1. **Introduction:** In COPD, resting residual volume is increased and IC is decreased as a result of air trapping and hyperinflation. IC decreases further with activity and may correlate more strongly to exercise capacity than measures of airflow (FEV1). 6 minute walk test (6MWT) is an objective measure of functional exercise capacity.

**Objectives:** The objectives were to examine the correlation between IC and exercise capacity using 6MWT and spirometry and lung volumes in CGH from 1/1/2008 till 9/11/2011 were included.

**Results:** 144 subjects were included. Mean age (years) was 69.12±8.93, 138/144(96.5%) were male. Mean FEV1 (L) was 1.33±0.57. There was statistically significant correlation between FEV1 and 6MWT distance (simple linear regression coefficient, r=28.99, p=0.021, 95% confidence interval 4.42 to 53.57).

After adjusting for cardiovascular disease, the correlation was still statistically significant(r=29.00, p=0.021, 95% CI 4.36 to 53.63). There was statistically significant correlation between IC and 6MWT distance(r=38.81, p=0.003, 95% CI 13.08 to 64.53). After adjusting for cardiovascular disease, correlation was still statistically significant(r=39.09, p=0.003, 95% CI 13.22 to 64.96).

**Conclusion:** IC is better correlated with 6MWT distance (functional exercise capacity) (p=0.003) than FEV1(0.021) in COPD patients. Thus, we concluded from this study that IC is a better predictor of exercise capacity than FEV1 in COPD patients.

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**P2240**

**Is inspiratory capacity (IC) better correlated with functional exercise capacity than FEV1 in COPD patients?**

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**Respiratory Medicine, Changi General Hospital, Singapore, Singapore; Clinical Measurement Unit, Changi General Hospital, Singapore, Singapore**

**Introduction:** In COPD, resting residual volume is increased and IC is decreased as a result of air trapping and hyperinflation. IC decreases further with activity and may correlate more strongly to exercise capacity than measures of airflow (FEV1). 6 minute walk test (6MWT) is an objective measure of functional exercise capacity.

**Objectives:** The objectives were to examine the correlation between IC and exercise capacity using 6MWT (and FEV1 and exercise capacity) in COPD patients and to compare the correlation between IC and exercise capacity with FEV1 and exercise capacity in COPD patients.

**Methods:** This was a retrospective study. All COPD patients undergoing both 6MWT and spirometry and lung volumes in CGH from 1/1/2008 till 9/11/2011 were included.

**Results:** 144 subjects were included. Mean age (years) was 69.12±8.93, 138/144(96.5%) were male. Mean FEV1 (L) was 1.33±0.57. There was statistically significant correlation between FEV1 and 6MWT distance (simple linear regression coefficient, r=28.99, p=0.021, 95% confidence interval 4.42 to 53.57).

After adjusting for cardiovascular disease, the correlation was still statistically significant(r=29.00, p=0.021, 95% CI 4.36 to 53.63). There was statistically significant correlation between IC and 6MWT distance(r=38.81, p=0.003, 95% CI 13.08 to 64.53). After adjusting for cardiovascular disease, correlation was still statistically significant(r=39.09, p=0.003, 95% CI 13.22 to 64.96).

**Conclusion:** IC is better correlated with 6MWT distance (functional exercise capacity) (p=0.003) than FEV1(0.021) in COPD patients. Thus, we concluded from this study that IC is a better predictor of exercise capacity than FEV1 in COPD patients.
measurement (p=0.19). PNIF repeatability was found at the acceptable level; the median value of CV was 15.5% (0-66), and it did not vary significantly between age groups. Statistically significant increase in PNIF value by 14.3% (45-157%) was observed in the after administration of 0.05% oxymetazoline (p=0.000001).

Conclusions: 1. Only the PNIF value from the 4th and 5th sample did not differ significantly, thus at least 3 measurements are needed.

