements in cough rate and LCQ, the magnitude of which were far greater than in patients who reported a partial or no response. Partial responders reported significant LCQ improvements compared with non-responders, despite a similar small reduction in cough rate; potential explanations are improvement of cough intensity rather than frequency; improvement in psychological state with thorough investigation and reassurance; hypervigilance to small improvements in cough frequency and a placebo effect influencing the LCQ scores.

Paediatric respiratory disease

P69 CAN CHANGES IN SPIROMETRY OVER TIME BE INTERPRETED USING CROSS-SECTIONAL REFERENCE DATA?

<sup>1</sup>S Stanojevic, <sup>1</sup>TJ Cole, <sup>1</sup>A Wade, <sup>1</sup>C Bastardo, <sup>2</sup>A Prasad, <sup>3</sup>PH Quanjer, <sup>1</sup>J Stocks. <sup>1</sup>UCL Institute of Child Health, London, UK; <sup>2</sup>Great Ormond Street Hospital, London, UK; <sup>3</sup>Sophia Children's Hospital, Rotterdam, The Netherlands

**Background:** Serial spirometry measurement can facilitate the identification of individuals with rapid lung function decline. In clinical practice, however, repeated measurements are commonly interpreted using cross-sectional reference data, despite well recognised limitations (Van Pelt *et al.* *AJRCCM* 1994).

**Aim:** To assess adjustments for the correlated nature of repeated measurements in order to interpret changes over time using cross-sectional reference data.

**Methods:** Normal lung growth can be viewed as roughly a constant Z-score (adjusted for height, age and sex) over time, with the uncertainty around the change normally distributed around a mean change of 0 Z-scores. The standard deviation of the change

depends on the correlation ( $r$ ) between the two measurements (Cole, *Human growth in context*, 1998). The adjusted Z-score for change ( $Z_c$ ) adjusts the observed Z-score change for the baseline Z-score and the interval between measurements. Spirometry data from 938 healthy, white subjects (aged 5–18 years) measured twice over time intervals 0.1 and 5 years, were collated to estimate the occasion-to-occasion correlation coefficient ( $r$ ) for FEV<sub>1</sub> Z-score (Stanojevic *et al.* *AJRCCM* 2008). Measurements less than one year apart had an  $r$  value of 0.90, such that normal within-subject variability in health after one year is  $0 \pm 0.88$  Z-scores. Changes in spirometry were also assessed after a one-year interval in 98 children with cystic fibrosis (aged 4–12 years) to determine the clinical implications of using the  $Z_c$ .

**Results:** Based on a cross-sectional cut-off of  $< -1.64$  Z-scores, 32/98 patients had an abnormal result at baseline, of whom 21 remained abnormal after one year. Of those with normal results at baseline, 10 had abnormal results at follow-up. Using  $Z_c$ , 31 subjects declined significantly in lung function ( $< -1.64 Z_c$ ), of whom 22 were normal and nine were abnormal at baseline. Most importantly, 14 subjects classified as “normal” on both test occasions using the cross-sectional cut-off had significant lung function decline using  $Z_c$ .  $Z_c$  also identified 23 subjects with improving lung function.

**Conclusion:** Adjusted Z-scores for change take into account previous results and facilitate interpretation of lung function over time and appear to be more sensitive at detecting lung function deterioration than cross-sectional Z-scores.

**Funding:** This study was funded by Asthma UK.

P70 OXYGEN UPTAKE RESPONSES IN CHILDREN WITH CHRONIC CHEST DISEASES FOLLOWING SIMULATED SPORTING ACTIVITY

<sup>1</sup>PJ Oades, <sup>2</sup>D Stevens, <sup>2</sup>CA Williams, <sup>2</sup>N Armstrong. <sup>1</sup>Royal Devon and Exeter Foundation NHS Trust, Exeter, UK; <sup>2</sup>CHERC, University of Exeter, Exeter, UK

**Introduction:** Oxygen uptake (VO<sub>2</sub>) during moderate steady-state exercise (SSE) has been used to assess recovery following more strenuous exercise. Understanding how children with chronic chest diseases (CCD) recover from exercise may provide insight into physiological disturbance in disease. This study aimed to investigate the SSE VO<sub>2</sub> responses over 24 h following a period of repetitive short burst physical activity that simulated typical sport in children with CCD and healthy controls.

**Methods:** Twenty-seven children with stable CCD (19 cystic fibrosis (CF) and eight non-CF bronchiectasis; age  $12.7 \pm 3.1$  years; FEV<sub>1</sub>  $82 \pm 23\%$  PR) and 25 controls (age  $13.4 \pm 3.3$  years, FEV<sub>1</sub>  $102 \pm 12\%$  PR) performed simulated sporting activity (SSA) by exercising on a cycle ergometer repeatedly for 2-minute periods at moderate-to-heavy intensity ( $\sim 50\%$  DGET-VO<sub>2peak</sub>) with 1 minute of rest between bursts. Participants attempted to complete up to 10 exercise bouts and then performed three identical moderate intensity SSE tests ( $\sim 80\%$  GET) at 3 minutes (test 1), 1 h (test 2)

and 24 h (test 3) post SSA. During each test  $\text{VO}_2$  was measured continuously by on-line respiratory gas analysis.

