receive active anti-cancer treatment, but the relevance of this observation is obscured by a lack of case-mix adjustment and a high proportion of unrecorded data. We have sought to examine this finding more closely on the 2010 dataset (with less unrecorded data) by performing case-mix adjustment.

Methods Details of all patients from English trusts that were submitted to the NLCA database in 2010 were obtained. We then performed logistic regression analysis based on sex, age, stage and performance status to calculate mutually-adjusted ORs for overall and specific treatments. Since a patient would have reduced opportunity to access an LCNS if their survival were short, a second model was created excluding those patients who had survival of <28 days.

Results Of 30 334 in the dataset, 42 were removed due to missing sex (4), in situ disease (2) and occult stage (36). 74.8% were recorded as having been seen by a LCNS, 7.8% were not seen, and in 17.4% the outcome was not recorded. The latter two groups were combined for the remainder of the analysis. ORs for treatment if seen by a nurse in both models are shown below.

Conclusions Contact with a LCNS was associated with increased rates of active treatment, particularly chemotherapy or radiotherapy, but not surgery, and this effect was independent of sex, age, disease stage and performance status. While the LUCADA dataset does not contain detailed information on individual reasons for LCNS assessments, this should be investigated further as there may be important additions to the known benefits LCNS provide to patients. However, regardless of the explanation, all lung cancer patients should have the opportunity to benefit from the expertise of a LCNS.

COPD systemic manifestations and cardiovascular disease

S91 *ASPERGILLUS FUMIGATUS* SENSITISATION IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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M Bafadhel, J Agbetile, A Fairs, D Desai, M Pancholi, V Mistry, I D Pavord, A J Wardlaw, C H Pashley, C E Brightling. *Institute for Lung Health, Leicester, UK*

Background Bacteria and viruses have been implicated in exacerbations of chronic obstructive pulmonary disease (COPD) and bacteria are often isolated in stable state. Whether fungi are also commonly present and associated with clinical and pathological features of disease is uncertain.

Objectives To determine the frequency of filamentous fungal culture and sensitisation to *Aspergillus fumigatus* in COPD and its relationship to clinical outcomes.

Methods Subjects with COPD were recruited from a single centre into a 1-year observational study. Assessments of lung function, allergen testing, and sputum analysis for inflammation, bacterial and fungal cultures were undertaken in COPD subjects and in smoking healthy controls.

Results Fungi were cultured at baseline in 63/128 subjects of which 47/63 were *A fumigatus*. *A fungus* was cultured in 2/11 controls (both were *A fumigatus*). The total sputum cell count, sputum neutrophil % and inhaled corticosteroid dosage were significantly increased in COPD patients with a positive fungal culture compared to those without a fungal culture ($p<0.05$), but the within subject repeatability of fungal culture between stable visits was low ($K=-0.04$). Sensitisation to *A fumigatus* was present in 13% of COPD subjects and was associated with worse lung function (FEV_1 % predicted 39% vs 51%; $p=0.01$), but not related to fungal culture. Positive fungal cultures were present in 42/110 exacerbations and were not associated with bacterial culture or severity of exacerbation.

Conclusions *A fumigatus* sensitisation is related to poor lung function. Positive fungal culture is a common feature of COPD. The clinical significance of this remains uncertain.

S92 COGNITIVE FUNCTION & CEREBRAL WHITE MATTER TRACT MICROSTRUCTURE IN COPD

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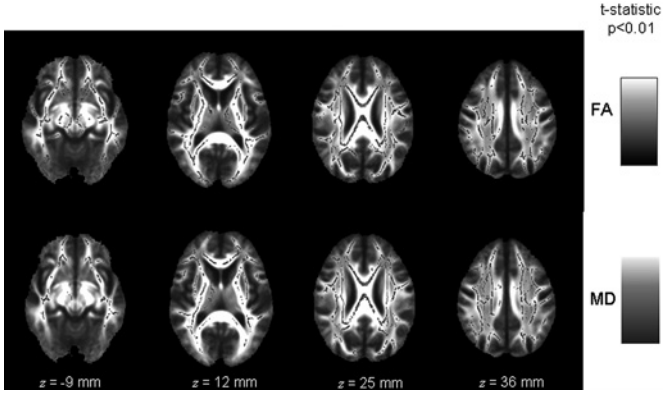
J W Dodd, M Van Den Broek, P W Jones, R A Charlton. *St George's University of London, London, UK*

Rationale There is evidence to suggest that COPD leads to cognitive impairment in patients both with and without hypoxaemia[1]; but the pathogenesis remains poorly understood. Also relevant to potential brain pathology in COPD are common vascular comorbidities including hypertension, diabetes and older age. Diffusion tensor imaging (DTI) is a novel MRI technique sensitive to subtle changes in white matter due to vascular damage. This is the first study to investigate white matter microstructure and tract pathology in COPD.