2. The PNIF is satisfactorily characterized by a relatively low coefficient of variation (15%).

3. The administration of oxymetazoline 0.05% causes an increase in PNIF by approximately 14% from the baseline value.

P2243
Detection of air leaks and their effects on forced oscillometry measurements
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Introduction: Forced oscillation technique (FOT) is a method to estimate respiratory resistance (Rrs) and reactance (Xrs). However, some common artefacts may affect the accuracy of FOT readings. In particular, air leaks from lips not sealed around the mouthpiece, or those from the equipment. We studied the significance of this artefact and identified possible markers to detect it.

Methods: 11 healthy subjects (33±7 years) underwent FOT measurements (Jaeger, Wurzburg, Germany) which generated 0.4-Kpa peak-to-peak input signals. The Rrs and Xrs values at 5 and 20 Hz (R5, R20, X5, X20) were calculated in pairs with breathing volumes. To simulate air leaks, we applied artificial holes of increasing sizes (3.5 mm, 6 mm, and 8.5 mm diameters) on the breathing filter at 1 cm from the circumference. FOT data were compared to normal values obtained with no air leaks.

Results: With increasingly bigger filter holes and resulting air leaks, we identified corresponding larger indentations in the descending limb of the breathing volume (ΔV 2.3±1.7 ml, 5.3±1.7 ml, and 14±4.2 ml, respectively; p<0.001), indicating that ΔV may be a marker for air leak. This was confirmed by a significant correlation between ΔV and R5 (p<0.01, r=0.74), R20 (p<0.01, r=0.71), X5(r<0.001, r=0.50). In line with this, a 1.1 ml increase in ΔV was associated with a 10% decrease in R5 values.

Conclusion: Indentations on the descending limb of the breathing volume may be used to detect the presence and magnitude of air leaks. Visual inspection of the data is required to exclude records where indentations are found. The first author is receiving an ERS Long Term Fellowship.

P2244
Early diagnosis of small airway disease
Evangelia Danil, Georgios Kaltsakas, Sofia-Antiopi Gennimata, Anastasios Palamidas, John Jordanoglou, Nikolas G. Kouroulis. 1st Respiratory Medicine Dept, Athens University, Sotiria Hospital, Athens, Attica, Greece

Inflammatory changes in the peripheral airways of smokers are detected even when “normal” spirometry is still present, indicating that early structural damage in the small airways develop before the diagnosis of overt COPD is established. The Forced Oscillation Technique (FOT) is a sensitive technique to detect airway disease. We studied 15 men (3±13 years) and 10 women (3±10 years) from the “Faculty of Medicine” University of Athens, who performed a FOT measurement. In these subjects, we measured the slope of phase III (Rrs), the effective time at the 60-70% part of the forced vital capacity at the lung (TEFFp7%), or the effective time at the 60-70% part of the forced vital capacity at the lung (TEFFp7%). The result of this study indicates that a large proportion of asthma patients in primary care and in the general population is undiagnosed.

P2245
Prognostic factors in COPD patients controlled in two outpatient clinics
Verónica Hernández, Georgios Kaltsakas, Sofia-Antiopi Gennimata, Anastasios Palamidas, John Jordanoglou, Nikolas G. Kouroulis. 1st Respiratory Medicine Dept, Athens University, Sotiria Hospital, Athens, Attica, Greece

Patients from two outpatient clinics were included. FEV1, BODE, U-BODE and ADO indexes were determined at recruitment and patients were followed up for a mean of 4.5 years. We studied 106 patients (70±8.9 yrs.; FEV1 44±14% of ref., 35% of whom >65 yrs.); 35% died during follow-up. In this population, FEV1 did not predict mortality, whereas BODE (p=0.001), U-BODE (p=0.000) and ADO indexes (p=0.003) did. BMI did not discriminate survival significantly but dyspnea (p=0.003, distance walked (p=0.000) and age (p=0.002) did. In patients attending the outpatient clinic of a tertiary referral hospital, FEV1 is not a good prognostic marker, at variance to age, dyspnea, walked distance, ADO, BODE and U-BODE indexes.

