was used to identify factors that increased length of stay beyond the median for the overall population.

**Results** We identified 719 exacerbations between 1/4/2013-31/3/2014. The number of exacerbations ranged from 157-228/quarter with the winter quarters (Q3/4) being associated with the highest exacerbation frequency. Exacerbators had a median (IQR) age of 46 (31-64) years, length of stay of 2 (1-5) days, Charlson score 4[4-4]. The majority of patients were female (72%). The percentage of repeat attender was 12% of the total population with the highest percentage in the winter quarters. Logistic regression models identified that ethnicity (non-white/Caucasian), baseline admission CRP, neutrophil count, age, coding of status asthmaticus and Charlson co morbidity index significantly increased length of stay beyond the median of 2 days. In contrast neither admission or highest ever blood eosinophil count influenced the median length of stay.

**Conclusions** We have identified a number of factors associated with an increased length of stay in asthma hospital exacerbations in Leicester. Our observations support the notion that age, co morbidity and biochemical features of infection rather than eosinophilic inflammation increase length of stay. Further research is required to examine the mechanisms that underpin asthma admissions in this population and to reduce length of stay.

### COPD phenotyping

**PS8** A COMPARISON BETWEEN THE CLINICAL FEATURES OF PISS AND PIIZZ PATIENTS WITH ALPHA-1 ANTITRYPSIN DEFICIENCY

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**Introduction** Alpha-1 antitrypsin deficiency (AATD) is a hereditary disorder affecting about 1 in 3000 people in the UK commonly associated with early-onset emphysema. There are two common deficiency alleles - PI S and PI Z. PISS patients have severe AATD, with levels of 10-15% normal. PIZZ patients have less severe deficiency (= 40% normal) and are generally thought to have a minimal risk. We hypothesised that if PISS patients were at lower risk of COPD than PIIZZ, and their lung disease would be more characteristic of usual COPD than that of PIIZZ patients.

**Method** 104 PISS patients and 638 PIIZZ patients from the UK AATD registry (ADAPT) were compared for their demographics, lung function, risk factors for COPD (e.g. smoking, occupation), co-morbidities associated with COPD, index status (i.e. if diagnosed due to lung disease or family screening) and CT densitometry (where available). Outcome in terms of lung function decline and mortality was also assessed. Univariate statistics were used to guide subsequent regression analyses.

**Results** Emphysema was more likely in PIIZZ than PISS patients (OR 11.0 (5.7-21.3); p < 0.001) in the regression analysis after accounting for age, pack years and lung index status. PIIZZ patients also had significantly worse FEV1 and DLCO than PISS patients in similar regression models (both p < 0.01). Emphysema was more severe in both upper and lower zone (both p < 0.01), and proportionately greater in the lower zone (U/L Z VI = 1.5 v 1.2) in PIIZZ patients. Mortality and DLCO decline were also greater in PIIZZ patients. Conclusion PISS patients have a milder form of AATD associated with better lung function. The data suggests the pattern of emphysema is closer to usual COPD than classical AATD. Further analyses comparing PISS to PIIMM are now ongoing.

**PS9** UTILITY OF FIB4 SCORE AND LIVER DISEASE IN ALPHA-1 ANTITRYPSIN DEFICIENCY (A1ATD)


**Introduction** A1ATD is an autosomal co-dominant condition where homozygosity for the Z-allele results, classically, in emphysematous lung involvement, and liver fibrosis dependent on polymerisation rate of aberrant protein.1 The FIB4 score non-invasively estimates risk of liver fibrosis,2 but has not previously been investigated in A1ATD. We completed preliminary assessment of the utility of FIB4 in our A1ATD cohort. Whilst the standard of care in A1ATD should be joint respiratory-hepatology services, not all patients are able to access this. A simple tool to guide referral to hepatology services could therefore be clinically useful to the respiratory community.

