

# Selection of Scientific and Best Practice Abstracts submitted to the PCRS National Respiratory Conference 2018

The following pages include a selection of some of the scientific and best practice abstracts presented at the 2018 PCRS National Primary Care Respiratory Conference.

## Commentary on abstracts



**Dr Iain Small**, *Editor PCRU*

This year's conference saw a new generation of respiratory researchers present their work, supported by Academic Departments of Primary Care with strong links to PCRS. There were a series of excellent, practical and successful presentations around case-finding, diagnosis, clinical review and co-morbidities that provided evidence to support practical and 'do-able' actions and interventions (Abstracts 59, 84, 39, 83, 17).

I was particularly struck by the work looking at the impact of respiratory disease on mental health (and vice versa) (Abstracts 36 and 40) and working life (Abstracts 75 and 77).

It was refreshing to see these sessions so well attended, and I commend each abstract published here to our readers.



**Alex Woodward**, *Respiratory Physiotherapist*

It is well documented that many respiratory patients are either not referred to pulmonary rehabilitation or do not attend it. The abstracts on pulmonary rehabilitation provide some useful and practical information for primary care services to help with both of these situations. They highlight that a simple electronic GP record search for patients eligible for pulmonary rehabilitation can more than double the referral rate and reiterate the importance of incorporating pulmonary rehabilitation discussions into annual review templates. They show that not only does educating patients on what pulmonary rehabilitation is and the benefits of it improve uptake, but also that a well informed and knowledgeable referrer about pulmonary rehabilitation helps to increase uptake and referral numbers.

For primary care pulmonary rehabilitation providers, they raise awareness that many patients who attend pulmonary rehabilitation may have low health literacy so these patients may need extra support to enable them to complete the programme. They also show that a simple weekly follow-on primary care-based maintenance class after completing pulmonary rehabilitation may prolong the benefits gained, potentially reducing re-referral rates to help improve service capacity.



**Andrew Whittamore**

Along with Viv Marsh, I chaired a fantastic session of abstracts poster presentations at the conference. The underlying theme was that improved communication created better outcomes whether healthcare professional to patient, healthcare professional peer to peer or healthcare professional to commissioners. The standard was very high and we can all learn from these abstracts to improve what we do.

## Scientific abstracts

Critical inhaler technique errors in a severe asthma service - identifying the need for a validated scoring system	53
A survey of HCP views on teaching methods applied during childhood asthma reviews and challenges to achieving optimal inhaler use	53
Access to respiratory healthcare for people with a severe mental illness (SMI) and obstructive airways disease (asthma, COPD): a qualitative study	53
TANDEM (Tailored intervention for ANxiety and DEpression Management in COPD): qualitative evaluation from the pilot/feasibility	54
Incidence of type II diabetes in chronic obstructive pulmonary disease	54
The working-age experience of living with chronic obstructive pulmonary disease (COPD)	54
Quality of life differences between working-age and older adults with chronic obstructive pulmonary disease (COPD): a meta-analysis	55
Making a diagnosis of asthma in primary care: a qualitative study of current practices and challenges	55
The use of a novel case-finding algorithm in the identification of chronic obstructive pulmonary disease (COPD) patients in primary care: baseline results of the ASSIST study	55
A qualitative study: the acceptability of a 'case-finding for COPD' clinic to patients in GP practices across Hampshire	56
The ASSIST study: an analysis and thematic review of feedback questionnaires from patients attending a case-finding for COPD clinic	56
Generating social networks and resources (GENIE) in COPD: evaluating benefits and costs in Southampton Community COPD Service	56
Making Waves: an asset-based community development approach to improve self-management, social inclusion and mental well-being in people with COPD	57
Baseline findings of a training needs analysis (TNA) for general practitioners and practice nurses during the ASSIST study	57
Can a single-use spacer be used effectively on multiple occasions?	57
Perceptions of COPD patients of the proposed withdrawal of high-dose inhaled corticosteroids prescribed outside guidelines	58
IMPLementing IMProved Asthma self-management as Routine Treatment: the IMP2ART programme	58
Cochrane review of serious adverse events in regular treatment with salmeterol and inhaled steroids for chronic asthma	59
Does the severity of COPD affect inspiratory power across different inhalers? Part 2: Non-capsule devices	59
Does the severity of COPD affect inspiratory power across different inhalers? Part 1: Capsule devices	60
Characterisation of blood eosinophils and their association with disease outcomes in steroid-naïve COPD patients in primary care: descriptive cohort study using the Clinical Practice Research Datalink (CPRD)	60
Use of blood eosinophils to predict outcomes under inhaled maintenance treatment in steroid-naïve COPD patients in primary care: new user cohort study using the Clinical Practice Research Datalink (CPRD)	61

## Best Practice Abstracts

Asthma friendly schools: an intervention to improve asthma management by staff in primary schools in Haringey	61
A retrospective multi-practice audit identifying factors contributing to uncontrolled asthma in adults and children	61
The Improving Asthma Care Together (ImpACT) project	62
BREATHE – Outcomes of a different kind of breathlessness clinic	62
Co-morbidities in high SABA users	63
FeNO: taking the guess work out of asthma	63
Potential for FeNO testing in general practice asthma management	63
Seasonal influenza vaccination of inpatients admitted to hospital with acute exacerbations of COPD: a missed opportunity?	64
Does hospital at home improve patient-reported symptom burden associated with an acute exacerbation of chronic obstructive pulmonary disease? A retrospective audit of pre- and post-COPD assessment test scores	64
Pilot project to identify undiagnosed respiratory disease in individuals accessing drug and alcohol services in Tower Hamlets	65
Reviewing outcomes for patients attending a follow-on class after pulmonary rehab: a service evaluation	65
Understanding poor referral rates to pulmonary rehabilitation: an online survey of service providers	66
The effectiveness of an integrated pulmonary rehabilitation (PR) introductory education session in improving capacity in the ACERs PR Service: a retrospective audit	66
Health literacy assessment in pulmonary rehabilitation: how well do we communicate with our patients through written patient information and literature?	66
Increasing pulmonary rehabilitation referral rate for chronic obstructive pulmonary disease patients in a GP setting	67
A novel respiratory community-facing GPST training post	67
Wiltshire Community Respiratory support for patients with interstitial lung disease	67
BreathChamps: brightening the future of children with asthma in fun ways	68
Training community pharmacist teams to offer appropriate management of asthma	68
The Morecambe Bay Respiratory Network: integrating from the ground up	69
A review of the delivery of education to healthcare professionals in the Mission ABC project	69
Retrospective multi-practice audit identifying suboptimal uptake of high value interventions within COPD patients at risk of hospitalisation	69
Implementation of local guidelines into a population of COPD patients: 'Going for GOLD' – a real world experience	70
Free inhaled corticosteroids in asthma: do they really work?	70
The use of inhaled corticosteroids (ICS) in COPD: are patients being prescribed ICS unnecessarily?	70
IMPACT: the next steps	71

## Scientific Abstracts

### Abstract Number: 83

#### **Critical inhaler technique errors in a severe asthma service - identifying the need for a validated scoring system**

Authors: De Vos R, Longstaff J, Heiden E, Neville D, Jones T, Chauhan A

Institution: Portsmouth Hospitals NHS Trust

**Objective:** Our aim was to evaluate the inhaler techniques of new patients attending the severe asthma service at Queen Alexandra Hospital in Portsmouth and to identify critical inhaler technique errors. These patients were already established on inhaled medication and had previously been taught how to use their inhaler prior to attending the service.

**Methods:** 35 patients were observed taking their prescribed inhaler by a Respiratory Nurse Specialist. Errors in technique were recorded using the seven recommended steps devised by the UK inhaler group.

**Results:** 100% of patients made one or more error in performing their inhaler technique, with 86% making four or more errors per device.

**Discussion:** National guidelines recommend that clinicians check patient's inhaler technique at every opportunity. Our study highlights the importance of this recommendation as all patients exhibited critically poor inhaler technique, despite being referred to secondary care with 'uncontrolled' asthma. Studies have shown that critical errors can be corrected or reduced with increased training, and identifying these errors will improve inhaler technique; the cornerstone of asthma care.

**Conclusion:** There are currently no guidelines on how clinicians can objectively measure inhaler technique, or which critical errors have an impact on health outcomes or reflect the effectiveness of inhaled asthma therapy. These findings highlight the need for a standardised and validated measurement of scoring inhaler technique errors and proposes the development of such a scoring system

**Corresponding author:** Ruth De Vos

### Abstract Number: 39

#### **A survey of HCP views on teaching methods applied during childhood asthma reviews and challenges to achieving optimal inhaler use**

Authors: Hamilton M, Prime D, Akram G, Bennie M

Institution: GlaxoSmithKline

**Aim:** To explore healthcare professionals' views on type and suitability of teaching methods used during childhood asthma reviews. Preference for method types and challenges to optimal use of inhalers by children were also explored.

**Methods:** Data were collected using a self-administered electronic questionnaire via an advert to HCP networks of Asthma UK and Education for Health using Twitter and Facebook.

**Results:** 28 individuals participated (27 female, 1 male). The majority (n=19) were specialist respiratory nurses, with varied experience (<1 year to >20 years). Participants were mainly from NHS England (n=25) across primary and secondary care. Teaching methods used by most HCPs were (1) a child's own inhaler/spacer, (2) demonstration spacer and (3) placebo inhaler. These were considered suitable for use by the HCPs who pre-

ferred them over other methods including inhaler training aids, websites and posters/vignettes. None of the methods in use were considered 'unsuitable'. All participants thought they were adequately trained in correct inhaler use and most felt they had adequate resources (n=24), although less than half agreed they could easily obtain placebo inhalers and not all responded to having age-appropriate materials. Children and parents were reported to be engaged during asthma reviews but preparation for appointments was found to be poor. A 'lack-of-understanding' was reported to be the main challenge to achieving optimal use of inhalers by children.

**Conclusion:** HCP views on teaching methods, perceived suitability and general preference have been explored. Areas for improvement include: obtaining placebo inhalers, access to age-appropriate materials and preparation for appointments. HCPs treating children with asthma need appropriate time and resources to effectively educate children and caregivers in all areas of asthma management. If realised, levels of understanding are expected to improve and have a positive impact on asthma control.

**Corresponding author:** Melanie Hamilton

### Abstract Number: 40

#### **Access to respiratory healthcare for people with a severe mental illness (SMI) and obstructive airways disease (asthma, COPD): a qualitative study**

Authors: Mitchell C, Zuraw N, Twohig N, Delaney B, Dolan N, Hulin J, Walton E

Institution: University of Sheffield

**Aim:** To explore with people with a SMI and obstructive airways disease: (1) barriers and facilitators to respiratory healthcare and (2) the impact of the SMI on the self-management of respiratory health.

**Methods:** General practice staff undertook database searches to identify and screen eligible participants prior to postal invitation to participate (10 general practices). Semi-structured interviews were undertaken with consenting respondents. Anonymised, transcribed interview data were organised using NVivo software. Self-conscious iterative thematic analysis identified emergent themes linked to coded data. This process was subject to independent verification.