P2246
Evaluation of treatment with fixed dose combinations in asthma patients in primary care in Sweden by using mannitol challenge test
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Background: The mannitol challenge test is an indirect bronchial challenge test suitable for use in a primary-care setting. The test is most often used to diagnose asthma. In this pilot study the test was used to evaluate the effectiveness of ongoing treatment with ICS/LABA combination therapy in patients with asthma.

Objectives: To explore the prevalence of optimal treated asthma patients in primary care in Sweden. The hypothesis was that not all patients are optimal treated.

Methods: Male and female patients, age 18-65 years with asthma, who were treated with a fixed dose combination (budesonide/formoterol or fluticasone/salmeterol) were included in the study. The subjects performed a mannitol challenge test (direct FEV1 followed by an inhalation of a β2-agonist). A new spirometry (reversibility test) was performed 15 minutes later. The main explorative end-point was positive or negative response of mannitol challenge test and/or a reversibility of ≥ 15% baseline.

Results: The preliminary result of this pilot study (100 subjects) shows that an unexpected, surprisingly high proportion of the asthma patients had a positive response, either as a direct fall of FEV1 ≥ 15% in the mannitol challenge test and/or a reversibility of ≥ 15%.

Conclusion: The result of this study indicates that a large proportion of asthma patients in primary care, who are currently treated with fixed dose combination therapy, may not be optimally treated. Further research is needed to support these findings and to understand the reasons.

P2247
Difference of respiratory reactance between mild and moderate COPD by forced oscillation technique using a MostGraph-01
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Background: COPD is characterized with persistent airflow limitation caused by airway inflammation and parenchymal emphysema. The Forced Oscillation Technique (FOT) can detect the lung impairment by measuring respiratory impedance during tidal breathing without special maneuver of respiration. Respiratory impedance consists of phase III and the effective time at the 60-70% part of the forced vital capacity (TeffP7%). The forced oscillation technique (FOT) can detect the lung impairment by measuring respiratory reactance. In particular, air leaks from lips not sealed around the mouthpiece, or those from the equipment. We studied the significance of this artefact and identified possible markers to detect it.

Methods: We recruited 26 outpatient patients with stable mild (n=13) and moderate (n=13) COPD at the University of Tokyo Hospital. The impedance of respiratory system was measured by FOT using MostGraph-01, which was manufactured in Japan CHEST Company. The Xrs during inspiratory and expiratory phase during tidal breathing were evaluated at 4 Hz of oscillatory frequency. Comparisons of Xrs between both groups were performed using the Student’s t-test.

Results: The mean Xrs at 4 Hz (X4) in respiratory cycle were similar in mild and moderate groups. There were also no significant differences between inspiratory phase (Xin4) and expiratory phase (Xex4) in both groups. However, the ratio of Xin4 to Xex4 in mild COPD was significantly lower than that in moderate COPD (p<0.01).

Conclusion: The ratio of Xin4 to Xex4 during tidal breathing in mild COPD was lower than moderate COPD. During tidal breathing, the Xrs changes in inspiratory and expiratory phase and might be influenced by airway obstruction and parenchymal emphysema changes. The measurement of Xrs during tidal breathing might be useful property to distinguish the severity of COPD.

P2248
Mannitol challenge testing in clinical practice and its role in identifying airways hyperreactivity
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Introduction: Mannitol challenge testing can be useful in asthma diagnosis, to demonstrate objective evidence of airways hyperreactivity (AHR). Aim: To review mannitol testing locally, identify characteristics of those with positive and negative tests, and look at outcomes in terms of diagnosis and clinical improvement.

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Methods: We reviewed all tests in our Trust between 2009 and 2011, compared baseline spirometry between positive and negative tests, and looked at immunological evidence of atopy. We reviewed clinic letters for change in diagnosis or management, as well as symptomatic improvement and whether patients were discharged from follow-up (representing clinical stability).

