adherence and other aspects of basic management, as far as possible. We retrospectively evaluated 166 patients (median age at referral 11.7 years [4;17]; 61% males). SAFS (n=76) was defined as specific IgE (spIgE) or skin prick test (SPT) positivity to any of *Aspergillus fumigatus, Alternaria alternata* or *Cladosporium herbarum*. Non-sensitised patients (n=90) had negative spIgE and SPT to all fungal allergens tested. Age of onset, atopy, symptoms (asthma control test), medication usage, lung function and airway inflammation were assessed. **Results** More boys had SAFS (57/76 (75%) vs 43/90 (48%), p<0.001). Children with SAFS had earlier onset of asthma (median 0.5 years [0;12.5] vs 1.5 [0;12.5], p=0.006), higher total serum IgE (637 IU/ml [12;6737] vs 177 [1;10 881], p=0.002) and higher sum of inhalant allergen SPT and spIgE [*Allergy* 2007;**62**:1379;86] (16 mm [0;38] vs 9 mm [0;36], p<0.001, and 78 IU/ml [0;400] vs 19 IU/ml [0;243], p=0.02, respectively). Children with SAFS had a lower FEV_1 (1.4 L [0.5;3.8], vs 1.9 [0.7;4.3], p=0.008) and lower FVC (2.3 L [0.6;4] vs 2.6 [0.8;5.5], p=0.045). Bronchodilator reversibility was more frequent in SAFS (n=59/73 (81%) vs 42/81 (52%), p<0.001). Maintenance oral steroids were more frequently prescribed in SAFS (n=18/76(24%) vs 8/88 (9%), p=0.02). Symptoms and airway inflammation (assessed in sputum, bronchoalveolar lavage and endobronchial biopsy) were similar in children with and without fungal sensitisation.
Conclusions Children with STRA and fungal sensitisation had lower lung function, earlier asthma onset, more atopy and more bronchodilator responsiveness. There is a need for a randomised controlled trial of antifungal therapy in paediatric SAFS.

S83 | **REPEATABILITY AND INTER-RELATIONSHIPS OF SMALL AIRWAY BIOMARKERS**

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Introduction and objectives There is evidence that the small airways may have an important role in asthma, and a number of physiological techniques have been developed to assess small airway dysfunction. We aimed to determine the within-visit and between-visit repeatability of putative small airway biomarkers, and explore the inter-relationships between them.
Methods We recruited 17 patients with moderate asthma (GINA 3/4), twelve patients with severe asthma (GINA 5) and fifteen healthy control subjects. Participants attended baseline, 2-week and

Abstract S83 Table 1 Principal components analysis of small airway biomarkers

	Component 1	Component 2	Component 3	Component 4
FEV_1	0.569	−0.461	−0.298	−0.198
FVC	0.027	0.008	**−0.862**	0.178
MEF	**0.785**	−0.107	−0.183	−0.444
RV/TLC	0.059	0.240	**0.839**	0.248
K_{CO} (% pred)	0.098	−0.125	−0.068	**−0.754**
S_{cond}	0.410	0.353	0.530	0.087
S_{acin}	−0.370	0.457	−0.250	0.586
R5−R20	0.073	**0.959**	0.151	−0.038
AX	−0.079	**0.955**	0.140	0.131
$FeNO_{200}$	**0.855**	0.039	0.129	0.123
NO_{alv}	**0.902**	0.026	0.219	0.168
ADC	0.346	−0.119	0.040	**0.797**

Variables that load strongly (loading score > 0.75) onto each factor are highlighted.
FEV_1, forced expiratory volume in one second; FVC, forced vital capacity; MEF, mid-expiratory flow; RV, residual volume; TLC, total lung capacity; K_{CO}, carbon monoxide transfer coefficient; AX, reactance area; $FeNO_{200}$, fractional exhaled nitric oxide at 200 ml/s flow; NO_{alv}, alveolar nitric oxide; ADC, apparent diffusion coefficient.

3-month visits. At each visit, participants undertook standard pulmonary function tests, multiple breath washout (MBW), impulse oscillometry (IOS) and measurement of exhaled nitric oxide at multiple flow rates. Five healthy subjects and 10 patients with asthma also undertook hyperpolarised helium-3 MRI at the baseline and 3-month visits. This was used to calculate the apparent diffusion coefficient (ADC), a measure of alveolar airspace size.
Results S_{acin}, a MBW marker of acinar airspace disease, showed excellent repeatability in patients with asthma, with intraclass correlation coefficients (ICC) of 0.914, 0.897 and 0.879 for within-visit, 2-week and 3-month repeatability respectively. The IOS small airway markers R5-R20 and AX displayed similarly good repeatability (0.966 [within-visit], 0.905 [2-week] and 0.844 [3-month] for R5-R20, and 0.977 [within-visit], 0.875 [2-week] and 0.855 [3-month] for AX). The 3-month repeatability for ADC was 0.682. Principal components analysis was used to explore the inter-relationships between the small airway biomarkers. Four components were extracted, as shown in Abstract S83 table 1. The highest loading variables on each component were $FeNO_{200}$, NO_{alv} and MEF on component 1, R5-R20 and AX on component 2, FVC and RV/TLC on component 3, and K_{CO} (% predicted) and ADC on component 4. Thus, components 1−4 corresponded broadly to the concepts of "airway inflammation", "frequency dependence of small airway resistance and elastance", "air trapping" and "alveolar disease" respectively.
Conclusions The putative small airway markers under investigation are robust and repeatable. Principal components analysis has revealed that the information obtained from multiple tests of airway function may be condensed down to four primary concepts, and that there is significant redundancy among the measurements.

S84 | **CAN CLINICIANS ACCURATELY PREDICT NON-ADHERENCE TO MEDICATION IN PATIENTS WITH DIFFICULT ASTHMA? A COMPARISON BETWEEN CLINICAL JUDGEMENT AND PRESCRIPTION ISSUE DATA**

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Background It is increasingly recognised that sub-optimal adherence to prescribed medication regimes is common in patients with difficult asthma and may be associated with adverse clinical outcomes. Simple reliable methods of measuring non-adherence have not been developed and clinicians' judgement is often relied upon as the only assessment of adherence. We have previously shown that checking prescription data are a useful method of investigating non-adherence in this patient population. We aimed to determine how well a clinician's judgement of adherence correlated to adherence as measured by prescription issue data.
Methods Adult asthma patients attending a difficult asthma clinic during July/August 2010 were included. GP retrospective prescription issue data and hospital dispensing data for asthma medications, patient demographics and clinical outcome data were collated. The medication adherence score was calculated as the number of doses issued/number of doses prescribed × 100 for a mean duration of 12 months. Clinicians with an expertise in the management of difficult asthma were asked to stratify each patient according to their perceived adherence, classified as adherent (=80% adherence score; partially adherent 50%−79%; non-adherent <50%). Agreement between clinician judgement and adherence score was analysed using a weighted κ coefficient. Logistic regression was performed to determine whether any clinical features could predict better agreement.
Results Data from 63 consecutive patients was included in the analysis (41 female, median (range) age 51.2(61.3)). Clinicians suspected non-adherence in 11/63 (17.4%) of patients, partial