**Results:** Participants (6 female, 4 male) were diverse in age (45–74 years). Six had co-morbid asthma and four had COPD. Interviews are ongoing. Four key themes have been identified to date. 'Social support' was an enabler of healthcare (eg, carers accompanying participants to appointments, neighbours calling for help during illness). Family and friendship networks were often disrupted by life trauma and the wider psychosocial impact of mental illness. The majority of participants lived alone and reported 'social isolation'. Breathing problems and financial constraints compounded anxiety associated with getting out and sometimes excluded patients from access to healthcare. Relational continuity with local healthcare practitioners helped counteract isolation and psychological barriers to healthcare. Smoking was embedded in daily routines and widely ritualised 'for stress'. Interventions such as stop-smoking support and pulmonary rehabilitation to support self-care were poorly accessed, if at all. Smoking cessation services were not perceived to support a need to develop alternative self-management strategies to support mental health.

**Conclusions:** Interventions to reduce social isolation and optimise supportive networks and self-care could alter the restrictive housebound trajectory for those with SMI and co-morbid respiratory disease and improve access to healthcare. There is a need to co-design accessible smoking cessation treatments with people with SMI, to address mental health concerns and provide stress management support.

**Corresponding author:** Caroline Mitchell

### Abstract Number: 36

#### **TANDEM (Tailored intervention for ANxiety and DEpression Management in COPD): qualitative evaluation from the pilot/feasibility**

**Authors:** Mammoliti K-M, Sohanpal R, Barradell A, Taylor SJC, Pinnock H

**Institution:** Queen Mary University of London

**Aim:** Those living with COPD have a higher risk of anxiety/depression which increases with the severity of their COPD. TANDEM is a randomised controlled trial investigating whether a cognitive behavioural approach (CBA) intervention, delivered by trained respiratory healthcare professionals and preceding pulmonary rehabilitation, improves anxiety/depression outcomes and pulmonary rehabilitation attendance/completion, thereby reducing functional limitations. The aim of the study was to assess the feasibility of the TANDEM CBA intervention prior to a definitive trial.

**Methods:** Individual face-to-face interviews were conducted with study participants following completion of intervention delivery (intervention, n=4; control, n=3). Reasons and experience of participating, experience of receiving the intervention and suggestions for improvement were explored. Interviews were recorded, transcribed verbatim and analysed thematically.

**Results:** Identified themes: (1) Negative impact of COPD and anxiety/depression; (2) willingness to be involved in TANDEM; (3) acceptability of the recruitment process; (4) acceptability of the intervention; (5) refinements in the recruitment process and intervention for the main trial.

**Conclusion:** The participants' experience of the TANDEM CBA intervention was consistently reported as positive. Practical skills learnt were easily translated into everyday tasks, leading to participants feeling empowered in their ability to break the vicious cycle of anxiety/depression, in turn inspiring overall confidence, especially in their ability to manage their condition and improvement in their physical abilities.

**Corresponding author:** Kristie-Marie Mammoliti

### Abstract Number: 17

#### **Incidence of type II diabetes in chronic obstructive pulmonary disease**

**Authors:** Gayle A, Dickinson S, Poole CD, Pang M, Quint J

**Institution:** Boehringer Ingelheim Ltd

**Aim:** To estimate the incidence of type II diabetes mellitus (T2DM) among people with COPD and investigate whether exposure to inhaled corticosteroids (ICS) and exacerbation status is associated with developing T2DM.

**Methods:** This descriptive cohort study used primary care data from the UK Clinical Practice Research Datalink (CPRD). People

with a diagnosis of COPD, any smoking history, and registered in practice between January 2010 and December 2016 were selected. Crude incidence rates and cumulative prevalence by age, gender and social deprivation were determined. Using a nested case-control design, we matched each patient with incident T2DM (cases) with five non-T2DM controls by age, gender and GP practice at T2DM diagnostic date. Logistic regression measured the association between ICS exposure, frequent exacerbations (2 or more annually) and T2DM co-morbidity, adjusting for lifestyle factors and co-morbidity.

**Results:** We identified 220,971 COPD patients with a mean age at diagnosis of 66 years (95% CI 65 to 66), of whom 54% were male. The cumulative prevalence of T2DM was 9.27% (95% CI 9.15% to 9.39%). The incidence of T2DM was 1.26 per 100 patient years (95% CI 1.24 to 1.28), and was higher among men than women (1.32 vs. 1.18). The adjusted odds ratio (OR) for developing T2DM was 1.47 (95% CI 1.36 to 1.60) among frequent exacerbators versus infrequent. All levels of ICS exposure increased the likelihood of T2DM incidence compared with those not exposed; most affected were patients receiving >800 µg budesonide equivalent daily (OR 1.73, 95% CI 1.65 to 1.82).

**Conclusion:** Incidence of T2DM among COPD patients is high. Exposure to ICS and frequent COPD exacerbations are independently associated with elevated risk of developing T2DM in this population.

**Corresponding author:** Alicia Gayle

### Abstract Number: 77

#### **The working-age experience of living with chronic obstructive pulmonary disease (COPD)**

**Authors:** Masters L, C de C Williams A, Cassidy E, Simpson, J  
**Institution:** UCL

**Aim:** To understand, in greater depth, the impact that COPD has on quality of life for individuals of a working-age.

**Methods:** A qualitative investigation was conducted in 11 adults with COPD aged between 52 and 63. A framework analysis approach was used to analyse the data.

**Results:** Ten themes were identified, which interact in complex and nuanced ways. The themes identified were: valuing giving back, valuing independence, conflict with the COPD, helplessness versus agency, changed relationship to health, loss of control, self-efficacy, resilience, readiness and empowerment versus disempowerment from services.

**Conclusion:** The study sample reported very few concerns specific to their age group. The majority of participants did not report concerns about loss of employment, for example. However, changes to their role within the family and the need to be cared for by their children were reported as being particularly distressing aspects of living with COPD. Participants also reported complex relationships to making lifestyle changes, such as stopping smoking. Participants commonly reported a lack of 'readiness' for making changes, and some experienced services as disempowering when this sense of not being ready was not taken seriously. These areas need further exploration.

**Corresponding author:** Lisa Masters

## Abstract Number: 75

### Quality of life differences between working-age and older adults with chronic obstructive pulmonary disease (COPD): a meta-analysis

Authors: Lisa Masters, Dr Amanda C de C Williams, Dr Emma Cassidy, Jane Simpson

Institution: UCL

Chronic obstructive pulmonary disease (COPD) has a significant impact on quality of life. It could be argued that the impact COPD has on day-to-day life differs according to an individual's life stage. This research is a systematic review and meta-analysis of the COPD quality of life literature. Studies which have compared quality of life scores between working-age and older adults have been included, along with studies that have looked at age differences between individuals scoring high or low on quality of life measures. A total of 10 studies have been included. Overall, there was no significant difference found between working-age and older adults with COPD on measures of quality of life. It is concluded that there are likely to be multiple other factors which impact quality of life in individuals with COPD, and these need to be considered in further depth.

**Corresponding author:** Lisa Masters

## Abstract Number: 76

### Making a diagnosis of asthma in primary care: a qualitative study of current practices and challenges

Authors: Akindele A, Daines L, Cavers D, Pinnock H, Sheikh A  
Institution: Asthma UK Centre for Applied Research, Usher Institute, University of Edinburgh Usher Institute, University of Edinburgh

**Aim:** Misdiagnosis (over-diagnosis and under-diagnosis) of asthma is common. Under-diagnosis can lead to avoidable morbidity and mortality, while over-diagnosis results in excessive spending and exposes patients to unnecessary side effects of treatment. This study aimed to explore the diagnostic approach and challenges faced by general practitioners (GPs) and practice nurses when making a diagnosis of asthma.

**Methods:** A mixture of purposive and convenience sampling was used to recruit participants. GPs and nurses working in NHS Lothian, Scotland were interviewed using in-depth semi-structured qualitative interviews. Transcripts were analysed using a thematic approach.

**Results:** 10 GPs and 5 nurses were interviewed. Participants weighed up an individual's probability of asthma which contributed to their decision to conduct peak flow monitoring, spirometry and/or a trial of treatment. Challenges in the diagnostic assessment of asthma included time pressures, the variable nature of asthma, overlapping clinical features of asthma with other conditions such as chronic obstructive pulmonary disease in adults and viral illnesses in children. To improve diagnostic decision-making, participants suggested improved educational opportunities and better diagnostic tools. The idea of a clinical prediction calculator to guide the asthma decision-making process was appealing to the nurses interviewed; however, most GPs felt that their clinical judgement would be preferable. Participants were also positive towards the idea of diagnostic hubs as they felt hubs would provide greater availability of tests. However, some raised concerns about funding and deskilling primary care practitioners.

**Conclusions:** Clinical judgement of the probability of asthma was fundamental in the diagnostic process. Tests (including trial of treatment) to confirm or refute the working diagnosis were chosen based on probability and local availability. To improve the diagnostic pathway for asthma, standardising the clinical assessment made by individual healthcare practitioners should be supported by access to diagnostic services for additional investigation and clarification of diagnostic uncertainty.

**Corresponding author:** Adeola Akindele

## Abstract Number: 59

### The use of a novel case-finding algorithm in the identification of chronic obstructive pulmonary disease (COPD) patients in primary care: baseline results of the ASSIST study

Authors: Ray E, Kruk, H, Gillett K, Culliford D, Lin X, Jordan R, Thomas DM, Price D, Wilkinson T

Institution: University Hospital Southampton NHS Trust

**Aim:** Chronic obstructive pulmonary disease (COPD) accounts for a significant proportion of hospital admissions in the UK and is a leading cause of death worldwide. Missed opportunities for early diagnosis and optimisation of treatment are common in primary care. We implemented a case-finding strategy in order to identify previously undiagnosed patients with COPD who may have attended their GP practice with symptoms of the disease (ASSIST study, REC: 16/5C0629).

**Methods:** Ever smokers aged 40–79 years with an estimated risk score  $\geq 22.5\%$  were identified using a published Read code-based case-finding algorithm (TargetCOPD score), applied to primary care records to actively case-find smokers with signs and symptoms of COPD. Eligible patients were invited to attend their GP practice for a specialist respiratory review including spirometry testing.

**Results:** 2,213 patients across 12 GP practices in Hampshire, UK were identified. Of these, 611 were deemed ineligible by the GP, leaving 1,602 invited. 383 (23.9%) patients responded to an initial mail-out, and 288 (male 51%, mean age 63, SD=6.71) were consented into the study following further eligibility checks and accounting for non-attenders. Overall, 31% (89) demonstrated obstructed spirometry (FEV1/FVC or FEV1/VC  $< 70$ ) with 15.2% (44) having a fixed obstruction less than the lower limits of normal. Of those with an FEV1/FVC or FEV1/VC  $< 70$ , 66% (59) had mild obstruction (FEV1  $> 80\%$  predicted) and 34% (30) had moderate obstruction (FEV1 50–79% predicted). 85% (76) with obstructed spirometry also reported chronic respiratory symptoms and 63% (55) had an MRC  $\geq 2$ . 66 (23%) patients were current smokers and overall the mean pack-year was 24.68 (SD=20.47).