**Results:** Aerobic capacity was significantly lower in the CCD group than in the controls. Repeated measures analysis of variance and subsequent Tukey tests revealed, in the children with CCD, a significant increase in  $\text{VO}_2$  between test 1 and test 2 ( $0.78 \pm 0.26$  to  $0.83 \pm 0.28$  l/minute,  $p < 0.01$ ), followed by a significant decrease between test 2 and test 3 ( $0.83 \pm 0.28$  to  $0.79 \pm 0.28$  l/minute,  $p < 0.01$ ). Test 3  $\text{VO}_2$  remained elevated above test 1  $\text{VO}_2$  but not significantly ( $0.79 \pm 0.28$  to  $0.78 \pm 0.26$  l/minute). The controls showed a sequential and significant decrease in  $\text{VO}_2$  between tests 1 and 2 ( $1.15 \pm 0.38$  to  $1.07 \pm 0.32$  l/minute,  $p < 0.01$ ) and tests 2 and 3 ( $1.07 \pm 0.32$  to  $1.03 \pm 0.32$  l/minute,  $p < 0.05$ ).

**Conclusions:** SSE  $\text{VO}_2$  responses following SSA differ between children with CCD and controls. Children with CCD demonstrate persistent elevation of  $\text{VO}_2$  during constant intensity exercise for 24 h following SSA.

### P71 EARLY RECOVERY OF OXYGEN UPTAKE FOLLOWING EXERCISE TESTING IN CHILDREN WITH CHRONIC CHEST DISEASES

<sup>1</sup>D Stevens, <sup>2</sup>PJ Oades, <sup>1</sup>N Armstrong, <sup>1</sup>CA Williams. <sup>1</sup>CHERC, University of Exeter, Exeter, UK; <sup>2</sup>Royal Devon and Exeter Foundation NHS Trust, Exeter, UK

**Introduction:** The value of exercise performance as a measure of wellbeing in patients with chronic chest diseases (CCD) is becoming increasingly recognised. Many studies to date have concentrated on peak aerobic capacity ( $\text{VO}_{2\text{peak}}$ ) as a measure of fitness. Our aim was to investigate changes in oxygen uptake ( $\text{VO}_2$ ) during early recovery following exercise and relate them to  $\text{VO}_{2\text{peak}}$  and markers of disease severity.

**Methods:** 19 patients with cystic fibrosis (CF) (aged  $13.1 \pm 2.9$  years; 10 female) and eight children with other stable CCD (aged  $11.1 \pm 2.2$  years; seven female) underwent maximal cardiopulmonary exercise testing on a cycle ergometer.  $\text{VO}_2$  was measured before, while exercising to  $\text{VO}_{2\text{peak}}$  and during recovery. Early  $\text{VO}_2$  recovery was quantified by the time in seconds to reach 50% of the  $\text{VO}_{2\text{peak}}$  value. Early  $\text{VO}_2$  recovery was correlated against lung function ( $\text{FEV}_1$  % predicted) and  $\text{VO}_{2\text{peak}}$  (ml/minute/kg). Disease severity was graded in the CF group by the Shwachman score (SS).

**Results:** In the CF group the SS was significantly correlated with early  $\text{VO}_2$  recovery ( $r = -0.63$ ;  $p = 0.004$ ) and  $\text{FEV}_1$  ( $r = 0.72$ ;  $p = 0.001$ ).  $\text{FEV}_1$  was significantly lower in the CCD group compared with the CF group ( $68 \pm 21$  vs  $87 \pm 21$  % predicted, respectively;  $p = 0.044$ ), yet no significant differences were found between the CF and CCD groups for  $\text{VO}_{2\text{peak}}$  ( $34.7 \pm 8.0$  vs  $35.9 \pm 8.4$  ml/kg/minute, respectively;  $p = 0.715$ ) and early  $\text{VO}_2$  recovery ( $58 \pm 16$  vs  $56 \pm 16$  s, respectively;  $p = 0.755$ ).

**Conclusion:** In young CF patients, early  $\text{VO}_2$  recovery following maximal exercise and  $\text{FEV}_1$  are significantly related to disease severity.  $\text{FEV}_1$ , however, does not fully reflect exercise performance and recovery in young patients with CF and other CCD. Measures of recovery following exercise may enhance our objective assessment of functional impairment in those with cardiopulmonary disease and deserves further research.

### P72 DOES ETHNICITY INFLUENCE LUNG FUNCTION IN PRESCHOOL CHILDREN?

<sup>1</sup>CM Bastardo, <sup>2</sup>S Sonnappa, <sup>2</sup>P Aurora, <sup>1</sup>J Stocks. <sup>1</sup>Department of Respiratory Medicine, UCL Institute of Child Health, London, UK; <sup>2</sup>Departments of Respiratory Medicine, UCL Institute of Child Health and Great Ormond Street Hospital for Children, London, UK

**Introduction:** Guidelines for assessing lung function (LF) in preschool children have been published recently<sup>1</sup> but little is known about the influence of ethnic background on LF in this age group.

**Methods:** LF was assessed using multiple breath washout (lung clearance index (LCI) and functional residual capacity (FRC)), whole body plethysmography (specific airways resistance; sRaw) and spirometry (FVC,  $\text{FEV}_1$  and  $\text{FEF}_{75-25}$ ) in healthy white and south Asian preschool children between 4 and 6 years, recruited from the local community. Spirometric parameters were expressed as Z-scores adjusted for height, age and sex.<sup>2</sup> Statistical analysis was by t test and multiple linear regression (MLR).