Methods Participants (n=50) completed a full cognitive assessment (including executive function, working memory, episodic memory, processing speed, visuospatial ability) and 3T MRI scan. We compare 25 stable non-exacerbating COPD and 25 age-matched healthy controls. Volumes of grey matter (GMV), white matter (WMV), and white matter lesions (LV), were calculated. DTI data was analysed using tract based spatial statistics (TBSS).[2]

Results There are significant group differences between COPD patients and controls on all cognitive measures except episodic memory (executive function: $F=15.39$, $p<0.001$; working memory: $F=5.94$, $p=0.019$; episodic memory: $F=3.91$, $p=0.054$; processing speed: $F=11.64$, $p=0.001$; visuospatial ability: $F=10.10$, $p=0.003$). COPD patients did not differ from healthy controls on measures of normalised GMV ($t=0.229$, $p=0.820$) or WMV ($t=-0.727$, $p=0.471$). Normalised Lesion Volume was significantly greater in patients vs controls ($t=-2.27$, $p=0.029$). DTI-TBSS revealed lower fractional anisotropy (FA) and higher mean diffusivity (MD) values throughout the brain in COPD patients vs Control subjects. Group differences in white matter integrity were observed throughout the temporal, frontal, parietal and occipital lobes and amounted to 60% of the total FA skeleton. See Abstract S92 figure 1.

Conclusion This is the first paper to demonstrate that white matter integrity throughout the brain is significantly compromised in patients with COPD compared to age-matched Controls. This damage to white matter is also demonstrated by the significant group differences in white matter lesion load. No differences between patients and Controls were observed in brain volume, suggesting that group differences may be related to white matter integrity rather than atrophy.



Abstract S92 Figure 1

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S93 THE DEVELOPMENT OF A NOVEL SCALE TO SCREEN AND MEASURE ANXIETY IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

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T G Willgoss, A M Yohannes, J Goldbart, F Fatoye. *Manchester Metropolitan University, Manchester, UK*

Introduction and objectives Comorbid anxiety disorders are common among patients with COPD, affecting up to half of all patients. Comorbid anxiety may be a significant factor in predicting quality of life, yet recognition and management of anxiety among this patient group is poor. Screening and measuring symptoms of anxiety can be challenging due to the overlap of physical symptoms and the lack of a validated disease-specific tool. The aim of this study was to develop a novel non-somatic scale (Anxiety Inventory for Respiratory disease (AIR)) to screen and measure anxiety in patients with COPD.

Methods This study utilised a multi-method approach to scale development incorporating both qualitative and quantitative methods. An item pool was developed using in-depth interviews with COPD patients who exhibited symptoms of anxiety (n=14), and the analysis of existing anxiety scales. Item wording, content and user-friendliness were checked by an expert reference group (ERG) that included clinicians and patients. This item pool was tested on a group of COPD patients (n=82). The Likert-type scale has four consistent responses to statements (Not at all, Occasionally, Frequently, Almost all of the time) that are scored from 0 to 3. Item and factor analysis were carried out to aid in item reduction and to explore the factor structure.

Results Sixteen items were selected for inclusion following development and approval from the ERG. Items were retained based on item-to-total correlation analysis and α-if-item-deleted analysis. One item was discarded as it had a corrected-item-to-total correlation of <0.55. Exploratory principal component factor analysis was performed and three further items were removed due to low communalities (<0.50). Secondary analysis indicated a single factor solution accounting for 66.67% of total variance with a mean communality of 0.67. Abstract S93 table 1 shows the factor loadings for the final items. The 12-item scale had a mean total score of 13.55 (SD=9.41, range=0–36), and a Cronbach's α of 0.95.