Results: Tests were performed on 177 patients between April 2009 and October 2011. The positive and negative groups were compared in terms of spirometry and immunological evidence for atopy (total IgE and FeNO). The test was positive in 40 patients (22.6%). Of these, immunological evidence of atopy was greater than in those with negative tests (mean total IgE 275 vs. 132; IgE to I1M 5.48 and 4.73; IgE to aspergillus 0.6 and 0.25). Baseline spirometry tended towards more airflow obstruction in the positive group though the means were both within normal range (80% and 97% predicted). Of the 126 patients for whom we had data the manitol challenge resulted in changes in treatment and improved symptoms in 115 (91.2%).

Conclusion: Bronchial provocation testing is useful in identifying those with AH, and for guiding treatment leading to symptomatic improvement.

P2249
Best time for evaluating the response to bronchodilators
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Introduction: There is no clear consensus on the time of interpretation of the bronchodilator effect. The interval between administration of bronchodilator type (β2-agonist short-acting and the practice of post bronchodilator spirometry remains a controversial issue. Our objective was to define the optimal time of bronchodilator responsiveness in assessing the reversibility or otherwise of an obstructive respiratory disorder (ORD).

Materials and methods: Analytical study prospectively over a period of 8 months performed in the pneumology service of FSI Hospital Security. The study included patients with ORD defined by an FEV/FVC <0.7 and who had consulted outside of an exacerbation. Flows and expiratory volumes (FEV, FVC) were measured before and after bronchodilator in the 5th, 10th, 15th, 20th and 30th minute. The response to BD was expressed in absolute and percentage change from baseline.

Results: 68 patients were included in the study, mean age 54±15 years with a majority of men. Our study was conducted in patients with asthma and COPD whose airway obstruction was moderate (FEV1 = 2 liters, or 62% of predicted). Our analysis was performed in the pneumology service of FSI Hospital Security. The study included patients with ORD defined by an FEV/FVC <0.7 who had consulted outside of an exacerbation. Flows and expiratory volumes (FEV, FVC) were measured before and after bronchodilator in the 5th, 10th, 15th, 20th and 30th minute. The response to BD was expressed in absolute and percentage change from baseline.

Conclusion: The optimal time for evaluating the response to BD is during the 20th minute with a significant difference compared to that observed at the 5th and 10th minute.

P2250
Small airway dysfunction by impulse oscillometry system (IOS) in asthma.
Relation with spirometry, bronchodilator response and disease control
Roberta Pisi, Panagiota Tzani

Methods: We studied 38 patients with asthma (24 F, age range 16-70 yr). The fall in peripheral fractional exhaled nitric oxide (FeNO) values, in asthmatic patients. This fall was assessed by IOS and spirometry, bronchodilator response, disease control and the Asthma Control Test (ACT) and FeNO (in ppb) were also recorded.

Results: IOS and spirometry at baseline and after 400 mcg of salbutamol were measured. The increase in peripheral R5-R20 and X5 were significant related to spirometry, with FEF 25-75 < 0.05 for R5-R20 and X5 values. Logistic regression analysis showed that increased R5-R20 was independently associated with poor controlled asthma (p < 0.05).

Conclusions: We found that R5-R20 and X5 were related to FEF25-75, as baseline values but not as percent change after bronchodilator. The increase in peripheral airway resistance was associated with a poor asthma control, but not with FeNO values. These results further confirm the value of IOS as investigative tool in asthma.

P2251
Comparison of SAPADIA and ECCS lung function normal values in a Swiss hospital setting
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The SAPADILIA survey observed better lung function in healthy volunteers than the common ECCS normal values (ECCS) predicted. We thus introduced the SAPADILIA normal values (SAP) for lung function interpretation at the Kantonsspital St. Gallen. We currently analyzed the distribution of FVC and FEV1 in non-pulmonary patients with a normal lung function comparing SAP and ECCS (so far 379 lung functions). Data was analyzed using descriptive statistics, Bland-Altman (BA) analysis and linear regression. Estimated bias and precision were calculated.

For FEV1 we observed a significant difference between ECCS and SAP only in elderly men (>59 y.o.) (37±336 vs. 122±336 ml/s). When comparing FVC using SAP, the Bland Altman analysis revealed a bias, which was significantly lower using ECCS (e.g. in men bias of SAP was 0.33 l (0.27-0.39), bias of ECCS was 0.18 l (0.11-0.24). (fig.1, lower panels).