**Conclusions:** The results demonstrate that actively case-finding patients for COPD using an electronic algorithm applied to GP records identified patients with obstructed spirometry and symptoms of COPD. Further analysis and follow-up data will examine whether using the case-finding algorithm results in earlier identification of COPD in a cost-effective manner and an improvement in quality of life for patients.

**Corresponding author:** Emma Ray

## Abstract Number: 84

### A qualitative study: the acceptability of a 'case-finding for COPD' clinic to patients in GP practices across Hampshire

Authors: Rose D, Summers R, Ray E  
Institution: University of Southampton

**Aim:** Chronic obstructive pulmonary disease (COPD) is an umbrella term used to describe emphysema and chronic bronchitis. A late or missed diagnosis not only has an impact to the individual but also incurs substantial healthcare costs. Approximately 1.2 million people are living with diagnosed COPD in the UK, with potentially a further 2 million people remaining undiagnosed. A targeted 'case-finding for COPD' study (ASSIST, REC: 16/5C/0629) has been implemented in GP practices across Hampshire. To explore the views and experiences of patients attending case-finding clinics, we conducted a qualitative study.

**Methods:** 15 patients attending a case-finding clinic for COPD participated in semi-structured telephone interviews in 2017. Seven patients had symptoms and spirometry suggestive of COPD, and the remaining patients had no evidence of COPD present. All interviews were conducted using an approved interview schedule, which were audio-recorded and transcribed verbatim. Transcripts were then analysed, and semantic and latent themes were developed and peer reviewed.

**Results:** All patients stated they valued the meaningful relationships built with clinic staff, who they described as approachable and professional. In general, patients brought concerns and issues to the clinic, but left with a better understanding of their symptoms and an awareness of self-management strategies. Improvements in symptoms due to positive behavioural changes including losing weight and stopping smoking was a key outcome for both groups of patients.

**Conclusions:** Case-finding clinics were positively received by a majority of patients with and without airflow obstruction. Patients were more knowledgeable about their respiratory disease, were able to self-manage more effectively and had made positive behavioural changes as a result of attending the clinic. However, some patient's reported poor memory recall of events at the clinic and, because of the small sample size in this qualitative review, it is difficult to generalise the results.

**Corresponding author:** Danielle Rose

## Abstract Number: 67

### The ASSIST study: an analysis and thematic review of feedback questionnaires from patients attending a case-finding for COPD clinic

Authors: Ray E, Gillett K, Kruk H, Summers R, North M, Thomas DM, Wilkinson T  
Institution: University Hospital Southampton NHS Trust

**Aim:** A late or a missed diagnosis of chronic obstructive pulmonary disease (COPD) in primary care is associated with significant healthcare costs and poor patient outcomes. The ASSIST study (REC: 16/5C/0629) implemented a computerised case-finding algorithm in primary care records to identify previously undiagnosed patients at risk of having COPD.

**Methods:** In total, 1,602 patients were invited to attend a lung health check visit at their GP practice and 288 patients (male 51%, mean age 63, SD=6.71) were enrolled, reviewed by a res-

piratory nurse and completed spirometry testing. Patient feedback was sought via completion of a study-specific questionnaire, analysed and a thematic review of free text was completed.

**Results:** A proportion of patients (161, 57.5%) were concerned to receive an invitation letter explaining they may be at risk of having a lung condition, although 147 (53.3%) were not surprised. Patients (265, 94.3%) agreed that being invited made them feel supported by their GP practice but felt worried about attending the clinic (285, 100%). Common themes to attend included (1) concern for their own health, (2) benefitting their own health, and (3) benefit for others. 283 (99%) patients stated that attending the clinic was a positive experience, whilst 223 (80%) agreed that it had made them think about their health. In general, patients expressed that attending the clinics (1) was a positive learning opportunity, (2) had provided reassurance, and (3) that future clinics should be available to other patients.

**Conclusions:** Although patients were concerned they may be at risk of having a lung condition, patients who attended the clinic overwhelmingly found it a very positive experience. This was due to the thorough assessment at the visit, perceived expertise of the staff conducting the clinics and advice provided, which led to patients recommending continuing the service in the NHS.

**Corresponding author:** Emma Ray

## Abstract Number: 88

### Generating social networks and resources (GENIE) in COPD: evaluating benefits and costs in Southampton Community COPD Service

Authors: Welch L, Lin X, Vassilev II, Rogers A, Orlando R  
Institution: University of Southampton (NIHR Wessex CLAHRC)

**Background:** Currently the evidence base for self-management support in COPD has no one intervention or specific component that is wholly successful in COPD (Walter 2010, Peytremann-Bridevaux 2008, Taylor 2014). Therefore a novel approach was undertaken to supporting self-management by enlisting support through a method designed to increase social assets: GENIE (Generating Engagement in Networks). GENIE is a facilitated social network tool designed to increase personal networks and link people to community resources.

**Aims:** This study aims to evaluate the healthcare utilisation and quality of life in COPD patients using GENIE alongside usual care after leaving the COPD service, with those offered usual care.

**Methods:** The study is a pilot two-armed parallel single-blind block randomised controlled trial. 60 subjects with mild to very severe COPD were recruited from the East of Southampton post-pulmonary rehabilitation and COPD maintenance exercise therapy. Subjects were either offered a usual PR discharge plan (exercise DVD and Breathe Easy literature) or a facilitated session with the GENIE social networking tool. Six core questionnaires were used in the evaluation. Subjects completed health utilisation, EQ-5D scores, COPD Assessment Tool (CAT), GAD, PHQ-9 and HIEQ at baseline prior to the intervention. These outcomes measures were repeated at a 3-month follow-up visit.

**Results:** The intervention group and control group were compared at baseline and at 3 months; the groups were evenly distributed. Clinical results indicate clinical stability in CAT, GAD and PHQ-9 with marginal improvements in favour of the intervention. Health utilisation costs fell by 40% in the intervention group and

by 0.64% in the control arm. Quality of life increased in the intervention group by 6% and decreased in the control group by 4%.

**Conclusions:** Comparative analysis continues, but currently the results favour intervention reducing NHS activity, cost and improved perceived patient quality of life.

**Corresponding author:** Lindsay Welch

### Abstract Number: 70

#### **Making Waves: an asset-based community development approach to improve self-management, social inclusion and mental well-being in people with COPD**

Authors: Sewell L, Taylor A, Dodd P, Monkhouse J, Khan A, Kerslake M, Lord V, Lowton-Smith S, Fessey V, Krumins S, Gelder C

Institution: Coventry University

**Aim:** Making Waves (MW) clinics are an assets-based innovation that blend social activities with peer and clinical support. The first MW clinic was developed in Coventry in 2015. This was spread to six further sites in the East and West Midlands. The aims of the evaluation were to describe the population that attend MW clinics, to observe changes in health status and to measure participants' ability to self-manage their COPD.

**Method:** This was a prospective observational study. Outcome measures including the COPD Assessment Test (CAT), the Medical Research Council (MRC) Breathlessness Scale, Warwick Edinburgh Mental Well-Being Scale (WEMWBS), Hospital Anxiety and Depression Scale (HADS), EuroQol 5D and the Patient Activation Measure (PAM) were obtained at baseline, 3 months and 6 months.

**Results:** Following NHS ethical approval, 145 participants consented to participate in the evaluation from April to December 2017. 67 participants had complete datasets at 6-month follow-up. Mean age was 72.2 (SD 7.7) years, 53% were female and 38% lived alone. 68% of participants had a baseline MRC breathlessness score of 3 or higher. 44% and 54% of participants reported baseline HADS score of 8 or above for anxiety and depression respectively. 50% recorded PAM levels 1 or 2 at baseline, indicating low levels of activation to self-manage. Scores for the EQ5D and CAT improved significantly from baseline to 6 months in the 67 participants with complete datasets. 35% of participants increased their PAM levels by at least one level from baseline to 6 months.

**Conclusion:** MW clinics are a novel innovation that may help participants to improve their levels of health status and capacity to self-manage their COPD. MW clinics have the potential to improve social isolation and are a valued addition to existing respiratory services.

**Corresponding author:** Louise Sewell

### Abstract Number: 45

#### **Baseline findings of a training needs analysis (TNA) for general practitioners and practice nurses during the ASSIST study**

Authors: Kruk H, Astles C, Ray E, Gillett K

Institution: University Hospital Southampton, CLAHRC Wessex

**Objective:** Our aim was to evaluate a self-reported current level of respiratory knowledge among general practitioners (GPs) and practice nurses (PNs).

**Methods:** A training needs analysis (TNA) was offered to all clinical staff in 12 GP practices participating in the ASSIST study. The TNA is a self-assessment tool with a scoring system on knowledge of (1) spirometry, (2) asthma, (3) chronic obstructive pulmonary disease (COPD), (4) influences or risks around asthma and COPD, (5) inhaler technique, and (6) guidelines and shared decision-making (SDM). A low score indicated the individuals' perceived knowledge about the subject required improvement, whereas a high score indicated that the individual felt confident about their knowledge of that subject.

**Results:** GPs (n=7): The self-reported scores were as follows (shown as mean/maximum possible score, minimum–maximum score): spirometry (7/24, 3–15), inhaler technique (13/24, 11–16), knowledge of asthma and knowledge of COPD (both scored 27/40, 17–33), influences or risks around asthma and COPD (17/24, 12–22) and guidelines and SDM (18/32, 8–31).

PNs (n=15): The self-reported scores were as follows: guidelines and SDM (21/32, 8–28), influences or risks around asthma and COPD (14/24, 10–22), knowledge of COPD (24/40, 19–33), knowledge of asthma (26/40, 19–34), spirometry (16/24, 11–23) and inhaler technique (19/24, 12–24).

**Conclusions:** The results show that self-reported knowledge of spirometry and inhaler technique amongst GPs is low, in contrast to PNs who scored highly in these areas with one PN self-reporting a maximum score for inhaler technique. Conversely, PNs scored themselves lowest for guidelines and influences or risks around asthma and COPD, whereas the GPs scored themselves highest in these areas. This contrast in reported levels of knowledge suggests that there is a knowledge gap across primary care clinical teams. However, the TNA is a self-reported subjective measure which may not capture actual skill or knowledge level.

**Corresponding author:** Helen Kruk

### Abstract Number: 34

#### **Can a single-use spacer be used effectively on multiple occasions?**

Authors: Sanders MJ, Tran C

Institution: Clement Clarke International Ltd

**Aim:** We were interested to understand if a disposable spacer – whose design origins and current purpose are for single use, emergency situations and for which regular cleaning is neither relevant nor feasible – could be used effectively on more than one occasion.