**Results:** 37 white children (median age 5.78 years, range 4.39–6.99, 51% female) and 31 south Asian (median age 5.45 years, range 4.09–6.89, 48% female) were recruited. MLR showed significant differences between white and south Asian children for FVC and  $\text{FEV}_1$  but not for other LF measurements. However, after adjusting for age, sex and height, significant differences between the two ethnic groups were seen for all spirometry outcomes but other LF measurements continued to remain similar, although height was a significant predictor for most outcomes. (see table). Differences were also apparent when expressing spirometric outcomes as Z-scores, with FVC and  $\text{FEV}_1$  being 0.7 (95% CI 0.09 to 1.23) and 0.7 (95% CI 0.15 to 1.19) lower in the Asian than white children, whereas  $\text{FEF}_{75-25}$  Z-scores were similar (0.39; 95% CI –0.40 to 1.01).

**Conclusions:** Spirometry measurements are lower in south Asian than white healthy preschool children but other LF measures appear to be similar. These ethnic differences should be taken into account to prevent errors in interpretation of LF measurements.

1. Beydon, *et al.* *Am J Respir Crit Care Med* 2007;**175**:1304–45.
2. Stanojevic, *et al.* *Am J Respir Crit Care Med* 2008;**177**:253–60.

Abstract P72 Table Multiple linear regression analyses showing the differences in LF between white and Asian children before and after adjustment\*

	Unadjusted $\beta$ coefficient (95% CI) p value	Adjusted* $\beta$ coefficient (95% CI) p value
LFT		
LCI (l)†	0.09 (–0.15 to 0.33); 0.47	0.02 (–0.2 to 0.25); 0.83
FRC (l)†	–0.07 (–0.15 to 0.01); 0.447	–0.03 (–0.1 to 0.03); 0.303
sRaw (kPa/s)†	–0.04 (–0.14 to –0.06); 0.447	–0.02 (–0.122 to 0.086); 0.734
FVC (l)‡	–0.25 (–0.38 to –0.11); 0.001	–0.14 (–0.25 to –0.03); 0.013
$\text{FEV}_1$ (l)‡	–0.21 (–0.32 to –0.10); <0.0005	–0.15 (–0.24 to –0.07); 0.001
$\text{FEF}_{75-25}$ (l/s)‡	–0.19 (–0.34 to 0.02); 0.078	–0.22 (–0.43 to –0.01); 0.04

\*Adjusted for age, sex and height. †n = 35 whites, 31 Asians; ‡n = 28 whites, 25 Asians. FRC, function residual capacity; LCI, lung clearance index; LF, lung function; sRAW, specific airways resistance.

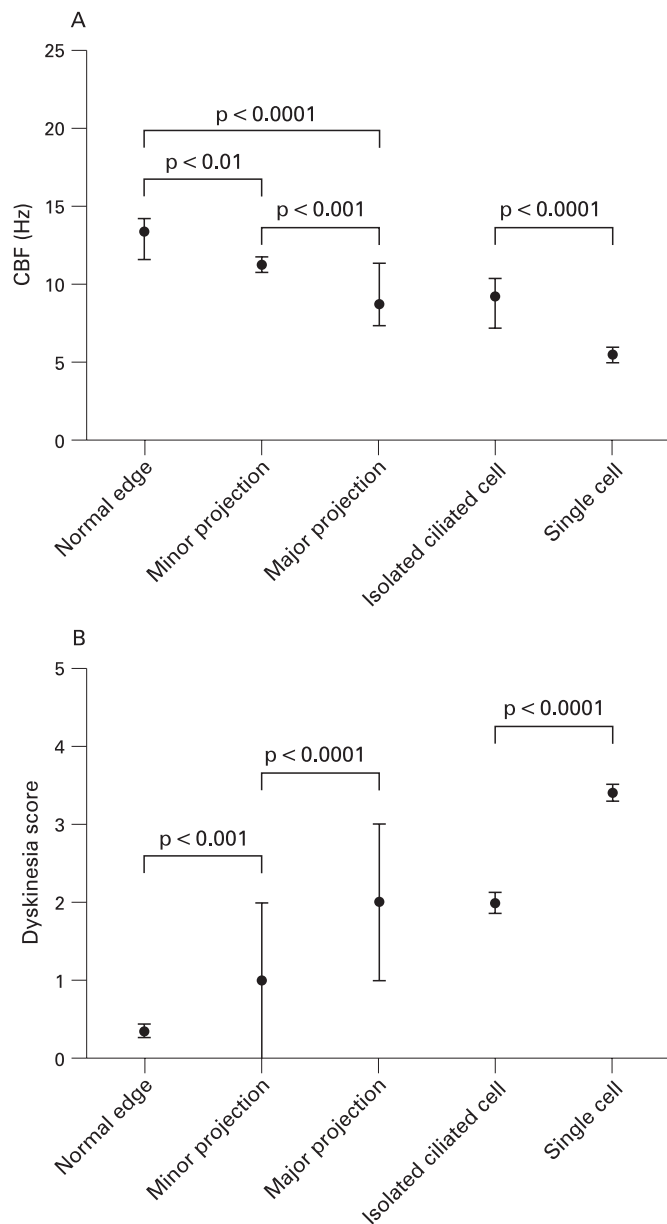
### P73 DISRUPTION OF CILIATED EPITHELIAL EDGES RESULTS IN A SLOWER CILIARY BEAT FREQUENCY AND INCREASED CILIARY DYSKINESIA

B Thomas, A Rutman, C O'Callaghan. University of Leicester, Leicester, UK

**Introduction and Objectives:** Ciliary function studies for the diagnosis of primary ciliary dyskinesia (PCD) are performed on nasal brush biopsy samples. Whereas in many cases intact uniform ciliated edges are observed, disrupted edges are also seen.

