with higher pre-bronchodilator FEV₁ improvement at end of QUEST experienced fewer exacerbations during both studies. Over 80% of patients who achieved $\geq 100\text{mL}$ or $\geq 200\text{mL}$ pre-bronchodilator FEV₁ improvements at the end of QUEST maintained these improvements in TRAVERSE.

Conclusions Greater improvements in pre-bronchodilator FEV₁ in QUEST led to long-term enhanced benefits of dupilumab treatment; patients maintained these improvements and had fewer exacerbations during TRAVERSE.

Please refer to page A189 for declarations of interest related to this abstract.

S87 SEVERE ASTHMA OUTCOMES WHEN SWITCHING FROM MEPOLIZUMAB TO BENRALIZUMAB IN NON-RESPONDERS WITH PERSISTENT SPUTUM EOSINOPHILIA

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Background Anti-IL-5 monoclonal antibodies reduce systemic corticosteroid use and exacerbation rate in severe eosinophilic asthma. Although their specific mechanisms of action differ, there is as yet no guidance on whether to choose mepolizumab or benralizumab for any given patient.

Aims To investigate clinical outcomes of patients switching to benralizumab after non-response to mepolizumab associated with persistent sputum eosinophilia.

Methods We recruited patients who failed to respond to mepolizumab over 12 months (no meaningful reduction in maintenance steroid use and/or exacerbation rate), with sputum eosinophils above the threshold of 2%.

Over the subsequent 12 months of benralizumab treatment we recorded daily prednisolone dose, ACQ6, AQLQ, and sputum & blood eosinophils. Lung function and FeNO testing was severely impacted by the COVID pandemic.

Results Fifty-three of 165 (32%) mepolizumab patients were identified as candidates for a switch of therapy with residual positive sputum eosinophils, of which 36 have completed 12 months of treatment, 20 with available sputum eosinophil results. Five patients stopped therapy before a full year (two for failure to respond to treatment at 6–9 months, one allergic reaction, two unspecified).

Abstract S87 Table 1

Clinical parameter Median (IQR) or mean (SD)	n	Prior to benralizumab	12 months benralizumab	Paired test p value
OCS δ mg/d, median (IQR)	33	4 (10)	5 (7.5)	0.101
Annual exacerbations δ , mean (SD)	25	4.5 (5.5)	2 (5)	0.010
Sputum % eosinophils δ , median (IQR)	20	8.5 (15)	0 (0)	<0.001
ACQ6 δ , mean (SD)	33	2.8 (1.7)	2.3 (1.5)	0.046
AQLQ β , mean (SD)	28	3.3 (1.8)	4.0 (2.1)	0.033
ICS δ mcg BDP equivalent / d, median (IQR)	33	2000 (1200)	1840 (400)	0.753
Blood eosinophils β 10 ⁹ cells/ml- median (IQR)	30	0.09 (0.11)	0 (0.00)	0.001

Clinical parameters measured at time of decision to switch from mepolizumab or benralizumab (δ) or benralizumab baseline visit (β) and after 12 months on benralizumab.

After 12 months on benralizumab, all patients had negative sputum eosinophils as well as improvements in ACQ6, AQLQ, blood eosinophils and reduced exacerbation rate compared to before switching (table 1).

Conclusions Around a third of patients failed to respond to mepolizumab and displayed persistent airway eosinophilia. All of these patients had complete suppression of sputum eosinophils on benralizumab with significant clinical improvements in exacerbation rate, blood eosinophils, asthma control and quality of life. These real-life observations in our severe asthma patient population confirm the results of the SIROCCO and Calima trials.

S88 USE OF A CONNECTED INHALER SYSTEM IN THE PRE-BIOLOGIC ASSESSMENT OF PATIENTS WITH SEVERE ASTHMA

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Background Sub-optimal adherence is a significant factor in patients with difficult to treat asthma. Aligning adherence to maintenance inhaled corticosteroid (ICS) treatment with digital inhaler monitoring and measurement of fractional exhaled nitric oxide (FeNO suppression) can rapidly differentiate patients with poor adherence from those who require treatment escalation with type-2 biologic therapy.¹

Objectives To assess the feasibility and utility of monitoring adherence using a digital connected inhaler system (CIS) embedded within the patient pathway as a service evaluation, to rapidly identify patients for initiation of biologic therapies in UK specialist severe asthma clinics (n=7).