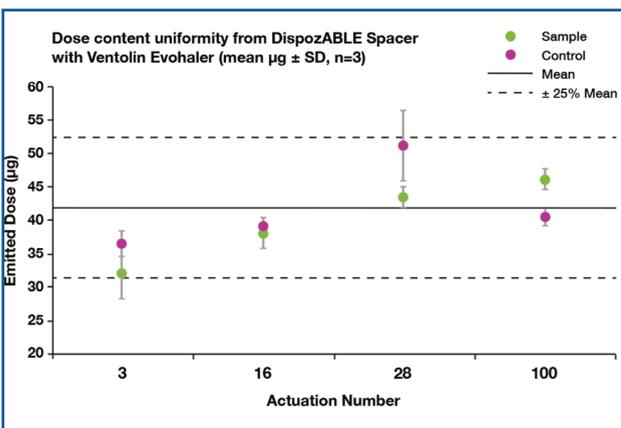
**Method:** We have evaluated the emitted delivered dose content uniformity (DCU) of salbutamol from Ventolin Evohaler (100 µg metered dose, GSK) pressurised metered dose inhaler (pMDI) via the DispozABLE Spacer (Clement Clarke). pMDIs were primed and shaken per manufacturer's instructions and connected to a dose unit sampling apparatus (DUSA, Copley Scientific, operated at 28.3 L/min) via the DispozABLE Spacer (Figure 1). Sample



Figure 1. pMDI-Spacer-DUSA

testing was completed: four sets of two actuations (#3–4, 16–17, 28–29 and 100–101) were dispensed into a single DispozABLE Spacer with drug recovery from the actuator and DUSA. Immediately following sample testing, for mass balance purposes, four sets of control testing were completed using a new Spacer on each occasion with recovery from actuator, Spacer and DUSA. Salbutamol was quantified using validated HPLC and reported as salbutamol base.

**Results:** Overall mean±SD salbutamol recovery (µg) did not differ between Sample and Control: 11.0±1.5 and 10.6±1.2 (on actuator) and 40.0±6.0 and 41.9±6.3 (DUSA), respectively. The mean values for each actuation set (n=3 pMDIs) are shown in Figure 2, demonstrating the delivered emitted DCU through the canister life. No value was outside 75–125% of the mean, remaining therefore within acceptable limits.



**Conclusion:** The multiple use of a single DispozABLE Spacer through the canister life of the Ventolin Evohaler did not have a detrimental effect on the dose content uniformity of salbutamol. These data suggest that a patient could use the Spacer repeatedly during a situation that required multiple puffs of drug – for example, in the hospital emergency room, as an inpatient and/or when access to nebulised drug is not immediately available.

**Corresponding author:** Mark Sanders

## Abstract Number: 47

### Perceptions of COPD patients of the proposed withdrawal of high-dose inhaled corticosteroids prescribed outside guidelines

Authors: Gilworth G, Harries T, Corrigan C, Thomas DM, White P  
Institution: Kings' College London

**Background:** Guidelines recommend the prescription of high-dose inhaled corticosteroids (ICS) in COPD only for patients with severe or very severe disease. High-dose ICS are commonly prescribed outside guidelines for mild or moderate COPD despite the lack of evidence of their benefit. They may cause side effects including increased risk of pneumonia.

**Aim:** To explore patients' opinions and feelings about using high-dose ICS prescribed outside guidelines and their attitudes to proposed withdrawal.

**Methods:** One-to-one semi-structured qualitative interviews were guided by a topic list. This included participants' understanding of COPD, length of use of ICS, perceived beneficial and adverse effects, concerns regarding symptom control and required support during possible withdrawal. Participants under-

went spirometry testing to confirm COPD severity. Interviews took place at a location of the participants' choice, were audio-recorded and transcribed verbatim. Thematic analysis is underway using N-Vivo to assist data organisation.

**Results:** Twenty-two interviews were completed. Most participants were seen at home. Two recordings were lost due to technical issues, three participants did not meet spirometry eligibility criteria. Many participants were not aware they were using a high-dose ICS or of the risk of side effects. Attitudes to risk of side effects varied. Some participants were unconcerned by what they perceived as low risk to them individually. Others were concerned. Most would be willing to attempt withdrawal or titration to a lower dose of ICS once provided with a reasoned explanation. Participants expressed fears of worsening symptoms on withdrawal of the ICS.

Participants' opinions of the support they should receive whilst withdrawing from ICS included monitoring phone calls and maintaining access to inhalers for immediate use should their symptoms deteriorate.

**Conclusions:** Most COPD participants would be willing to withdraw from high-dose ICS with adequate support. They would welcome more information relating to their medication and risks of side effects.

**Corresponding author:** Gill Gilworth

## Abstract Number: 42

### IMPLementing IMProved Asthma self-management as Routine Treatment: the IMP2ART programme

Authors: Pinnock H, Morrow S, McClatchey K, Taylor SJC, for the IMP2ART programme group  
Institution: The University of Edinburgh

The challenge of implementing supported self-management for asthma

Supported self-management, which helps people adjust their treatment in response to changes in symptoms, improves day-to-day control and reduces the risk of asthma attacks. However, for many reasons, supported self-management is not widely implemented; fewer than a quarter of people replying to a recent Asthma UK web survey owned an action plan. Our recent systematic review concluded that successful implementation of supported self-management requires attention to patient resources, professional motivation and training, and organisational prioritisation and support.

How the IMP2ART programme will address the challenge

Building on the findings of preliminary IMP2ART studies and working with six general practices, Asthma UK, PRCS-UK and Education for Health, we will develop the components of an implementation strategy. For example:

- Patient resources to support self-management (eg, a range of action plans; flexible access to professional advice; digital options)
- Professional education to motivate and train practice teams (eg, online, team-based modules to raise awareness and provide specific skills)
- Organisational strategies to facilitate adoption (eg, audit/feedback; review templates; electronic action plans)

Facilitated by respiratory nurse specialists, practices will be encouraged to adopt and adapt strategies to suit their practice routines.

Refining the implementation strategy

We will recruit GPs, asthma nurses and admin staff from four practices to pre-pilot the implementation strategy and provide qualitative feedback on feasibility.

The IMP2ART UK-wide trial

Following a pilot (n=12 practices), we will undertake a national cluster RCT (n=144 practices) which will evaluate the impact and cost-effectiveness of the IMP2ART implementation strategy on unscheduled care (assessed from routine data) and ownership of action plans. A mixed-methods process evaluation will explore potential for scaling-up and sustainability.

**Funding:** IMP2ART is independent research funded by NIHR PGfAR (RP-PG-1016-20008). The views expressed are those of the authors, not necessarily those of the NHS, NIHR or Department of Health.

**Corresponding author:** Hilary Pinnock

## Abstract Number: 22

### Cochrane review of serious adverse events in regular treatment with salmeterol and inhaled steroids for chronic asthma

**Authors:** Cates CJ, Schmidt S, Ferrer M, Sayer B, Waterson S  
**Institution:** St George's, University of London

**Aim:** Epidemiological evidence has suggested a link between beta2-agonists and increased asthma deaths. This Cochrane systematic review aimed to assess the risk of mortality and non-fatal serious adverse events in trials which randomised patients with chronic asthma to regular salmeterol and inhaled corticosteroids (ICS) in comparison with the same dose of ICS.

**Method:** We analysed data from 41 studies in 27,951 adults and eight studies in 8,453 children that compared regular salmeterol in addition to ICS against the same dose of ICS. We included parallel design controlled clinical trials on patients of any age and severity of asthma if they randomised patients to treatment with regular salmeterol and ICS, and were of at least 12 weeks duration. We conducted the review according to standard procedures expected by the Cochrane Collaboration.

**Results:** No deaths were attributed to asthma in any of the studies and there were no deaths in children. The results for all-cause mortality in adults are compatible with at best one less and at worst one more death from any cause (in comparison with one death on regular ICS alone). Non-fatal serious adverse events (admissions to hospital) were not increased beyond the play of chance in adults or children when regular salmeterol was added to ICS as randomised treatment.

**Conclusion:** We remain uncertain of the safety of salmeterol and ICS with respect to the risk of dying from asthma, while the results for non-fatal serious adverse events are too imprecise to completely rule out any increased risk. Clinical decisions regarding regular use of salmeterol in combination with ICS have to take into account the balance between known symptomatic benefits of salmeterol when used in combination with an ICS and the remaining degree of uncertainty associated with its potential harmful effects.

**Corresponding author:** Sam Waterson

## Abstract Number: 28

### Does the severity of COPD affect inspiratory power across different inhalers? Part 2: Non-capsule devices

**Authors:** Sanders MJ, Green A

**Institution:** Clement Clarke International Ltd

**Aim:** Pressurised metered dose (pMDI), soft mist (SMI) and dry powder (DPI) inhalers are popular as therapy delivery options in COPD but can differ markedly in resistance and inspiratory flow requirements. We explored whether disease severity could influence the ability of subjects to use these inhalers effectively.

**Method:** We measured device resistance ( $R=kPa^{1/2}/L/min$ ) according to Clark and Hollingworth,<sup>1</sup> and interpolated mean values (n=6) for pMDI Evohaler (GSK), SMI RespiMat (Boehringer Ingelheim), DPis Ellipta (powder blister, GSK) and Turbohaler (powder reservoir, AstraZeneca) at the device-effective flow rates identified from the literature<sup>2</sup> or attributed for calculation: Evohaler 10 L/min, RespiMat 20 L/min, Ellipta 30 L/min and Turbohaler 30 L/min. Minimum inhalation duration was attributed on a pragmatic basis allowing for coordination, delivery and chase air times. Inspiratory power (airWatts/inhalation) was calculated as flow rate (L/s) x pressure (kPa) x duration (s). Using reference inspiratory flow profiles<sup>3</sup> for subjects with moderate (n=12, FEV1 predicted 50–80%) and very severe COPD (n=10, <30%) we calculated the power that could be applied by an untrained subject inhaling against the device resistances at specified flows for the duration, expressing the result as a ratio of power generated by the subject to that required by the device.