**Aim:** To determine if cilia on disrupted edges beat with a normal beat pattern and frequency similar to that of cilia on undisrupted edges.

**Methods:** Nasal brush biopsy samples from 42 children in whom the diagnosis of PCD was excluded were assessed. Samples were categorised into five groups: a normal ciliated edge (>50  $\mu\text{m}$  in length); a ciliated edge (>50  $\mu\text{m}$  in length) with minor cellular projection; a ciliated edge (>50  $\mu\text{m}$  in length) with major cellular projection; an isolated ciliated cell on an epithelial strip >50  $\mu\text{m}$  in length and single unattached ciliated cells. Ciliary beat frequency (CBF) and beat pattern of 50 samples from each group were



**Abstract P73 Figure** Ciliary beat frequency (CBF) and dyskinesia score for different types of ciliated epithelium. (Normal edge = ciliated epithelial strip  $>50\ \mu\text{m}$  in length, Minor projection = ciliated epithelial strip  $>50\ \mu\text{m}$  in length, with cells projecting out of the epithelial edge line, but with no point of the apical cell membrane projecting above the tips of the cilia on the adjacent cells, Major projection = defined as ciliated epithelial strip  $>50\ \mu\text{m}$  in length, with cells projecting out of the epithelial edge line, with at least one point of the apical cell membrane projecting above the tips of the cilia on the adjacent cells, isolated ciliated cell = defined as the only ciliated cell on an epithelial strip greater than  $50\ \mu\text{m}$  in length and single cell = defined as ciliated cells that had no contact between themselves or any other cell type). (A) CBF in Hz and (B) Dyskinesia score (0 = normal beat pattern throughout the epithelium, 1 = dyskinetic beat pattern in  $\leq 25\%$  of the cilia studied, 2 = dyskinetic beat pattern in  $\leq 50\%$  of the cilia studied, 3 = dyskinetic beat pattern in  $\leq 75\%$  of the cilia studied and 4 = dyskinetic beat pattern in all the cilia studied). Data are expressed as median (IQR).

**Abstract P73 Table**

	Normal ciliated edge	Ciliated edge with minor projections	Ciliated edge with major projections	Epithelial strip with an isolated ciliated cell	Single ciliated cell
CBF in Hz	13.4 (11.6–4.2)	11.4 (8.9–13.9)*	8.7 (7.3–11.3)*	9.2 (7.2–10.3)*	6.5 (2.2–8.3)*
Dyskinesia score	0 (0–1)	1 (0–2)*	2 (1–3)*	2 (1.8–3)*	4 (3–4)*

Data expressed as median (interquartile range). \* $p < 0.05$  compared with corresponding values for normal ciliated edge. CBF, ciliary beat frequency.

determined using a high speed digital video microscopy system. The percentage of dyskinetically beating cilia in each sample was assessed and expressed as a dyskinesia score (0, normal beat pattern throughout the sample; 1, dyskinetic beat pattern in  $\leq 25\%$  of the cilia; 2, dyskinetic beat pattern in  $\leq 50\%$  of the cilia; 3, dyskinetic beat pattern in  $\leq 75\%$  of the cilia and 4, dyskinetic beat pattern in all cilia).

**Results:** See table and fig. A significantly lower CBF and a significantly higher dyskinesia score were observed in all sample types compared with that of a normal ciliated edge.

**Conclusions:** If ciliary beat frequency is measured and beat pattern assessed from cilia that are not part of an intact undisrupted strip of ciliated epithelium, the results should be viewed with caution.

#### P74 HIGH-RESOLUTION COMPUTED TOMOGRAPHY IN CHILDREN WITH CONFIRMED POST-INFECTIOUS OBLITERATIVE BRONCHIOLITIS

<sup>1</sup>M Brodie, <sup>2</sup>M Muller, <sup>2</sup>N Byrne, <sup>2</sup>L Mitchell, <sup>2</sup>DA Spencer. <sup>1</sup>Newcastle University, Newcastle upon Tyne, UK; <sup>2</sup>Freeman Hospital, Newcastle upon Tyne Hospitals NHS Foundation Trust, Newcastle upon Tyne, UK

**Introduction:** Postinfectious obliterative bronchiolitis (OB) is an irreversible small airway disease associated with persistent wheeze, cough and dyspnoea occurring after a discrete infection in infancy associated with characteristic high-resolution computed tomography (HRCT) changes and having excluded all other relevant conditions. The clinical course of OB in children is not well described.

