Abstract P62 Table 1

	FEV1 (%)	Log FEF 25–75 (%)	TLCO (%)	RV (%)	mMRC Score	6MWD	BODE index
Emphysema Score	-0.32	**-0.42***	**-0.69***	0.31	0.04	-0.27	**0.37***
Gas trapping Score	**-0.50***	**-0.50***	**-0.68***	**0.40***	0.02	-0.29	**0.47***
%LAA	**-0.47***	**-0.42***	**-0.51***	**0.49***	0.09	-0.32	**0.48***
AWT-Pi10	-0.02	0.03	0.29	-0.02	-0.06	0.07	-0.08
$RVC_{856–950}$	**-0.61***	**-0.65***	**-0.55***	**0.51***	0.15	-0.21	**0.48***

Pearson's correlation coefficient of CT markers with lung function and functional parameters.
*indicates statistical significance with p value <0.05.

analysis of CT scans allows quantification of emphysema, bronchial wall thickening and gas trapping and offers the opportunity to study the heterogeneity of COPD.

This study aims to use quantitative digital software to analyse CT scans from a cohort of COPD patients to define clinically important phenotypes.

Methods Acute Exacerbation and Respiratory Infections in COPD (AERIS) is a longitudinal epidemiological study where patients with moderate to very severe COPD were followed monthly for 2 years. At enrolment subjects had pulmonary function testing and high resolution spiral CT was performed in inspiration and expiration. A sub-cohort of 36 patients is included in this analysis.

CT scans were reported by a thoracic radiologist using a validated scoring system for emphysema and gas trapping. Image analysis was performed using Apollo software. Emphysema was defined as the percent of lungs with low attenuation values below -950 Hounsfield Units (%LAA) on inspiratory scan. Airway wall thickness was standardised by using the square root of the wall area for a theoretical airway with an internal perimeter of 10 mm (AWT-Pi10). Gas trapping was calculated using the relative volume change of low attenuation areas from -856 to -950 between the inspiratory and expiratory scans ($RVC_{856–950}$).

Results Correlation between the reported CT scores (emphysema and gas trapping) and corresponding quantitative measures (% LAA and $RVC_{856–950}$) were strong: $r = 0.79$ and $r = 0.5$, respectively ($p < 0.05$). CT scores and quantitative measures for emphysema and gas trapping were significantly correlated with pulmonary function and BODE index (Table 1).

Conclusion In this study we have shown that quantitative chest CT measures correlate with a number of traditional physiological and prognostic markers in COPD. These measures have the potential to be clinically useful imaging biomarkers for the disease and further work will help validate this by investigating the longitudinal changes of the AERIS cohort.

P63 ASSESSMENT OF REGIONAL VARIABILITY IN MATRIX METALLOPROTEINASE CONCENTRATIONS BY CT INFORMED BRONCHOALVEOLAR LAVAGE IN PATIENTS WITH COPD

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Abstract P63 Table 1 Table showing median values of MMPs corrected for protein concentration and interquartile range in brackets. P value for paired samples using one-tailed Wilcoxon signed rank Test

	Median concentration in Diseased Lobe (pg/ml/μg protein)	Median concentration in Preserved Lobe (pg/ml/μg protein)	P value
MMP-1	0.11 (0.14)	0.03 (0.06)	0.09
MMP-2	66.39 (66.41)	35.77 (27.34)	0.03
MMP-3	0.35 (0.63)	0.19 (0.22)	0.01
MMP-7	13.96 (41.40)	5.44 (12.95)	0.08
MMP-8	10.66 (17.93)	5.08 (22.10)	0.22
MMP-9	19.62 (14.31)	8.10 (17.69)	0.37

Background Matrix metalloproteinases (MMPs) are a family of proteolytic enzymes involved in the normal physiological turnover of the pulmonary extracellular matrix. They have been implicated in animal models of emphysema. However, there have been conflicting results in human studies, largely due to the anatomical regional variability and heterogeneity of COPD not being taken into account. This study aims to understand the role of MMPs in COPD by using CT analysis to guide regional bronchoalveolar lavage (BAL) and employing multiplex profiling of this fluid.

Methods Twelve mild-to-moderate COPD patients (FEV1/FVC ratio <0.7, FEV1 >50%) underwent high resolution spiral chest CT. This was reported by a thoracic radiologist and lobes with most and least evidence of disease (emphysema or bronchial wall thickening) were identified. During bronchoscopy 100 ml of saline was instilled into each of these lobes and the BAL was collected. This fluid was filtered and then concentrated 2-fold by lyophilisation. MMP-1, -2, -3, -7, -8 and -9 were measured using a multiplex ELISA. Sample protein concentration was determined using a Bradford assay. MMP concentration was corrected for BAL protein concentration.

Results MMPs and protein were successfully detected in BAL. Median values for MMP-1, -2, -3, -7, -8 and -9 were all increased in the diseased lobe compared to the relatively preserved lobe. This was significant for MMP-2 and -3 and trended towards significance for MMP-1 and -7 (Table 1).

Conclusion These results suggest that certain MMPs are present in greater quantities in areas of the lungs most affected by COPD, adding to the evidence that they may be involved in the pathogenesis of the disease. This study also demonstrates the regional anatomical variability of COPD in respect to imaging abnormalities and the underlying disease processes. Regional sampling needs to be considered in future studies to enable full understanding of the heterogeneous pathological mechanisms involved in COPD.

P64 EVALUATION OF SALIVA BIOMARKERS AS INDICATORS OF HEALTH STATUS AND EXACERBATIONS IN COPD

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Saliva is increasingly promoted as a suitable alternative diagnostic bio-sample to blood, yet its role in respiratory disease is still to be elucidated.