**Results:** Flow rate, resistance, duration data and inspiratory power are given in Figure 1. Devices that propel the medication towards the patient (pMDI, SMI) required less inspiratory power than the higher resistance DPis. All of the devices were within the theoretical capability of the subjects for successful use.

	pMDI (Evohaler)	SMI (RespiMat)	DPI (Ellipta)	DPI (Turbohaler)
Resistance ( $kPa^{1/2}/L.min^{-1}$ ) [1]	0.01	0.03	0.07	0.10
Effective flow rate ( $L.min^{-1}$ ) [ref.]	10 [2]	20	30 [2]	30 [2]
Durations (seconds)				
Coordination	0.50	0.50	0.00	0.00
Delivery	0.20	1.20	0.25	0.25
Chase	1.80	0.80	1.75	1.75
Minimum duration (seconds)	2.50	2.50	2.00	2.00
Inspiratory power ratio (patient : device)				
moderate COPD	1 : 0.004 <input checked="" type="checkbox"/>	1 : 0.04 <input checked="" type="checkbox"/>	1 : 0.24 <input checked="" type="checkbox"/>	1 : 0.36 <input checked="" type="checkbox"/>
very severe COPD	1 : 0.008 <input checked="" type="checkbox"/>	1 : 0.10 <input checked="" type="checkbox"/>	1 : 0.61 <input checked="" type="checkbox"/>	1 : 0.87 <input checked="" type="checkbox"/>
<b>Key to symbols</b>	<input checked="" type="checkbox"/> sufficient inspiratory power for device			
<b>References</b>	[1] Clark and Hollingworth. J Aerosol Med 1993 <a href="https://doi.org/10.1089/jam.1993.6.99">https://doi.org/10.1089/jam.1993.6.99</a> [2] Haidl et al. Respiratory Medicine 2016 <a href="https://doi.org/10.1016/j.rmed.2016.07.013">https://doi.org/10.1016/j.rmed.2016.07.013</a> [3] Wachtel et al. Respir Drug Del 2006; 2: 511-514.			

**Figure 1 - Non-capsule inhaler inspiratory power**

**Conclusion:** The data indicate that COPD disease severity has an important influence on ability to use these inhalers, with inspiratory power requirements potentially representing an important consideration for device selection particularly as disease progresses. We are currently undertaking further research to determine any effect of training on power requirements.

1. Clark and Hollingworth. J Aerosol Med 1993. <https://doi.org/10.1089/jam/1993.6.99>
2. Haidl et al. Respiratory Medicine 2016. <https://doi.org/10.1016/j.rmed.2016.07.013>
3. Wachtel et al. Respir Drug Del 2006; 2: 511-514.

**Corresponding author:** Mark Sanders

## Abstract Number: 27

### Does the severity of COPD affect inspiratory power across different inhalers? Part 1: Capsule devices

Authors: Sanders MJ, Green A

Institution: Clement Clarke International Ltd

**Aim:** Capsule dry powder inhalers (DPIs) differ markedly in resistance and inspiratory flow requirements. We explored whether COPD disease severity influenced the ability of subjects to use DPIs effectively.

**Method:** We measured capsule DPIs Handihaler (Boehringer Ingelheim), Breezhaler (Novartis) and Zonda (Laboratorios Liconsa/Teva) device resistance ( $R=kPa\frac{1}{2}/L/min$ , Clark and Hollingworth<sup>1</sup>), and interpolated mean values for each DPI ( $n=6$ ) at the literature<sup>2-4</sup> device-effective flow rate (20, 50 and 30 L/min for Handihaler, Breezhaler and Zonda, respectively). Next, we connected the devices to a Copley LCP5 precision vacuum pump to determine capsule-emptying (inhalation duration) and calculated inspiratory power (airWatts/inhalation) as flow (L/s) x pressure (kPa) x duration (s). Using reference inspiratory flow profiles<sup>5</sup> for subjects with moderate ( $n=12$ , FEV1 predicted 50–80%) and very severe COPD ( $n=10$ , <30%), we calculated the power an untrained subject could apply inhaling against the device resistances at specified flows for the duration, and expressed the result as the ratio of power generated by the subject to that required by the device.

**Results:** At the specified flow, Handihaler and Zonda capsules emptied in 2.5 s (Figure 1). The higher effective flow for the lower resistance Breezhaler led to capsule emptying in 1.5 s. Despite similar resistance and duration, Handihaler required less power than Zonda because of the lower flow requirement. Although Breezhaler is a lower resistance device, greater inspiratory power was necessary owing to higher flow requirement.

	Handihaler	Breezhaler	Zonda
Resistance ( $kPa\frac{1}{2}/L.min^{-1}$ ) [ref.1]	0.14	0.05	0.15
Effective flow rate ( $L.min^{-1}$ ) [ref.]	20 [2]	50 [3]	30 [4]
Capsule empty time (seconds)	2.5	1.5	2.5
Inspiratory power ratio (patient : device)			
moderate COPD	1 : 0.28 <input checked="" type="checkbox"/>	1 : 1.11 <input type="checkbox"/>	1 : 0.55 <input checked="" type="checkbox"/>
very severe COPD	1 : 0.41 <input checked="" type="checkbox"/>	1 : 1.15 <input type="checkbox"/>	1 : 1.22 <input type="checkbox"/>

Key to symbols	
<input checked="" type="checkbox"/>	sufficient inspiratory power for device
<input type="checkbox"/>	insufficient inspiratory power for device

References
[1] Clark and Hollingworth. J Aerosol Med 1993 <a href="https://doi.org/10.1089/jam.1993.6.99">https://doi.org/10.1089/jam.1993.6.99</a>
[2] Chodosh et al. J Aerosol Med 2004 <a href="https://doi.org/10.1089/089426801316970268">https://doi.org/10.1089/089426801316970268</a>
[3] Ghosh et al. J Aerosol Med Pulm Drug Del 2017 <a href="https://doi.org/10.1089/jamp.2017.1416">https://doi.org/10.1089/jamp.2017.1416</a>
[4] <a href="https://www.mhra.gov.uk/home/groups/par/documents/websiteresources/con723050.pdf">https://www.mhra.gov.uk/home/groups/par/documents/websiteresources/con723050.pdf</a>
[5] Wachtel et al. Respir Drug Del 2006; 2: 511-514.

Figure 1 - Capsule DPI Inspiratory power

**Conclusion:** The data indicate that COPD severity has an important influence on the ability to use capsule inhalers. Some capsule inhalers may be beyond the capability of some COPD subjects to use correctly. While capsule inhalers appear similar, there are differences in duration of capsule emptying and inspiratory power that may be clinically relevant. Inspiratory power assessments may represent an important consideration for inhaler device selection and merits further investigation.

1. Clark and Hollingworth. J Aerosol Med 1993. <https://doi.org/10.1089/jam/1993.6.99>
2. Chodosh et al. J Aerosol Med 2004 <https://doi.org/10.1089/089426801316970268>
3. Ghosh et al. J Aerosol Med Pulm Drug Del 2017 <https://doi.org/10.1089/jamp.2017.1416>
4. <https://www.mhra.gov.uk/home/groups/par/documents/websiteresources/con723050.pdf>
5. Wachtel et al. Respir Drug Del 2006; 5: 511-514.

**Corresponding author:** Mark Sanders

## Abstract Number: 65

### Characterisation of blood eosinophils and their association with disease outcomes in steroid-naïve COPD patients in primary care: descriptive cohort study using the Clinical Practice Research Datalink (CPRD)

Authors: Ashdown HF, McFadden E, Thomas DM, Pavord ID, Butler CC, Bafadhel M, Smith M

Institution: University of Oxford

**Aim:** Blood eosinophils are a potential biomarker to guide choice of maintenance treatment in COPD. We aimed to explore blood eosinophil testing, its values, and their relationship to patient characteristics and disease outcomes in routine primary care.

**Method:** We used routinely collected data from UK primary care in the CPRD, linked with Hospital Episode Statistics. Included COPD patients were >40 years with smoking history and diagnostic spirometry, not previously treated with inhaled corticosteroids, starting a new inhaled maintenance medication between 2005 and 2015. Primary analysis used the most recent blood eosinophil count in the two years before the new treatment, divided into high (>150/ $\mu$ L) and low (<150/ $\mu$ L) groups. We explored the relationship of blood eosinophils to patient and disease characteristics; Cox regression compared eosinophil groups for time-to-first-exacerbation after maintenance treatment initiation.

**Results:** 30,384 patients fulfilled the inclusion criteria, of whom 18,462 (60.8%) had a valid eosinophil count. Testing occurred less in males, current smokers, asthma, increasing severity of COPD and increasing baseline exacerbation frequency. In those tested, median eosinophil count was 200 cells/ $\mu$ L (interquartile range 100–300/ $\mu$ L), with 31.8% in the low and 68.2% in the high group. Higher eosinophils were significantly associated with male sex, younger age, ex-smokers, lower severity classification, atopy, asthma and higher baseline exacerbations. Median time-to-first-exacerbation was 524 (95% CI 510 to 540) days, with no difference between the eosinophil groups (adjusted hazard ratio 0.98 (0.93–1.02,  $p=0.26$ )), and this did not change when the eosinophil threshold was increased to >300/ $\mu$ L. A high most recent eosinophil count was 98.4% predictive of a high mean eosinophil count over the previous two years.

**Conclusion:** In a primary care population commencing a new maintenance treatment, blood eosinophils are not a marker of prognosis. However, those with eosinophils tested may not be representative of the whole COPD population. Most recent eosinophil count may be a suitable surrogate for multiple values over time.

**Corresponding author:** Helen Ashdown

## Abstract Number: 64

### Use of blood eosinophils to predict outcomes under inhaled maintenance treatment in steroid-naïve COPD patients in primary care: new user cohort study using the Clinical Practice Research Datalink (CPRD)

Authors: Ashdown HF, McFadden E, Thomas DM, Pavord ID, Butler CC, Bafadhel M, Smith M  
Institution: University of Oxford

**Aim:** Blood eosinophils are a potential biomarker to guide inhaled corticosteroid (ICS) treatment in COPD. We aimed to investigate whether blood eosinophil levels predict the effect of maintenance treatment with ICS versus non-ICS in routine primary care.

**Method:** We used routinely collected data from UK primary care in the CPRD, linked with Hospital Episode Statistics. Included COPD patients were aged >40 years with a smoking history and diagnostic spirometry, not already treated with ICS, starting a new inhaled maintenance medication (intervention group: ICS; comparison group: long-acting bronchodilator, non-ICS) between 2005 and 2015. Primary analysis used the most recent blood eosinophil count in the two years before the new treatment, divided into high (>150/ $\mu$ L) and low (<150/ $\mu$ L) groups. Primary outcome was time-to-first-exacerbation event after maintenance treatment initiation, compared between ICS and non-ICS groups, stratified by blood eosinophil group. Cox regression using covariates likely to contribute to confounding by indication, including severity and baseline exacerbation frequency, investigated the interaction of blood eosinophils.

**Results:** Of 8,452 patients, 50.2% initiated an ICS (68.0% high eosinophil) and 49.8% a non-ICS treatment (67.3% high eosinophil). Risk of exacerbation was higher in patients prescribed ICS than non-ICS, but with a lower risk seen in those with high eosinophils (hazard ratio 1.12, 95% CI 1.06 to 1.19) than low eosinophils (1.30, 95% CI 1.20 to 1.43) (p value for interaction, 0.005). The association was attenuated but remained significant (p=0.02) in a model adjusted for covariates including severity and baseline exacerbation frequency.

**Conclusion:** This is the first study demonstrating significant predictive effect of blood eosinophils on ICS treatment outcomes in primary care, in a very large COPD population studied. In contrast to results from trials, the ICS group had worse outcomes, likely due to residual confounding by indication. Blood eosinophils may be a low-cost and acceptable way to identify patients most likely to benefit from ICS.

