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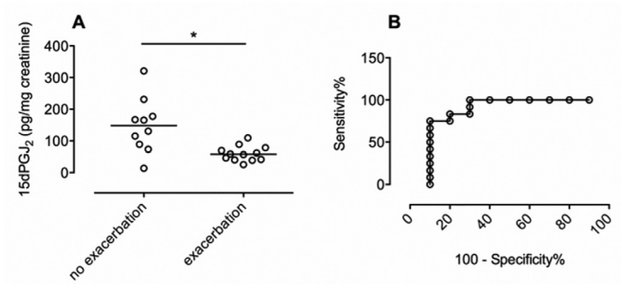

Abstract S65 Figure 1 (A) Urine 15dPGJ$_2$ at baseline is significantly lower in children who have an asthma exacerbation within 3 months. (B) ROC curve for 15dPGJ$_2$. ROC AUC=0.858, p=0.005. PG:prostaglandin. Bar represents median, comparison by Mann-Whitney test. *p<0.01.

S66 THE GLI SPIROMETRY REFERENCE EQUATIONS INFLUENCE THE APPARENT RATE OF DECLINE IN FEV1 AMONG CHILDREN AND ADOLESCENTS WITH CYSTIC FIBROSIS

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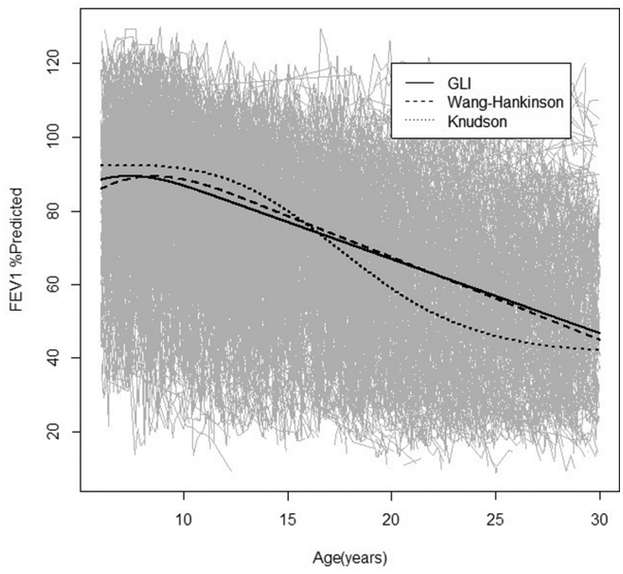
Background In patients with cystic fibrosis (CF), interpretation of cross-sectional FEV$_1$ data is greatly influenced by choice of spirometry reference equation, particularly during childhood (Stanojevic; J Cyst Fibros 2014). We hypothesised that availability of the Global Lung Function Initiative (GLI) spirometry reference equations (Quanjer; ERJ 2012) will also affect the apparent rate of decline in lung function over time, thereby potentially altering our understanding of disease progression in CF.



Abstract S66 Figure 1 Average FEV1 decline in people with cystic fibrosis according to three spirometry reference equations

Methods Data were extracted from two patient registries: the UK CF Registry (n = 6043 subjects; 20,013 test occasions over a period of 5 years) and the Toronto CF database (n = 1023 subjects; 27,868 test occasions over a period of 23 years). Spirometric outcomes were interpreted using%predicted FEV$_1$ calculated from GLI, Knudson (as currently used by the UK CF Registry), and Wang-Hankinson (as used by the US CF Foundation) reference equations. Patients >30 yrs or with FEV$_1$ > 130% predicted were excluded. We used a non-linear mixed effects model to describe the average change in FEV$_1$ with age. To illustrate the importance of reference equation in evaluating risk factors, FEV$_1$ decline according to patient gender was also explored.

Results The pattern of lung function decline at the population level differed according to selected equation (Figure). Average rate of decline was steeper with Knudson or Wang-Hankinson than GLI. Importantly, GLI equations showed a steady decline in FEV$_1$ starting at 6 yrs, whereas the other equations suggest greater decline during adolescence. Similar patterns were observed in both UK and Toronto populations. When analysed according to gender, the rate of lung function decline was steeper in females during early adolescence compared with males where the decline was steady.

Conclusions In both datasets, Knudson and Wang-Hankinson reference equations suggest relative preservation of spirometry in childhood followed by rapid decline in adolescence. However using the more robust GLI equations, steady decline throughout childhood with a less dramatic acceleration during adolescence is seen, with differences in pattern of change over time according to patient gender. Accurate identification of critical periods of lung function decline offers novel opportunities to target care.

Funded by the UK CF Trust.

S67 LUNG CLEARANCE INDEX (LCI) IS A SENSITIVE PREDICTOR OF HIGH RESOLUTION COMPUTED TOMOGRAPHY (HRCT) SCORES IN CHILDREN WITH NON-CF BRONCHIECTASIS

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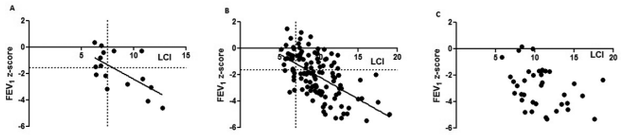
Introduction and objectives LCI is a sensitive predictor of early cystic fibrosis (CF) lung disease, and correlates with HRCT better than spirometry (Thorax. 2008;63:129–134). The same is true in adults with non-CF bronchiectasis (Am J Respir Crit Care Med. 2014;189:586–592.), but by contrast, in PCD there were no relationships between LCI, HRCT or spirometry (Am J Respir Crit Care Med. 2013;188:545–549). It is unclear whether these differences reflect primary versus secondary ciliary dyskinesia, or CFTR versus non-CFTR disease. We hypothesised that in children with non-CF bronchiectasis, relationships between spirometry, LCI and HRCT will be similar to those in CF children and non-CF bronchiectasis adults, rather than PCD patients.