**Objective:** To describe the features and progression of HRCT findings in a cohort of children with OB.

**Methods:** Children with OB were identified from a unitary database. A consultant radiologist reviewed all HRCT scans independently and scored each lobe (0, none; 1, mild; 2, moderate; 3, severe) for mosaicism (inspiration), mosaicism (expiration), bronchiectasis (peripheral or central), bronchial wall thickening and tree-in-bud sign.

**Results:** A total of 13 children was identified, 12 post-adenovirus and one post-*Mycoplasma pneumoniae*. 21 scans were reviewed. Serial scans were performed in eight children. When present bronchiectasis and the tree-in-bud sign occurred in the same lobes affected by OB. Peripheral bronchiectasis was identified in 17 (81%) scans, in contrast to classic radiological teaching that bronchiectasis is usually central in OB. When considering individual lobes in serial scans (median of 37 months apart), bronchiectasis improved in five, deteriorated in three and was unchanged in 25; bronchial wall thickening improved in two, deteriorated in six and was unchanged in 34. Expiratory scans revealed more severe OB in 43% of lobes compared with inspiratory views and in 12% this provided the only evidence of OB. When considered alone, OB was present in 71% of inspiratory scans, 62% of expiratory and 73% of dual inspiratory and expiratory scans combined.

**Conclusions:** Bronchiectasis is common in OB and is usually peripheral in nature. Bronchiectasis and the tree-in-bud sign occur in the same lobes as mosaicism. To optimise the detection of OB



Abstract P74 Table Percentage of lobes with HRCT abnormalities

	Right upper lobe	Right middle lobe	Right lower lobe	Left upper lobe	Lingula	Left lower lobe
Mosaicism (inspiration)	84	53	63	68	68	84
Mosaicism (expiration)	71	50	79	64	71	85
Bronchiectasis	32	11	37	5	21	37
Bronchial wall thickening	21	5	42	5	5	26
Tree-in-bud sign	0	5	5	0	0	5

HRCT, high-resolution computed tomography.

inspiratory and expiratory scans should both be performed if possible. In a moderate number of children bronchiectasis improved over time and this justifies the practice of performing repeat scans. Clearly, this should be balanced against the risks of increased radiation exposure however.

# **P75 MONITORING FOR TREATMENT COMPLICATIONS IN CHILDREN WITH SEVERE CHRONIC ASTHMA**

SJ Moss, MC McKean, C O'Brien, DA Spencer. *Newcastle upon Tyne Hospitals NHS Trust, Newcastle upon Tyne, UK*

**Introduction and Methods:** Potential adverse effects of long-term systemic and high dose inhaled corticosteroids in chronic asthma are well documented. Other potentially toxic agents such as methotrexate are increasingly used in paediatric practice. We suspected that screening for treatment-related adverse effects was not being performed in a consistent manner and therefore undertook a retrospective case note review of patients in our tertiary paediatric respiratory clinics to obtain baseline data for future audit. All patients had confirmed chronic severe asthma requiring treatment at step 5 or above of the BTS asthma guidelines.

**Results:** 31 patients (median age 12.5 years (2–17), 23 male) were maintained on a median daily dose of 5 mg prednisolone and had received a median of three booster courses in the past year. Nine patients were receiving omalizumab, three subcutaneous methotrexate and four continuous subcutaneous terbutaline. 29% of patients were <9th centile for height, and 27% were >98th centile for weight. 22% of patients who had dual x ray absorptiometry scans had a lumbar spine density Z score of  $\geq -2$ . No patients were found to be hyperglycaemic. Raised blood pressure was documented intermittently in 20% of patients, but no persistent hypertension was detected. Significant cutaneous infection occurred in one patient rendered lymphopenic by methotrexate therapy. 10 patients underwent assessment of adrenal function and this was abnormal in three. The presence of Cushingoid features, myopathy, cataracts and depression were not well documented.

**Conclusions:** Performance and documentation of monitoring for potential treatment-related adverse effects was not conducted in a consistent manner in our patient group. A more robust method of monitoring to include a formal annual review of therapy is required.

# **P76 OUTCOME OF CONFIRMED CONGENITAL CYSTIC ADENOMATOID MALFORMATION OF THE LUNG IN THE NORTHERN REGION OF ENGLAND: 22 YEARS EXPERIENCE, 1985–2006**

J Mangalore Devdas, B Ray, P Hammond, M Ward-Platt, MC McKean. *Royal Victoria Infirmary, Newcastle upon Tyne, UK*

**Objectives:** To establish the natural history of confirmed congenital cystic adenomatoid malformation (CCAM) cases in the northern region of England over a 22-year period from 1985 to 2006 inclusive.

**Methods:** This population-based study identified cases for subsequent review using the prospectively collected regional NorCAS

(Northern Congenital Anomaly Survey), fetal medicine databases and hospital admission records.