**Corresponding author:** Helen Ashdown

## Best Practice/Service Development Abstracts

### Abstract Number: 49

#### Asthma friendly schools: an intervention to improve asthma management by staff in primary schools in Haringey

Authors: Kerr E, Holliday T, Singh G  
Institution: University College London

**Brief outline on the context:** Asthma is the most common chronic health condition in children, causing significant morbidity and mortality in 9% of UK primary school children, or approximately three children in each class of 30 students. Haringey is

the sixth most deprived borough in London and has particularly poor outcomes for children with asthma.

**Details of the issue:** The NHS spends over £137m on asthma-related hospital care each year and yet, in 2016, 11 children in London died as a result of an asthma attack – almost half of all childhood asthma deaths in the UK. The National Review of Asthma Deaths highlighted a need for 'getting the basics right', including in the education sector.

**Analysis of the problem:** Primary schools could help to reduce preventable asthma admissions and deaths through the implementation of a set of standards to improve staff knowledge and confidence in managing asthma.

**Strategy for change:** This project aimed to promote collaboration between schools, healthcare and the local authority to improve asthma outcomes in Haringey via the implementation of five key 'Asthma Friendly' standards. Newly-designated 'Asthma Leads' in primary schools assisted with implementation of the standards and asthma training was provided to all staff.

**Measurement of improvement:** A pre- and post-intervention audit of each school used questionnaires to evaluate staff knowledge of asthma management.

**Effects of changes:** Pre-intervention, 36% of staff felt uncertain of the procedure to follow in an asthma attack. Post-intervention, 100% of staff agreed that they were confident in managing an asthma attack.

**Lessons learned:** Our simple and cost-effective intervention successfully filled a significant gap in staff knowledge of asthma management, suggesting that primary schools have a key role in the community in helping to reduce asthma morbidity and mortality. However, this requires a willingness to work with patience and persistence across sectors.

**Corresponding author:** Emma Kerr

### Abstract Number: 25

#### A retrospective multi-practice audit identifying factors contributing to uncontrolled asthma in adults and children

Authors: Anderson S, Canavan M  
Institution: Respiratory Care Solutions

**Introduction:** The national review of asthma deaths (2014) found that 46% of deaths could have been avoided if patients had been better managed in the year before they died. People did not receive key elements of routine care; many reviews did not include key components: 73% did not have their asthma control assessed and only 42% had an assessment of their medication use. Compliance with ICS was low (38% had fewer than four prescriptions in the year); 39% had more than 12 SABA inhalers in the last year.

**Methods:** Respiratory Care Solutions (RCS) has been working with a collaboration of eight GP surgeries to standardise the respiratory care and reduce variation. We retrospectively audited notes of 156 patients who had attended for an asthma review in the past six months.

**Results:** 156 people attended for an asthma review including 43 children. 18% had asthma and COPD, 53% (13% children) had uncontrolled asthma as defined by an asthma control test <20. Only 1% attended acutely. 96% of the patients who had poor asthma control were not taking their preventer inhaler regularly or had poor inhaler technique. Other factors contributing to

uncontrolled asthma were: rhinitis 21%, GORD 8%, laryopharyngeal reflux 21% and anxiety 5%.

**Discussion:** A high percentage of asthma patients are at risk of exacerbation or death but lack insight into the importance of taking regular ICS therapy. Asthma patients require education and empowerment. It would be useful for Asthma UK to develop a patient passport similar to the BLF COPD passport, so patients are aware of ideal asthma management. It is important for clinicians to count both the reliever use and preventers issued to patients, but also a discussion with the patients about what they are using and when, because quite often pharmacies are collecting and patients are not using.

**Corresponding author:** Melissa Canavan

## Abstract Number: 51

### The Improving Asthma Care Together (ImpACT) project

Authors: Subramanian D, Greenwood S, Ali S, Bennett C, Lagnado H, Sutton L

Institution: Royal Derby Teaching Hospital NHS Foundation Trust

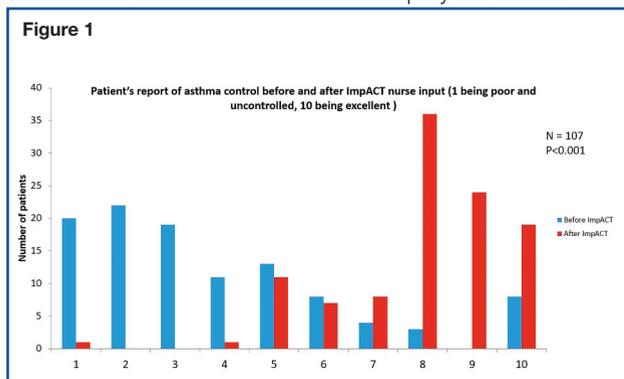
**Introduction:** The Improving Asthma Care Together (ImpACT) project implemented a novel model of care which provides an integrated responsive services for patients with asthma in Derby.

**Problem:** Our baseline audits showed that a low number of patients (20%) who were admitted to hospital had a management plan and only 20% were reviewed by their GP practice within 48 hours of discharge. Patients also found it difficult to access service and support during an exacerbation.

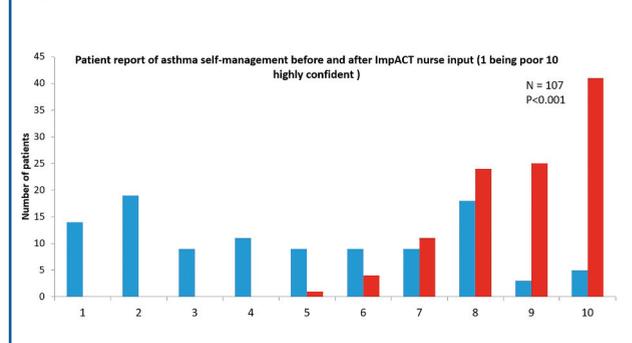
**Strategy for change:** We implemented a whole-scale service intervention which included in-reach to the emergency department, a ward discharge clinic, a 7-day telephone helpline and face-to-face review by specialist nurses within GP practices.

**Measurement of improvement:** A questionnaire was devised and patients were asked to complete this approximately 6 weeks following the intervention. A 10-point scale was used to ask patients what their confidence levels were in self-managing their asthma (0=no confidence and 10=highly confident) and how they rated their asthma control (0=poor and 10=excellent).

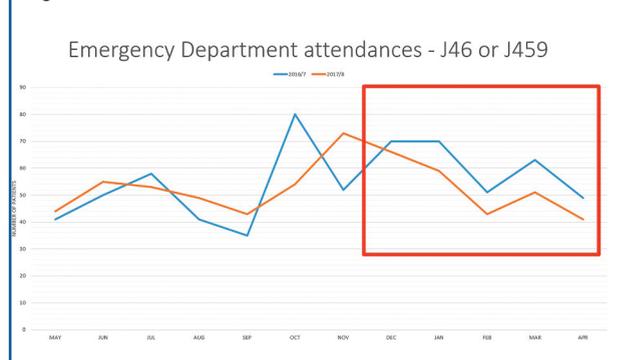
**Effect of change:** The service led to significant improvements in patients' self-reported assessment of asthma control and confidence in managing their own asthma (Figures 1–3; paired t-test  $p < 0.001$ ;  $n = 107$ ). Over 600 FeNO measurements were performed in primary care. Monthly asthma admissions from December to April have consistently been lower than the preceding year, despite an increase in respiratory attendances. 91% of genuine asthma admissions were followed up by our service.



**Figure 2**



**Figure 3**



**Lessons learned:** The service led to an improvement in patient-reported asthma control and self-management. Qualitative feedback demonstrated that patients valued this service, in particular the responsiveness and knowledge of the staff. The service also led to a significant improvement in 48-hour follow-up reviews.

**Message for others:** An integrated responsive service for asthma can be effective in improving patients' asthma control, self-management and can lead to a reduction in asthma admissions.

**Corresponding author:** Deepak Subramanian

## Abstract Number: 43

### BREATHE – Outcomes of a different kind of breathlessness clinic

Authors: Gaduzo S, Gupta V

Institution: Cheadle Medical Practice

**Introduction:** Patients with breathlessness referred to cardiology or respiratory clinics are often sent on to the other specialty if the diagnosis is unclear. This can lead to a delay in diagnosis, duplication of investigations and inconvenience for patients. An audit of a sample of such referrals confirmed this. With support from CCG and FT, initially under the '100 day improvement' banner, we set up a joint clinic with a cardiologist and respiratory physician consulting together, having access to ECG, echocardiogram, spirometry and CXR. The aim was to see and assess patients in one stop if possible. If further investigations were necessary, they would be arranged and a report, results and treatment plan sent to the GP. Where possible, patients were signposted to appropriate community teams, self-help organisations, etc. All appointments were for new patients. Follow-up was carried out in individual specialty clinics.

**Method:** Patients were initially recruited from outpatient waiting lists. The results from the first cohort have been previously reported at the BTS Winter Meeting 2017. This report examines the second cohort of 53 attendees, the majority of whom were referred directly to BREATHE (Breathlessness Rapid Evaluation, Assessment, Treatment and Health Education) from one-year care using a template developed with GPs. More than half were assessed with only one outpatient attendance. Extra investigations included full lung function, HRCT thorax, stress echo, overnight oximetry, 24-hour ECG and cardiac MRI.

**Results:** There was a range of final primary diagnoses and a significant number with multifactorial causes. Of significance is the relatively high number with deconditioning, anxiety, high body mass index (data to follow). Patient feedback was very positive, most commenting that although they spent a couple of hours in the clinic, a lot was done and they liked the collaboration between consultants. The clinicians themselves comment that they have found consulting together rewarding and also an invaluable asset in terms of communication and learning between specialities.

**Discussion:** Although resource-intensive, this model of joint consultation and investigation offers an alternative symptom-based way of dealing with breathless patients whose diagnosis is not clear. We would like to develop the pathway and model further with more involvement of primary and community care teams.

**Corresponding author:** Stephen Gaduzo

## **Abstract Number: 53**

### **Co-morbidities in high SABA users**

**Authors:** Gaduzo S

**Institution:** Cheadle Medical Practice

**Introduction:** In 2014 the National Review of Asthma Deaths (NRAD) showed that high SABA use was associated with a higher chance of dying from asthma. Cheadle Medical Practice (CMP) is a suburban group practice consistently attaining maximum QOF points for respiratory, with low exception rates. We also have slightly lower admission rates for asthma compared to our CCG average. I wanted to see whether there was a correlation between high SABA use and co-morbidities, especially anxiety and depression, and whether these patients had attended for practice nurse asthma review in the previous year.

**Method:** A search was conducted on the clinical system (Emis) for patients with asthma diagnosis, but not COPD, with 12 or more issues of salbutamol in the previous 12 months. Their notes were individually checked for co-morbidities and reviews.