Methods 12 children with non-CF bronchiectasis performed LCI and spirometry and underwent thoracic HRCT. HRCT scans were scored quantitatively (Thorax. 2013;68:532–539). Results were compared with those from large CF (n = 125) and PCD (n = 38) cohorts.

Results In non-CF bronchiectasis there was a correlation between first second forced expired volume (FEV$_1$) and LCI (p = 0.009, r=-0.6), similar to that seen in CF (p < 0.0001,



Abstract S67 Figure 1 Correlation between LCI and FEV_1 in children with non-CF, non-PCD bronchiectasis (A), CF (B) and PCD (C)

r=-0.6) but not in PCD (Figure). In non-CF bronchiectasis LCI was more significantly correlated with HRCT (extent and severity of bronchiectasis (p = 0.002, r = 0.8 and p = 0.01, r = 0.7 respectively), airway wall thickening (p = 0.01, r = 0.7) and air trapping (p = 0.0006, r = 0.8)) than was spirometry (only correlation with air trapping (p = 0.03, r=-0.6)). As shown previously, there were good correlations between HRCT and LCI in CF, but in PCD only air trapping correlated with LCI, and there were no correlations with FEV_1.

Conclusions LCI is a good marker of structural lung disease in children with non-CF bronchiectasis and is more sensitive to HRCT abnormalities than spirometry, similar to adults, and CF at all ages. This suggests the different relationships seen in PCD result from the effects of primary versus secondary ciliary dyskinesia rather than CFTR versus non-CFTR lung disease. LCI may be useful in monitoring children with non-CF bronchiectasis, but this needs to be confirmed longitudinally. The results illustrate the importance of not extrapolating between different airway diseases.

S68 THE HI-FLO STUDY: A PROSPECTIVE OPEN RANDOMISED CONTROLLED TRIAL OF HIGH FLOW NASAL CANNULA OXYGEN THERAPY AGAINST STANDARD CARE IN BRONCHIOLITIS

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Introduction High flow nasal cannula (HFNC) oxygen therapy is increasingly used as a form of respiratory support with limited evidence to support its use. Data from retrospective studies suggest that HFNC reduces rates of intubation and respiratory parameters in infants with bronchiolitis. It is well-tolerated, easy to use, and has very few adverse effects.

Objective To determine if HFNC therapy reduces work of breathing, oxygen requirement and time to resolution of respiratory distress more quickly than standard care in bronchiolitis.

Methods We conducted a prospective open randomised controlled trial to compare HFNC oxygen therapy with standard care for children with bronchiolitis in ward environments in a tertiary referral children's hospital over a two-year study period. Patients under 18 months of age with a clinical diagnosis of bronchiolitis were eligible. Subjects were randomised to standard supportive care with low flow oxygen (up to 2 litres/minute) or HFNC oxygen at 8 litres/minute. Fractional inspired concentration of oxygen was titrated to maintain saturations >92%. A validated composite clinical score (modified Tal) was measured every 3 h. [1]

Results 72 patients were recruited, 36 in each treatment arm. The mean age of subjects was 4 months, range 0.5–12.9 months. 42% were male, and all but two were born at term. 79% were RSV positive. 3 patients in the control group, and 4 in the intervention group required admission to intensive care. There was no improvement in time to resolution of respiratory distress or oxygen requirement in patients receiving HFNC oxygen therapy. There was a trend towards lower clinical scores in the first 3 h following initiation of treatment in the intervention group. There were no adverse effects from HFNC therapy, and it was found to be safe in a ward environment.

Conclusion HFNC oxygen therapy may improve clinical parameters during the first hours of treatment, but it did not significantly reduce time to resolution of respiratory distress or oxygen requirement.

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Lung cancer: how are we doing and what's next?

S69 RISING STANDARDS OF CARE CONTINUE IN YEAR 9 OF THE NATIONAL LUNG CANCER AUDIT

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Introduction The National Lung Cancer Audit, now in its 9th year, is run jointly by the Royal College of Physicians and The Information Centre for Health and Social Care (HSCIC), and commissioned by the Healthcare Quality Improvement Partnership (HQIP). Over this period, the rich data of increasing quality has charted improving standards of care for patients, as well as persistent variation across organisations which in most cases is independent of case-mix.

Methods Although several other countries also submit data to the audit, this abstract presents provisional results for England only for patients first seen in 2013.

Results 30,508 patient records were submitted with more than 93% having performance status and the same number having disease stage recorded (see **Table 1**). Spirometry is available for 65% of Stage I-II/PS 0–1 NSCLC patients, allowing more detailed risk-adjustment to be carried out in future. The histological confirmation rate remains steady at 75%, and the proportion with non-subtyped NSCLC continues to fall. There has been a small but incremental rise in the resection rate in histologically-confirmed NSCLC which now stands at 23%, and in the proportions of patients with SCLC receiving chemotherapy (70%). Patient access to specialist nurses appears to have improved but demonstrates a continuing unmet need. The proportion having CT scan before bronchoscopy continues to rise (91%) as does the proportion having chemotherapy for locally advanced NSCLC with good PS (60%).

Variation in practice still exists – for example, the resection rate in Stage I-II NSCLC varies from 46% to 66% across the cancer networks, although the range is narrower than the previous year (35% to 62%).

Our final presentation will contain further analyses of survival across the audit lifespan.

Conclusions In contrast to the early years of the audit where standards of care appeared to improve rapidly and were partly related to improvements in data quality, recent years have shown only small incremental improvements. A reconfiguration of the