In summary, SAP tended to overestimate FVC and FEV1 in elderly men compared to ECCS. However, absence of a pulmonary consultation in our population does not exclude a slight impact of the underlying disease on lung function. We consider SAP for FEV1 and FVC appropriate for the measurement of lung function of our population. Cut-off values require special attention especially in elderly.

P2252
Prevalence of hyperinflation and its reversibility in asthma patients with poorly controlled disease or significant dysnea
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Introduction: Inflammation in asthma involves proximal and distal airways. The latter may induce a significant hyperinflation (HI).

Aim: To evaluate the prevalence of HI by body plethysmography in asthmatic patients with poorly controlled disease and/or significant dysnea.

Methods: In 324 patients (age 49±17; FEV1, 75±18% pred) insufficient asthma control was defined by an ACT score < 20 (n = 302) or a significant dysnea by a MRC score ≥ 1 (n=22).

HI was defined by either a RV > pred + 1.64 RSD (RV-HI) or a FRC > 120% pred (= FRC-HI). HI reversibility after bronchodilator was defined by a decrease of RV > 20% or a reduction of FRC > 10% from baseline. Change in dysnea and chest tightness were evaluated by a VAS.

Results: HI was found in 49% (RV-HI) and 47% (FRC-HI) of cases. Prevalence of HI was higher in patients with a FEV1 < 60% pred than in those with an FEV1 > 80% pred: 78% for RV-HI and 70% for FRC-HI, vs 34% and 40%, respectively. ACT score was lower in patients with FRC-HI (13±4 vs 14±6; p = 0.004). Post-bronchodilator change was -10±13% for FRC, and -12±21% for RV. HI reversibility was obtained in 59% of cases with RV-HI and 47% of cases with FRC-HI. Chest tightness decrease after bronchodilator was greater in patients with

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Spironome and home oxygen in COPD patients with and without a history of illicit drug smoking

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Our 960 bed inner city hospital has 3 full time COPD nurses providing a 7-day week service reviewing patients admitted with COPD exacerbations. They are employed with a view to reducing length of stay and preventing re-admissions. The team audited their work prospectively. Several patients have recurrent admissions with exacerbations of COPD. We looked at the database from January 2009 to September 2011 and compared spironometric confirmation of COPD and home oxygen prescription amongst four groups of patients: Ex-tobacco smokers and active tobacco smokers with and without a history of illicit drug smoking.

Results:

No history of drug use History of Drug Use
Average Age (yrs) 70 53.9
Number of Admissions 1114 252
Home oxygen (%) 244 (22) 59 (23)
Spironometry (%) 489 (44) 118 (47)

Conclusion: There were no significant differences in the proportion of patients that had documented spironometry or a home oxygen prescription amongst those with and without a history of illicit drug smoking. A greater proportion of ex-smokers with a history of illicit drug smoking had a home oxygen prescription. This may reflect more severe disease which may be caused by the additional damaged caused by drug smoking.

Assessment of ventilation heterogeneity by impulse oscillometry in patients with mild asthma

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Ventilation heterogeneity is an independent determinant of airway hyperresponsiveness (AHR) in asthma, and its measurement is complex and technically difficult. Impulse oscillometry (IOS) is increasingly used to obtain information on the state of the respiratory system. In this study, we determined the clinical validity of IOS as a novel and simple method for the assessment of ventilation heterogeneity in asthma.

Serial measurement of resistance at 5 Hz (R5) or 20 Hz (R20) by IOS was performed in 23 mild asthmatic patients and 28 normal control subjects; the measurements were made at baseline, after methacholine (maximal dose) provocation test for asthma and subsequent salbutamol administration. Further, exhaled nitric oxide (eNO) levels were examined and pulmonary function test was also performed.