**Methods** We report data from 30 PIIZZ patients with ultrasound (US) characterisation of liver disease. An abnormal US was considered as any abnormality other than cysts, thus including features of cirrhosis and fatty infiltration. FIB4 was calculated as [Age (years)xAST(U/l)]/[Platelets (109)xALT(U/l)]. The most recent lung physiology was recorded as FEV1 (%predicted), diffusion coefficient (KCO, %predicted) and residual volume (RV, % predicted). Body mass index (BMI) was calculated.

**Results** The 30 patients had a mean age of 54 ± 12.4 years, 14 were male. Lung function showed mean FEV1 1.85 ± 1.12 L

**Abstract PS9** Figure 1 ROC of the FIB4 index for detection of abnormal US

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**Results** The 30 patients had a mean age of 54 ± 12.4 years, 14 were male. Lung function showed mean FEV1 1.85 ± 1.12 L
(61.3 ± 30.9%), KCO 1.05 ± 0.40 mmol/min/kPa/L (66.4 ± 22.2%) and RV 3.58 ± 1.36 L (171.8 ± 50.4%). The mean FIB4 was 1.76 ± 1.36. Eight (26.7%) patients had liver disease on USS. FIB4 cut-off values of 1.45 and 3.25 were utilised, as they are widely validated.1 Of patients >3.25, 100% had abnormal scans (PPV 100%), and of patients <1.45, 15.8% had abnormal scans (NPV 82%). FIB4 enabled correct identification of patients with abnormal USS with an area under a ROC curve of 0.642. We demonstrate a relationship between liver involvement in AATD and BMI. Those with higher FIB4 had higher BMI (r = 0.453, p = 0.008). We found no relationship between FIB4 and severity of lung involvement.

Conclusions The FIB4 score, calculated from routine laboratory variables and age, may be useful to rule in and out significant liver involvement in AATD with reasonable sensitivity and specificity. Further work is required for validation against biopsy, the gold-standard assessment. We confirm a previously noted lack of association between liver disease and emphysema severity,2 and highlight the association between higher BMI and higher fibrosis risk in AATD.

### REFERENCES

1 UN drug report 2012, United Nations Office on Drugs and Crime

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**P60**

**CANNABIS LUNG CAUSING DEBILITATING EMPHYSEMA: ARE WE ON THE VERGE OF AN EPIDEMIC?**

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**Introduction and objectives** Cannabis (or marijuana) is the world’s most widely-used illicit drug, according to UN drug report 2012 prevalence of cannabis use between 15–64 years of age is around 1.7% in Europe and 2.6% in USA.1 It is particularly prevalent amongst adolescents and young adults. As societies reconsider the legal status of cannabis, policy makers and clinicians require sound knowledge of the acute and chronic effects of cannabis. There has been surprisingly little research into its effects on respiratory health. In a rural region of North Wales we have noticed an increasing number of young patients presenting with precocious bullous emphysema associated with very high tobacco and cannabis usage.

**Methods** A series of 8 patients presenting through the Emergency Department with an exacerbation of COPD were noted to have precocous COPD associated with high cannabis use. The age was between 35–48, all had both physiological and radiological signs of advanced emphysema. All had at least 10–20 years of cannabis usage smoking more than 5 ‘joints’ per day. Of these, 4 patients were significantly impaired to require long term oxygen therapy, and one is actively listed for a single lung transplant. All had normal levels of alpha 1 antitrypsin and chymotrypsin.

**Results** We found young patients with debilitating COPD secondary to cannabis use i.e. as less as 10 years of use.2 We postulate that cannabis smoking leads to severe COPD in young patients independent of genetic susceptibility, which is on the verge of increase.

**Conclusions** The addition of cannabis to the tobacco, and high usage at a young age is leading to increase in the incidence of COPD in general and bullous emphysema as a phenotype in particular. We are concerned that the dangers of cannabis inhalation and these risks are not being appreciated by the wider health community. More research is needed to know the mechanisms of the inflammatory response secondary to cannabis smoking.