Methods Using a CIS (Propeller Health) patients completed adherence monitoring/biomarker profiling for 1 month as part of a pre-biologic assessment followed by clinical decision (initiate biologic therapy or continue monitoring – figure 1). Patients had the following assessments at baseline and 1 month follow-up: spirometry, FeNO, peripheral blood eosinophil count and asthma control questionnaire (ACQ-7).

Results To date, 104 patients have been initiated on the CIS with 43 having outcome data at 3 months. In FeNO-high subjects (FeNO ≥ 45 ppb, n=26) median adherence was 100% (range 57 – 100%) and there were significant reductions in ACQ-7 (2.88 vs 2.14, p = 0.03) and FeNO (63ppb vs 32ppb, p < 0.001) between baseline and 1 month follow-up. In patients with positive FeNO suppression¹ (n=16), 14 maintained good adherence with no rescue prednisolone, 2 were commenced on a biologic therapy and 2 had persistent poor adherence. In those with negative FeNO suppression¹ (n=10), 6 were commenced on a biologic therapy at 3 months, with 4 having good adherence with ongoing monitoring. In FeNO-low subjects (FeNO<45 ppb, n=17), median adherence was 100% (range 85 – 100%) but no differences in parameters were seen at 1 month, consistent with previous data supporting this 'cut-point' to identify difficult to treat asthma patients with poor ICS adherence.¹

Conclusion Using a CIS in conjunction with FeNO monitoring is a useful method for assessing adherence to ICS when

Patient Pathway: Improves efficiency of patient flow for biologic eligibility.

Patients referred for assessment at a specialist asthma service undergo early adherence monitoring and biomarker profiling – “pharmacist/nurse-led adherence clinic”

Abstract S88 Figure 1

assessing patient suitability for biologic asthma therapies and to support adherence in routine care.

REFERENCE

1. Heaney, et al. (RASP-UK) *Am J Respir Crit Care Med* 2019;**199**(4):454–464.

Please refer to page A190 for declarations of interest related to this abstract.

New insights into airways disease

S89

COMPARISON OF THE LUNG MICROBIOME IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND IN HEALTH: AN IN SILICO STUDY

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A number of clinical studies have defined the lung microbiome of chronic obstructive pulmonary disease (COPD) patients. However, these studies are limited by several factors such as cohort size, lack of standardised processing and analysis methods as well as being confined to a single geographic location. Herein, a meta-analysis of publically available COPD microbiome data was performed. Search criteria to select for next generation sequencing (NGS) studies were formed to select for publications studying the microbiome in COPD and in health. This returned 686 studies, which was narrowed down to 60 relevant studies. Relevant studies were subjected to scoring criteria to determine data quality. Eighteen studies from across Europe, North America and Asia were identified as high-quality studies and sequencing data was retrieved and analysed using standardised methods. Quality control, read

trimming and processing was performed using Qiime2 and imported to R for manipulation and visualisation. Geographical location of the study and 16S target region were found to have the largest influence on the lung microbiome. Interestingly, bacterial diversity was found to be markedly increased in COPD samples when compared to healthy subjects, which was associated with an overgrowth of pathogens, such as *Haemophilus*, and a decrease in commensal organisms. The abundance of several genera such as *Moraxella* and *Veillonella* were also found to be significantly increased in COPD patients, proposing potential markers for COPD diagnosis. The level of abundance of these genera have potential to be used as defining criteria in the diagnosis of COPD. In conclusion, this meta-analysis provides detailed insight into the composition of the lung microbiome in COPD, highlighting the importance and benefits of utilising publically available data to build upon our current understanding of COPD and disease biology.

S90

COMPREHENSIVE MULTIOMICS ANALYSIS DEMONSTRATES SURFACTANT DYSREGULATION IN COPD

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Introduction and Objectives Pulmonary surfactant homeostasis is critical to lung function as it coats the vast air-liquid