The baseline R5, but not R20, was significantly higher in asthmatic patients than in controls. Both R5 and R20 were not significantly correlated with the degree of airway obstruction and eNO levels. However, R5 was significantly correlated with the severity of AHR (r = -0.55, p = 0.01), whereas R20 was not. The change in forced expiratory volume in 1 s (FEV1) (mean, 30%) after methacholine challenge was almost similar to the change in R20 (20%). However, the change in R5 (77%) after methacholine challenge was significantly greater than the change in FEV1, and this finding is consistent with its greater sensitivity to airway dilated responses after salbutamol administration.

The proportional change in R5 after methacholine and salbutamol administration is attributable to variable small airway functions, suggesting that R5 may potentially represent ventilation heterogeneity in patients atopic.

P2255

Heterogeneity of small airways flow and hyperinflation are markers of a persistent obstruction phenotype in severe non-controlled asthmatics

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Persistent functional impairment in some severe asthematics, even after maximal treatment, is usually linked to inflammation, which does not explain all asthma limitations and seems to be determined by small airways structural changes too.

Objective: Evaluate functional mechanisms related to persistent airflow obstruction (PAO) after an intensive therapeutic regimen in severe asthmatics.

Methods: Non-controlled severe asthmatics received high inhaled corticosteroid dose (ICs) plus LABA for 12 weeks and oral corticosteroid (OC) in the first two weeks, after which they were classified into PAO by an FEV1 after BD > 80% plus FEV1/FVC < 0.70. Complete airway reversibility were labeled as persistent airflow obstruction (NPAO). Both groups were compared. Ex smokers > 10 pack-years were excluded.

Results: At baseline, FEF25−75, RV/TLC and resistance (Raw) were significant different between NPAO and PAO.

All PAO values, including Slope of Phase III of the single breath nitrogen washout test (dN2), became different after OC and did not return to normal. ACQ in NPAO decreased to near normal values (1.7±0.94).

Conclusion: Persistent obstruction phenotype in severe asthematics showed a high heterogeneity of airflow measured by dN2 and early airway closure due to high RV/TLC suggesting a fixed impairment in small airways. FEF changes in these patients seem to be influenced by small airway disease. PAO also impairs improvement in asthma control scores.

P2256

Change in pulmonary function abnormalities in sarcoidosis over time: A review of 75 cases

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Airflow obstruction is common on initial pulmonary function tests (PFTs) in Sarcoidosis. Little has been published about change in PFTs over time, or with treatment. We examined PFT change in patients diagnosed with Sarcoidosis over a 14 year period. 75 patients were included. Median follow-up was 5.1 years. Patients were divided into those treated prior to follow-up (n=39) and those not (n=36). Results are shown in table 1. Treated patients tended to have greater deterioration of their PFTs. The difference was non-significant, except for a lower decline in FEV1/FVC ratio in the untreated. Previous research (Miller et al. Chest 2011; 139:52-59) suggests fixed ratio values are less accurate than percentile predicted; here, there was no statistical difference in percentile change between groups. Absolute FEV1 and FVC values declined in both groups, though less in those untreated. Both groups showed greater than expected annual decline in FEV1.
**P2257**

**Lung clearance index is a reliable and sensitive measure of airways disease in bronchiectasis**

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**Introduction:** In bronchiectasis (BE), there is a need for a sensitive outcome measure that is responsive to interventions, particularly in those with mild disease. FEV₁ is insensitive to small airways disease and is often within normal range in BE. Lung clearance index (LCI) is a measure of ventilation inhomogeneity derived from multiple breath washout (MBW).

**Objective:** To assess intra- and inter-visit repeatability of LCI and determine the relationship between FEV₁ and LCI in stable BE.

**Methods:** Inclusion criteria: HRCT diagnosis of BE within 5 years; clinically stable (>4 weeks no infective symptoms); no features of CF. Participants attended for 2 visits, 2 weeks apart. At each visit they performed MBW in triplicate, using 0.2% SF₆ and a modified Innocor™ device. LCI was derived from the mean of at least 2 acceptable washouts. Spirometry was performed to ATS/ERS standards.