**Results:** CMP practice population is 12,038 and we have 875 on the asthma register (7.2%). 31 patients (3.5%) had been issued 12 or more SABAs. All had been invited for formal asthma review; only 32% had attended. All 31 patients had co-morbid conditions; depression and muscle-skeletal problems were the commonest, each occurring in 42%. Anxiety was present in 26% and, interestingly, drug abuse was listed in 16%. All who had attended for practice nurse review had their SABA put on 'variable repeat' during that review. During the notes review all were converted to this to make tracking prescription frequency easier. 'Frequent SABA use' alert was added to their notes. The CMP respiratory team will prioritise recalling these patients for review. Further work will include examining exacerbation and admission rates and ICS prescription compliance.

**Corresponding author:** Stephen Gaduzo

## **Abstract Number: 38**

### **FeNO: taking the guess work out of asthma**

**Authors:** Hart PV

**Institution:** Bower Mount Medical Practice, Maidstone

**Introduction:** There has been a great deal of discussion recently regarding the merits of using fractional exhaled nitric oxide (FeNO) as a diagnostic tool for asthma. NICE favours its use as an objective measurement. The PCRS is more reserved, with the stance that it can be useful when diagnosis is unclear but the cost implication for individual primary care practices is impractical and confounding factors may affect the accuracy of the results (Primary Care Respiratory Update, Vol 5, Issue 1, Spring 2018 pp 9 – 14). The discussion so far has centred around diagnosis rather than FeNO use in the management of asthma. The author was interested to see whether FeNO could be a useful tool, not just in diagnosis but in the actual management of asthma.

**Method:** Niox Vero kindly lent a FeNO machine and consumables for a period of 4 months to a primary care practice. A total of 63 patients were tested as part of their routine asthma review, 10 of whom were tested for diagnostic purposes.

**Results:** A range of benefits were ascertained. Of particular benefit was the ability to ascertain if symptoms were related to asthma or another known co-morbidity such as chronic obstructive airways disease or gastro-oesophageal reflux disease. This ensured that inappropriate escalation of asthma medications was prevented and gave reassurance that high-dose steroids could be safely reduced in some patients. This suggests that the cost of FeNO could be offset by the reduction in medications and inappropriate hospital referrals. Inflammation precedes exacerbation, so easy and early detection would suggest that life-threatening asthma attacks and the cost of emergency hospital admissions may also be prevented.

**Conclusion:** This small scale project indicates that FeNO could be a useful tool in the management of asthma. The author proposes that further research with a wider patient population be conducted.

**Corresponding author:** Patricia Hart

## **Abstract Number: 13**

### **Potential for FeNO testing in general practice asthma management**

**Authors:** Daw R, Petty D

**Institution:** Westcliffe Medical Practice, Shipley, Bradford

**Context:** NICE recommended FeNO testing to help diagnose asthma and as an option to support management in people who are symptomatic despite using inhaled corticosteroids (ICS).<sup>1</sup> FeNO testing has also been shown to be useful in predicting the response to ICS and in reducing ICS.<sup>2,3</sup>

**Analysis of problem:** Little is known about how to use FeNO testing in 'real-world' practice. We aimed to pilot FeNO testing to see if it could improve:

- diagnostic accuracy of patients presenting with asthma-like symptoms
- patients' acceptance of an asthma diagnosis
- confidence in stepping-down ICS treatment

**Strategy for change:** Asthma nurses were trained to use the FeNO testing and how to apply it alongside normal clinical practice. Four nurses in five surgeries were trained. 107 patients were reviewed.

**Measurement of improvement:** Data were collected on FeNO testing used to assist/confirm asthma diagnosis, patients not accepting diagnosis and determining ICS step-up/down. Follow-up data were collected after 3 months.

**Results:** The mean age of patients was 46 (63% female). FeNO testing was used to assist in diagnosis in 39 (36%) patients, confirm existing diagnosis in 11 (10%) help patient accept the diagnosis in 1 (1%), improve adherence in 12 (11%) and to help ICS step-down in 27 (25%) and step-up in 26 (24%). Use of FeNO testing increased confidence in making an asthma diagnosis in 74 (69%) cases, stepping up/down ICS in 57 (53%) and increasing patient confidence in treatment changes in 39/51 cases (76%). ICS was increased in 12, reduced in 18 and used not to increase ICS in 22 patients. The net annual savings on ICS prescribing was £3,206, outweighing FeNO costs.

**Lessons learnt:** FeNO testing improves practitioner and patient confidence. Savings on ICS outweighed costs. Training is required to ensure appropriate targeting of FeNO testing.

1. NICE. <https://www.nice.org.uk/guidance/dg12>
2. Smith AD, et al. N Engl J Med 2005;352:2163-73.
3. Price DB, et al. Lancet Respir Med 2018;6:29-39. [http://dx.doi.org/10.1016/S2213-2600\(17\)30424-1](http://dx.doi.org/10.1016/S2213-2600(17)30424-1).

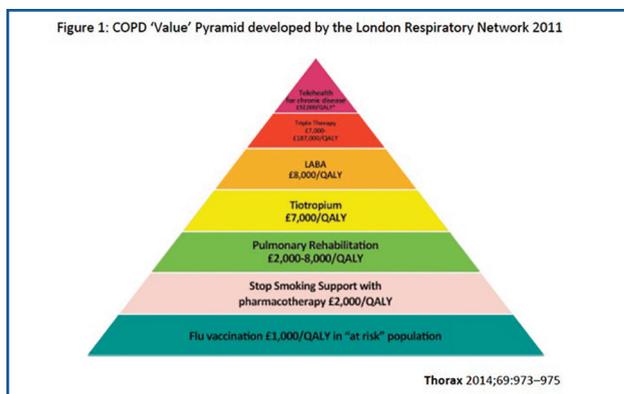
**Corresponding author:** Robert Daw

## Abstract Number: 87

### Seasonal influenza vaccination of inpatients admitted to hospital with acute exacerbations of COPD: a missed opportunity?

Authors: Vila P, Foley K, Vaghela A, Restrck LI  
Institution: Whittington Health

**Background:** Acute exacerbations of COPD (AECOPD) are often triggered by respiratory viruses including influenza and are associated with significant morbidity and mortality. Annual influenza vaccination (IV) is a high value intervention in COPD (Figure 1; COPD Value Pyramid) and is recommended by NICE. While each flu season we admit patients with AECOPD who have not been vaccinated pre-admission, hospitals have not historically offered IV to inpatients.



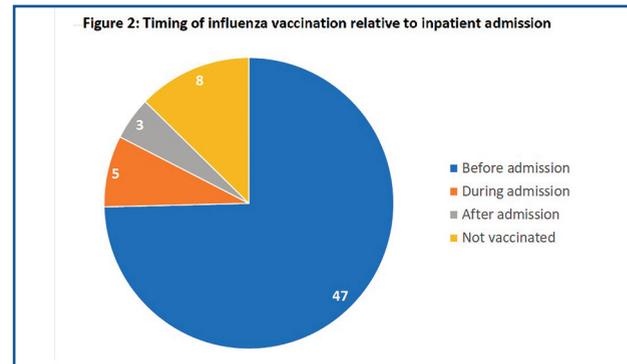
**Aim:** The aim of this study was to quantify (1) the number of inpatients admitted with AECOPD not vaccinated pre-admission at one London Trust over a 6-month flu season and (2) if/how they received IV subsequently.

**Method:** Patient demographics and vaccination status pre-admission and at flu-season end were determined for all inpatients admitted with confirmed AECOPD diagnosis (RCP Audit) from 1 October 2017 to 31 March 2018.

**Table 1: Patient demographics**

<b>Age</b>	
Mean (range)	48 (39-94) years
<b>Smoking /tobacco dependence (self-reported)</b>	
Current smoker	29/63 (46%)
Ex-smoker	34/63 (54%)
<b>FEV1</b>	
Mean (SD)	0.91 (0.39) litres
<b>FVC</b>	
Mean (SD)	1.91 (0.70) litres
<b>MRC breathless score</b>	
Median (range)	4 (2-5)

**Case for change:** 63 patients were admitted with AECOPD (Table 1; demographics); 16/63 (25%) were not vaccinated pre-admission. Of these, 5/16 (31%) were vaccinated during admission. Only 3/11 (27%) discharged without IV were subsequently vaccinated (Figure 2; IV status). 8/63 (13%) patients with AECOPD-related admission had not been vaccinated by 31 March 2018.



**Adding flu vaccination to 'COPD Bundle':** Patients admitted to hospital with AECOPD are arguably at greatest need of IV. Whilst 75% of patients had received vaccination pre-admission, 13% of this vulnerable group had still not been vaccinated by flu-season end.

**Discussion:** We believe that hospital admission represents an opportunity to offer IV to patients with COPD who have missed out and that vaccination pre-discharge would be cost-effective, particularly when comparing the relative costs of vaccination versus readmission with AECOPD secondary to influenza. Because a COPD Bundle is already part of standard care as an enabler of evidence-based interventions and IV is an evidence-based intervention, we now include IV status and vaccination as a component of our COPD Bundle and will evaluate the impact from October 2018 to March 2019.

**Corresponding author:** Pierre Vila

## Abstract Number: 81

### Does hospital at home improve patient-reported symptom burden associated with an acute exacerbation of chronic obstructive pulmonary disease? A retrospective audit of pre- and post-COPD assessment test scores

Authors: Sayat E, Middleton A, Roots D, Bhowmik A, Graham L  
Institution: Homerton University Hospital NHS Trust

**Background:** Hospital at Home (HAH) is an evidenced-based model of care for the management of acute exacerbations of

chronic obstructive pulmonary disease (AECOPD).<sup>1</sup> The Adult Cardiorespiratory Enhanced and Responsive Service (ACERS) HAH team is an integrated seven-day respiratory team which has been documented to reduce COPD-related bed days and hospital admissions.<sup>2</sup> The impact on symptom burden was not reported. This retrospective audit analysed if ACERS HAH intervention improved patient-reported symptom burden measured using the COPD Assessment test (CAT).<sup>3</sup>

**Method:** All patients with COPD referred to ACERS HAH service self-administered the CAT questionnaire on the initial and final contact with the team. HAH included regular home visits or telephone calls to assess and monitor patients' AECOPD symptoms until they had resolved. All patients referred with an AECOPD from April to December 2017 with completed datasets were included in the retrospective analysis. 332 patients were referred to the service within the time period. Of these, 113 (33%) had complete datasets. Patients spent an average of 20 days (range 1–63) under HAH. 61 patients (54%) were female, 79 (70%) were ex-smokers and 82 (72%) had moderate or severe airflow obstruction.

**Results:** 94 patients (85%) had a reduction in their CAT score post HAH intervention. The overall mean (SD) difference in CAT scores was 6.83 (6.78) points (95% CI 5.57 to 8.10,  $p < 0.0001$ ). The mean (SD) pre-CAT score was 28.31 (6.16) and post-CAT score was 21.48 (7.84).