**Results:** Thirty-seven cases of CCAM were confirmed by computed tomography scan (or with histopathological/postmortem confirmation). Twenty-six (70%) had been accurately identified by antenatal ultrasound scans. Twenty-nine (78%) were live births. Six cases died postnatally (16% of total cases; 20% of live births), all were premature (mean gestation 29 weeks). Ten subjects (27% of total; 35% of live births) required surgical excision. Thirteen (35% of total; 45% of live births) have been managed conservatively, are alive and well with mean age at last follow-up of 2.3 years. Mean maternal age, gestation and birth weight were 27 years, 36 weeks and 2900 g, respectively. The apparent prevalence of confirmed CCAM in the north of England is one in 25 000 live births. CCAM is more common in females (62%), the left lower lobe (39%) and right lower lobe (32%). Sixty per cent developed symptoms, 44% in the first year of life. The commonest symptoms were recurrent respiratory tract infection (30%). Two cases developed pneumothorax and one lung abscess. In subjects who had surgical intervention (80% in the first year of life) half were symptomatic in the neonatal period. Two patients had major postoperative complications; one with bleeding into the pleural cavity requiring re-exploration and another with bronchopleural fistula requiring chest drain insertion. One patient developed pectus excavatum following surgery. No fatalities resulted from surgery. Resected specimens allowed histopathological Stocker classification: 50% type 2, 30% type 1.

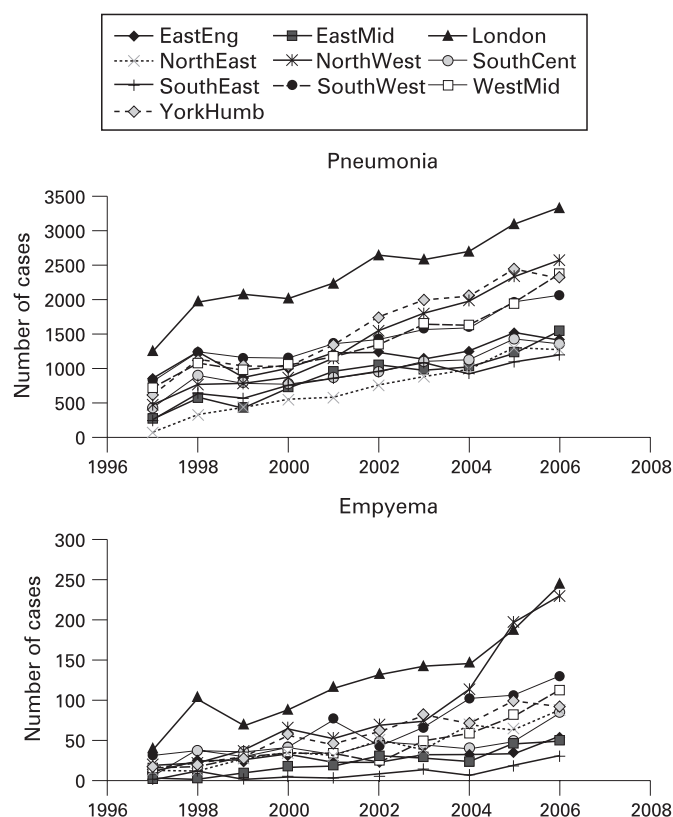
**Conclusions:** Few population-based studies on the prevalence of CCAM are available in the literature. The apparent prevalence of CCAM in the northern region of England is one in 25 000 live births. Thirty-five per cent of live births required surgery, most being symptomatic in early life. Prematurity contributed significantly to mortality in CCAM. Good surgical outcomes were observed. This study provides valuable information for counselling parents.

# **P77 MODELLING OF INCREASING PAEDIATRIC EMPYEMA AND PNEUMONIA ADMISSIONS IN ENGLAND 1996–2006 USING HOSPITAL EPISODE STATISTICS**

<sup>1</sup>SP Rushton, <sup>1</sup>D Cliff, <sup>1</sup>MDF Shirley, <sup>1</sup>M Pearce, <sup>2</sup>R Gorton, <sup>3</sup>J Clark, <sup>3</sup>DA Spencer. <sup>1</sup>Newcastle University, Newcastle upon Tyne, UK; <sup>2</sup>Health Protection Agency, North East, UK; <sup>3</sup>Newcastle Upon Tyne Hospitals NHS Foundation Trust, Newcastle upon Tyne, UK

Empyema thoracis is increasing in children in the developed world, although the reasons for this are unclear. We investigated trends in the number of cases for England over the period 1997–2006 in relation to pneumonia admissions.

Data on paediatric pneumonia and empyema were obtained from the hospital episode statistics database for the period 1997 to 2006. We used linear mixed effect (LME) models to investigate trends in individual strategic health authority areas (SHA) and relate these to changes in the background weather and baseline pneumonia cases using the SHA as a random effect.



Abstract P77 Figure The increasing incidence of paediatric pneumonia and empyema 1997–2006.

The rise in cases of empyema in all SHA was exponential over this period ( $t = 7.943$ ;  $p < 0.000$ ) although the pattern of increase was not homogenous. An LME with the mean temperature in each SHA for the month prior to the admission of cases was a significant predictor ( $t = -12.815$ ,  $p < 0.000$ ) of the heterogeneous variation if we assumed an exponential model for the basic trend through time (correlation between predicted and observed cases 0.74,  $t = 3667$ ,  $p < 2.2 \times 10^{-6}$ ). Rates of increase were high in the north and west, although the rate of increase in admissions in London was high relative to that of other southern health authorities. The incidence of pneumonia also increased in the same time period, but this did not explain the increasing trend in empyema cases (see fig).

It is possible that differences in environmental and health and social deprivation across the country are responsible for the differences in rates of both pneumonia and empyema observed across the UK, although the exponential nature of the increases suggests that other factors such as changes in the causative organisms themselves may be responsible. Enhanced paediatric pneumococcal empyema surveillance is now in place across the UK, but these data suggest that a similar system should also be implemented for all paediatric pneumonia.