**Results:** 30 patients (14M/16F) attended for 2 visits. The mean (SD) age was 56.6 (14) yrs. Mean (SD) FEV₁% predicted was 84.8 (20.7), range (40-117). Mean (SD) LCI was 9.2(1.7) on visit 1 and 9.3(1.9) on visit 2 (normal <7.5). The intra-visit and inter-visit intraclass correlation coefficient was 0.94. LCI negatively correlated with FEV₁ (r=0.73, p<0.001) and FEF₂₅-₇₅ (r=0.84, p<0.001). Sensitivity of LCI, FEV₁ and FEF₂₅-₇₅ for the diagnosis of bronchiectasis by CT was 83%, 40% and 73% respectively.

**Conclusions:** This is the first report of LCI in BE. LCI has good intra and inter-visit repeatability. Across a range of FEV₁ there is a strong relationship between LCI and FEV₁. LCI is a more sensitive test of lung function than FEV₁ and FEF₂₅-₇₅, and is abnormal in the majority of people with BE who have a normal FEV₁.

**P2258**

**Managing asthma in the outpatient clinic – Can the FEV₁/FVC indicate when to do a reversibility test?**

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**Background:** Testing for reversibility to SABA often constitutes the first step of a diagnostic assessment of asthma. However, patients with a normal or near-normal lung function often do not have significant reversibility, and performing reversibility testing in these patients may not be cost-effective.

**Aims:** To describe the value of the FEV₁/FVC ratio using lower limit of normal (LLN) for predicting significant reversibility to SABA, and to define optimum cut-points that might be applied clinically.

**Methods:** The MAPOut I study is a retrospective observational study of all patients consecutively referred to a tertiary hospital specialist clinic over a 12-month period, on suspicion of asthma (n=221). FEV₁/FVC % of the LLN for predicting reversibility was 0.76 (p<0.001). The FEV₁/FVC ratio was above the LLN in 77% of newly referred asthma patients, including subjects who had a reversibility test performed (94/122 (77%)). Only 14% of subjects with an FEV₁/FVC above the LLN had significant reversibility, compared to 54% of subjects with an FEV₁/FVC below the LLN.

**Conclusion:** Absence of significant airflow obstruction at rest was associated with a low likelihood of reversibility to beta-2-agonist. The majority of subjects referred for specialist assessment on the suspicion of asthma did not have airflow obstruction. In these subjects, alternative diagnostic strategies may be more cost-effective.

**P2259**

**The prediction of airway wall thickening by computer aided lung sound analysis**

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**Background:** Computer Aided Lung Sound Analysis (CALSA) has been used to detect and analyse added lung sounds to aid diagnosis of many respiratory diseases. The wall area of the main bronchi, expressed as a percentage of the cross-sectional area of each branch, is a biomarker of chronic airway inflammation which is raised in COPD. The objective of this study was to explore the possible relationship between characteristics of crackles measured by CALSA and percentage of wall area of the main bronchi measured by High Resolution Computed Tomography (HRCT), and hence the possibility of using crackles as a biomarker of COPD. 26 participants (9 healthy non-smokers, 9 healthy smokers and 8 COPD) were recruited. Lung sound data were recorded using a digital stethoscope. HRCT scans were conducted using a Siemens Sensation 64 CT scanner and the resulting data were analysed using the pulmonary workstation 2 (Vida Diagnostics, Iowa, US) software to give measurements of airway geometry. The results showed that the percentage of wall area at the right upper bronchus correlated with the two cycle duration of crackles (r=0.39, p=0.025) recorded at the right upper lobe (RUL), the number of crackles per breathing cycle (NCpB) at RUL (r=-0.49, p=0.005) and NCpB at right lower lobe (r=-0.49, p=0.006). Additionally, the NCpB at RUL was found to significantly predict the percentage of wall area at the right upper bronchus (adjusted R²=0.24, p=0.010). These initial results suggest NCpB might be usable to predict changes in percentage of wall area caused by the chronic inflammation of the main bronchi, though a larger sample is needed to confirm it. This suggests that crackles could possibly be used as a biomarker of COPD.