Conclusions The AIR is a short self-report non-somatic anxiety scale with a clear uni-dimensional factor solution and high internal consistency. Additional studies are warranted to further explore the scale's psychometric properties and to establish its ability to screen for clinical anxiety disorders.

Abstract S93 Table 1 Factor loadings for the 12-item Anxiety Inventory for Respiratory disease (AIR)

	Item	Factor 1 loading
1	I have felt tense, restless or wound-up	0.71
2	I have found it difficult to concentrate on things, such as watching TV or reading	0.71
3	I have had worrying thoughts going through my mind	0.83
4	I have felt frightened or very panicky	0.85
5	I have felt worked up and/or upset	0.78
6	I have had a fear of losing control and/or falling apart	0.82
7	I have worried about experiencing panic	0.88
8	I have found it hard to relax	0.77
9	I have had sudden and intense feelings of fear and/or panic	0.86
10	I have felt generally anxious	0.85
11	I have had thoughts that something bad might happen	0.83
12	I have felt nervous or on-edge	0.89

S94 ULTRASOUND MEASUREMENT OF QUADRICEPS WASTING IN EARLY CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND ITS RELATIONSHIP WITH DAILY PHYSICAL ACTIVITY

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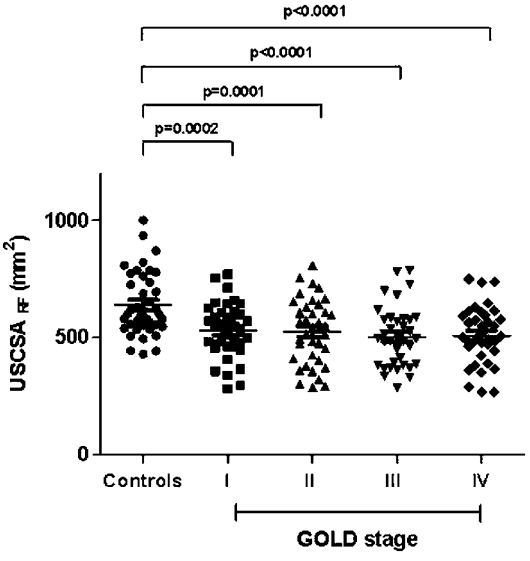
[1]D Shrikrishna, [1]R Tanner, [2]J M Seymour, [1]M Patel, [3]B A Connolly, [3]Z A Puthucheary, [1]S L F Walsh, [1]S A Bloch, [4]P S Sidhu, [3]N Hart, [2]J Moxham, [1]M I Polkey, [1]N S Hopkinson. *[1]National Heart and Lung Institute, NIHR Respiratory Biomedical Research Unit at Royal Brompton and Harefield NHS Foundation Trust and Imperial College, London, UK; [2]Department of Asthma, Allergy & Respiratory Science, Division of Asthma, Allergy and Lung Biology, King's College, London, UK; [3]Guy's and St Thomas' NHS Foundation Trust and King's College London, National Institute of Health Research Comprehensive Biomedical Research Centre, London, UK; [4]Department of Radiology, King's College Hospital, London, UK*

Introduction Quadriceps weakness is recognised as an important complication of COPD but few data exist about loss of muscle bulk in early disease. We hypothesised that quadriceps wasting, measured by ultrasound rectus femoris cross-sectional ($USRF_{CSA}$), would be observed in patients with mild COPD compared to healthy age-matched subjects and that this would correlate with daily physical activity levels.

Methods Rectus femoris cross-sectional area was measured using ultrasound ($USRF_{CSA}$) and daily physical activity (step count and physical activity level—PAL) recorded using a multisensor biaxial armband accelerometer. Fat free mass index (FFMI) and the impedance ratio (Z_{200}/Z_5) were determined by bioelectrical impedance analysis. Quadriceps maximum voluntary contraction (QMVC) was used as a measure of strength.

Results 150 patients with stable COPD, GOLD stage I (n=38), II (n=38), III (n=37) and IV (n=37), mean (SD) age 66 (9) years, 54% male and 40 age-matched healthy subjects participated in the study.



Abstract S94 Figure 1 Ultrasound rectus femoris cross-sectional area vs GOLD stage in COPD patients and healthy controls (ANOVA analysis—no significant difference between I and IV).