#### P78 A METHODOLOGY FOR A NATIONAL DATABASE FOR CHILDHOOD ASTHMA

<sup>1</sup>SW Turner, <sup>1</sup>R Leece, <sup>2</sup>C Palmer, <sup>1</sup>JG Ayres, <sup>1</sup>T Macfarlane, <sup>2</sup>A Mehta, <sup>2</sup>G Mehta, <sup>3</sup>S Cunningham, <sup>4</sup>S Mukhopadhyay. <sup>1</sup>University of Aberdeen, Aberdeen, UK; <sup>2</sup>University of Dundee, Dundee, UK; <sup>3</sup>Royal Edinburgh Hospital for Sick Children, Edinburgh, UK; <sup>4</sup>University of Brighton, Brighton, UK

**Introduction:** Childhood asthma is a common condition in which studies of large populations have demonstrated that causation is likely to involve genetic and environmental factors. Combinations of genetic and environmental factors may also be relevant to disease

heterogeneity within the asthma population but this hypothesis remains untested; to do this would require a large study population. Here we present preliminary data that demonstrate the feasibility of establishing a national database to study gene–environment interactions in childhood asthma.

**Methods:** Children aged 2–16 years and with an asthma diagnosis from a respiratory paediatrician were recruited from 15 centres across Scotland. Children with other respiratory conditions were excluded. Asthma, quality of life and dietary questionnaires were completed and returned by post. Children attended an assessment when free of symptoms. The assessment was carried out by a research nurse and included spirometry, bronchodilator response, exhaled nitric oxide (ENO) and skin prick testing. Saliva was collected for cotinine assay and DNA extraction. A database was developed adhering to established protocols created for the UK Cystic Fibrosis database.

**Results:** At the time of writing, 96 children had been invited to participate, of whom questionnaires were returned in 48, mean age 10 years. Spirometry was measured in 28 children (mean FEV<sub>1</sub> 94% (SD 18)), bronchodilator response in 27 (mean change 6% (SD 9)), ENO in 26 (mean 35 parts per billion (SD 33)) and skin testing in 23 (21 skin prick positive). Saliva was obtained in 40 children.

**Conclusions:** We have established our methodology and demonstrated the feasibility of creating a national database to study childhood asthma. Recruitment continues and we aim to create one of the largest cohorts of asthmatic children for study of gene–environment interactions.

#### P79 DEVELOPMENT OF A CENTRALISED WEB-BASED DATABASE MANAGEMENT SYSTEM FOR RESPIRATORY RESEARCH PROJECTS

<sup>1</sup>S Lum, <sup>2</sup>R White, <sup>2</sup>T Small, <sup>1</sup>J Stocks. <sup>1</sup>Portex Respiratory Unit, UCL, Institute of Child Health, London, UK; <sup>2</sup>J7IS Ltd, London, UK

Over the past decade, we have developed various relational databases to manage physiological and clinical data relating to lung development in health and disease. However, the retrieval of increasingly complex data has become problematical, exacerbated by software incompatibilities and changes in research directives.

**Aim:** To develop a data management system for research and clinical applications, that is user-friendly, has an open architecture to facilitate integration with a variety of applications, is customisable to unique projects and is web-based, providing a platform for multicentre studies.

**Methods:** A web-based database was developed using cutting edge technology (ColdFusion, MySQL and core software design and development techniques). Specifications were based on current and future requirements for storage and data-processing of cross-sectional and longitudinal data. Core questions relating to subject age (neonate/infant/child) and/or disease groups (eg, cystic fibrosis/asthma) formed the basis of the database structure to ensure consistency in data collection between research projects and to facilitate the development of new questionnaires.

**Results:** Archived demographic and clinical data from 1018 subjects (aged 3 weeks to 11 years) involving 850 variables were successfully transferred from existing databases to the new system, together with >6000 sets of lung function, cardiopulmonary exercise and skin-test data. Cross-sectional and longitudinal data can be extracted using the self-query function. New project questionnaires can be generated using the pool of core questions within the database.

**Conclusions and Future Directions:** The database represents cutting edge technology, which integrates our unique existing data and provided an invaluable tool to meet future requirements. The infrastructure of this self-managed, web-based database can be adapted for other clinical or research programmes. Additional

features, including data management and data audit tools using traceability functions, plus the facility to transfer questionnaire data directly into the database using a “magic pen” (thereby reducing time and the potential for transcription errors) will soon be available.

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## P80 DEVELOPING A CAREGIVER QUALITY OF LIFE SCORE FOR WHEEZY PRESCHOOL CHILDREN

<sup>1</sup>Ms Olden, <sup>2</sup>Dr Seddon, <sup>2</sup>Prof Juniper. <sup>1</sup>Royal Alexandra Children's Hospital, Brighton, UK; <sup>2</sup>McMaster University, Hamilton, Canada

Assessing asthma control in the preschool age group is problematic. Lung function is difficult to measure and may not be closely related to the quality of life (QOL). Validated QOL tools exist for caregivers of school-age asthmatic children. We aim to develop a QOL tool for wheezy preschool children and their families. As the first stage, we have explored QOL issues as perceived by caregivers and health professionals.

We interviewed 10 individual parents of children aged 1–5 years with recurrent wheezing, ran two parent focus groups involving a further nine parents and interviewed six health professionals. Parents were asked open-ended questions about how wheezing illness affected their child's QOL and their own QOL. Professionals were asked what aspects of QOL were most likely to be affected by wheezing disease in preschool children and their carers.

Prominent themes that emerged were as follows. Parents on their child's QOL: Missing fun activities, need to limit exercise, sleep disturbance. Parents on own QOL: Anxiety about child catching respiratory infections, worry about spotting deterioration, missing work/college, concern about not being listened to by professionals. Professionals on child's QOL: Sleep disturbance, restriction of activity, upset about taking medications. Professionals on caregiver QOL: Stress of remembering to give medication, disturbed sleep, employment prospects.

Although there was considerable overlap, professionals focussed on the problems of medication impinging on QOL, whereas caregivers rarely mentioned this. Compared with items in the Juniper caregiver QOL questionnaire for school-age asthma, issues about acute attacks, as opposed to chronic symptoms, predominated.

## Lung cancer: clinical aspects

### P81 ONE STOP LUNG SHADOW CLINIC: IS IT REALLY WHAT THE PATIENT WANTS?

S Bari, VS Lamonby, JIA Millar, V McLaughlin, WT Berrill. *West Cumberland Hospital, North Cumbria Acute Hospitals NHS Trust, Whitehaven, UK*

**Introduction:** Although the 31 and 62-day lung cancer target is easily achieved by investigating patients in one stop lung shadow clinics (OSLSC), some argue patients may find it too stressful to have all the investigations (bloods, ECG, spirometry, computed tomography scan, bronchoscopy) and consultation in a day. To investigate this we conducted a retrospective survey among patients seen in our OSLSC.

**Method:** Questionnaires were sent to 185 consecutive patients enquiring whether: GP explained the reason, adequacy of preclinic information, seen on time, happy to have all tests on the same day, it was difficult to cope, they prefer 2-day appointments, the wait was too long in between tests, waiting time acceptable, expectations met, other clinics should be run similarly and overall satisfaction. We compared the responses (anonymous) in different age groups (<70 years, 70 years and above), with or without lung cancer and gender.

**Results:** Of 116 (mean age 69.5 years (range 21–90), 60<70 years, 69 male, 38 lung cancer) responses, 78% thought GP explained the reason (9% disagreed), 83% thought preclinic information was adequate (11% disagreed), 81% seen on time (12% were not), 89% were happy to have all test done in a day (4% disagreed), 9% found difficult to cope (84% did not), 7% wanted 2-day appointment (89% disagreed), 83% did not think wait between the tests is too long (11% disagreed), 85% thought <30 minutes is an acceptable wait before first appointment, 97% cases had events as expected, 98% thought other clinics should be run similarly, 95% were satisfied (5% did not record). No significant difference observed in different age, gender and with or without lung cancer to all responses except patients aged 70 years and above felt more information could be given prior to clinic ( $p<0.05$ ).

**Conclusion:** Patients' views favour OSLSC. With appropriate preclinic information patients did not find it stressful irrespective of their age, gender and diagnosis. This saves them several hospital visits, especially in our rural setting. Elderly patients wanted more preclinic information. We plan to change our information pack on reflection and give patient choices. This survey reinforces our argument for OSLSC and we would like to encourage other units to experiment with this.

### P82 DO WE PREPARE PATIENTS ADEQUATELY FOR THE LUNG CANCER CLINIC EXPERIENCE?

VS Sreeguru Lakshman, A Ponnuswamy, JF Greenwood, A McIver, MJ Ledson, MJ Walshaw. *Liverpool Heart and Chest Hospital, Liverpool, UK*

**Introduction:** In order to achieve tight lung cancer waiting time targets, patients need to be processed rapidly, such that they may have little time to assimilate and reflect on their disease. This is particularly important at first referral, when the information given will play a major role in their appreciation of the subsequent journey. To look at this further, we surveyed the information given to patients prior to their attendance at our “one-stop” rapid access clinic where they undergo computed tomography scan, consultation and bronchoscopy (if indicated) on the same day.

**Patients and Methods:** Using a structured questionnaire, one researcher (VS) interviewed 50 consecutive patients (mean age 68 years (range 41–86); 80% from primary care, 4% from A&E and 16% from other clinicians; 62% male) on arrival at the rapid access clinic.

**Results:** Although 84% of patients were informed of the appointment by the referrer (31 (74%) in person, nine (21%) by phone and two (5%) by letter), the remainder only knew when they received a communication from the hospital. Reasons given for referral included “a shadow on chest x ray” needing further investigation in 78%, but suspected lung cancer was mentioned in 20%. However, in 12% no reason was given. Although 60% received no specific information about the rapid access clinic, 34% were told to expect some tests, but only 10% were aware they may need to stay the whole day. The hospital contacted patients by phone and letter in 72%, by letter alone in 12%, and the remaining 16% by phone alone: 72% of patients indicated this communication did not adequately prepare them for their first appointment. All 92% seen within a week of referral were aware of their clinic appointment. Only 10 patients suspected a diagnosis of lung cancer.

**Conclusions:** This study highlights deficiencies in the way we inform patients about the nature of our rapid access clinic and this is not limited solely to primary care. We are working with referring colleagues and hospital systems to improve their communication with patients to ease the stress of their journey.