**Discussion:** This retrospective audit demonstrated that the ACERS HAH service was both clinically and statistically effective in reducing symptom burden for patients following an AECOPD. The overall mean decrease in score met the proposed minimal clinical importance difference (MCID) proposed for the CAT of 2 points.<sup>4</sup>

1. Jeppesen E, Brurberg KG, Vist GE et al. Hospital at home for acute exacerbations of chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*. 2012 May 16;(5):CD003573. doi: 10.1002/14651858.CD003573.pub2.
2. Garner A, Hodson M, Ketssetzis G, et al. An analysis of the economic and patient outcome impact of an integrated COPD service in east London. *Int J Chron Obstruct Pulmon Dis*. 2017; 12: 1653–1662.
3. Jones PW, Harding G, Berry P et al. Development and first validation of the COPD Assessment Test. *Eur Respir J*. 2009 Sep;34(3):648–54. doi: 10.1183/09031936.00102509.
4. Kon SS, Canavan JL, Jones SE et al. Minimum clinically important difference for the COPD Assessment Test: a prospective analysis. *Lancet Respir Med*. 2014 Mar;2(3):195–203. doi: 10.1016/S2213-2600(14)70001-3. Epub 2014 Feb 4

**Corresponding author:** Laura Graham

## Abstract Number: 35

### Pilot project to identify undiagnosed respiratory disease in individuals accessing drug and alcohol services in Tower Hamlets

**Authors:** Addo B, Mohamed M, Davey C, Simpson J  
**Institution:** Barts Health NHS Trust

**Outline:** Referrals to the community respiratory team in Tower Hamlets have risen in patients with a history of drugs or alcohol misuse. Amongst this population it is perceived a large number do not access primary care services, so diagnosis and management of health conditions occur at a more severe stage of disease. It is also known that the use of opiates can mask respiratory symptoms. It is therefore likely that a high level of undiagnosed respiratory issues are present amongst drug and alcohol users.

**Aim:** To assess individuals accessing drug and alcohol services who may have undiagnosed respiratory disease using spirometry.

**Method:** Links were established with RESET (drug and alcohol service). A respiratory physiotherapist and technician attended for five sessions over three weeks. Spirometry was offered to all individuals attending walk-in clinics. Smoking status was recorded and current smokers were offered referral to smoking cessation services.

**Results:** 20 individuals had spirometry testing. All those tested had a smoking history; 95% were current smokers, of which 32% accepted referral to smoking cessation.

**Messages for others:** This has shown that a significant number of patients accessing drug and alcohol services may have an undiagnosed respiratory disease. It has confirmed high levels of smoking amongst this population. There is potential for further joint working between respiratory services and drug and alcohol services with this group of individuals.

**Corresponding author:** Bianca Addo

## Abstract Number: 89

### Reviewing outcomes for patients attending a follow-on class after pulmonary rehab: a service evaluation

**Authors:** Stirton-Croft AJ, Murnane D, Austin G  
**Institution:** Hertfordshire Community NHS Trust

**Introduction and objectives:** There are multiple benefits for those with chronic obstructive pulmonary disease (COPD) to complete pulmonary rehabilitation (PR). Short-term benefits include reducing dyspnoea, improving health-related quality of life, exacerbation reduction and improved exercise tolerance.<sup>1,2</sup> Furthermore, the burden of long-term conditions (LTC)<sup>3</sup> on the overstretched NHS means self-management and reducing symptoms associated with LTC such as COPD is essential. A service evaluation was carried out to establish if there are long-term benefits to attending a follow-on class after completing an NHS-provided PR course.

**Method:** In East and North Hertfordshire (E&NH) a specific PR follow-on class is held at Hartham Leisure Centre. It is based on the 12 station circuit of the PR course delivered by Hertfordshire community NHS Trust (HCT) with two additional exercises. Inclusion for the follow-on class is completion of the HCT PR course. Participants of the follow-on class were opportunistically invited to be re-evaluated for mobility, psychological and quality of life markers. There were no restrictions for length of time since completing the PR course or number of follow-on sessions attended.

**Results:** Overall it was found that those attending the follow-on group were still receiving beneficial effects up to 30 months after completion of the PR course. 87% of patients were walking further or equal to their pre-course assessment. Depression and anxiety markers were reduced over the same time period. Some individuals had reported exacerbations since completing the course. Of the patients reviewed, 62.5% had overall improvements in quality of life (CAT).

**Conclusion:** Follow-on exercise classes after completing HCT PR at Hartham Leisure Centre can have beneficial effects on quality of life, depression and anxiety measures and increasing mobility for at least 30 months following completion of a PR programme.

1. Heppner P, Morgan C, Kaplan R, Ries A. Regular walking and long term maintenance of outcomes after pulmonary rehabilitation. *Journal of Cardiopulmonary Rehabilitation* 2006; 26:44–53
2. Robinson H, Williams V, Curtis F, Bridle C, Jones A. Facilitators and barriers to physical activity following pulmonary rehabilitation in COPD: a systematic review

of qualitative studies. *Primary Care Respiratory Medicine* 2018; 1-12  
 3. Goodwin N, Curry C, Naylot C, Ross S, Duldig W. Managing people with long-term conditions. *The King's Fund* 2010

**Corresponding author:** Alison Stirton-Croft

## Abstract Number: 82

### Understanding poor referral rates to pulmonary rehabilitation: an online survey of service providers

**Authors:** Haque HW, Early F, Welwood I, Deaton C, Johnathan F  
**Institution:** Cambridge University Hospital NHS Foundation Trust (Addenbrookes Hospital)

**Background:** Pulmonary rehabilitation (PR) is an effective and cost-effective intervention for COPD; improving quality of life, fostering self-management skills and reducing hospital admissions due to exacerbations. Despite these benefits, in 2013/14 only 15% of eligible patients were referred to PR; of those, only 10% attended initial assessment.

**Objectives:** To identify barriers and understand the different kinds of work that people do around operationalising referral to PR services.

**Methods:** A 44-item online survey informed by Normalisation Process Theory (NPT) was circulated to 21 PR service providers in the East of England PR Network. Items included Likert-type scales and open questions. Analysis used descriptive statistics and thematic analysis of open questions.

**Results:** The response rate was 71% (15/21) (11 physiotherapists (73%); 2 nurses (13%), 2 other health professionals (13%)). Most PR programmes were commissioned by Clinical Commissioning Groups (94%) and provided by NHS Trusts (73.3%) as cohort (66.7%) and rolling programmes (33.3%) in community (68.2%) and hospital settings (13.6%). Most were group-based (75%). Referral was accepted from primary and secondary care. In open questions, providers' views of patients' perceived value of PR depended on good explanation of the service by referrer, with patients most likely to attend if the rationale for PR was properly explained at referral and word of mouth. Reasons for poor attendance were attributed to lack of motivation, limited knowledge of potential benefits, acute illness, co-morbidities and transport difficulties. Increased clarity of service providers' roles and greater professional awareness of PR were considered crucial to sustain PR referral rates and explained some variation in health-care professionals' referral rates.

**Conclusion:** The findings illustrate the interactions between service providers' capacity for action (provider judgements and decision-making process) and factors that drive the referral process.

**Corresponding author:** Hena Haque

## Abstract Number: 74

### The effectiveness of an integrated pulmonary rehabilitation (PR) introductory education session in improving capacity in the ACERs PR Service: a retrospective audit

**Authors:** Tipple J, Chan J, Kenward A, Huxen L, Green G, Graham L  
**Institution:** Homerton University Hospital NHS Trust

**Introduction:** The National Pulmonary Rehabilitation (PR) Audit (2015) reported 31% patients dropped out between referral to assessment. The literature documents one barrier to lack of perceived benefit.<sup>1</sup> In 2015/5 44% of all initial assessments in the

Adult Cardiorespiratory Enhanced and Responsive Service (ACERs) PR service were not attended, which equalled 255 hours of clinical time wasted. With referral rates to the ACERs PR service increasing yearly, capacity has remained the same. This project piloted a PR education session aimed at reducing non-attenders and improving uptake to the ACERs PR service.

**Method:** All patients referred from primary care were included; those excluded were internally referred patients, consultant referrals, post-exacerbation PR referrals, non-English speaking patients or patients with a psychosocial/cognitive barrier limiting group participation. The monthly education sessions were co-led by a physiotherapist and a psychologist supported by an expert patient. Patients were educated on what PR, anxiety-related breathlessness and the patient experience of PR.

**Result:** From January to June 2018 a total of 170 patients were referred. Of these, 51% (n=86) were male, 90% (n=153) had COPD and 66% (n=102) had moderate or severe airflow obstruction. Overall, 33% (n= 56) attended a session. Of the 56 patients that attended, 80% (n=45) booked an initial PR assessment, 18% (n=10) declined PR and 2% (n=1) were referred to another service. In total, 114 hours of clinical time were saved through this model of care.

**Conclusion:** An integrated PR education session was successful in increasing the capacity of the ACERs PR service by reducing the number of wasted clinical hours from non-attenders. Rolling this out to all referrals to the service would increase the capacity even further. More work needs to be done to assess the impact of this model of care on completion rates, another challenge for both local and national PR services.

1. Keating A1, Lee A, Holland AE. What prevents people with chronic obstructive pulmonary disease from attending pulmonary rehabilitation? A systematic review. *Chron Respir Dis.* 2011;8(2):89-99. doi: 10.1177/1479972310393756.

**Corresponding author:** Laura Graham

## Abstract Number: 50

### Health literacy assessment in pulmonary rehabilitation: how well do we communicate with our patients through written patient information and literature?

**Authors:** Grimwood L, Sellers, V  
**Institution:** BOC

**Background/introduction:** It was identified that a significant proportion of patients required help completing written paperwork during pulmonary rehabilitation (PR). This raised a concern regarding patients' health literacy levels that may not be a localised issue. An audit was conducted across all PR services to discover the extent of the problem. Existing and emerging literature suggests that poor health literacy is both a national and worldwide concern and that it is linked to poor clinical outcomes.

**Specific measure:** 98% of all patients will be able to understand the printed literature that is supplied as part of PR.

**Method:** Consecutive sampling of all consenting PR patients during the audit period (13 November 2017 to 2 February 2018) using an initial assessment and discharge questionnaire that had been piloted. A blank questionnaire was returned if a patient declined to take part in the audit.

**Results:** A total of 161 patients across nine regions and 25 venues completed the questionnaires. The Specific measure was not met. The audit found that 20% had a below functional health literacy score (METER), rising to 31% when calculated as an

adjusted METER score.<sup>1</sup> 26% reported needing help with understanding forms, letters or medicine labels, 43% reported difficulty remembering things, 20% reported trouble following a conversation in the past few months, 6% reported English was not their first language and 3% reported learning difficulties. 36% reported having hearing difficulties and 19% reported eyesight problems that were uncorrected.

**Conclusion/recommendations:** The findings identified a significant level of health illiteracy. Further work needs to be done regarding patient education across all health services, not just PR. The findings indicate that a significant number of patients may not be able to effectively self-manage due to health illiteracy, memory, cognition, eyesight, hearing and language barriers. This raises concerns regarding the safety, reliability and practicality of patients self-managing their respiratory condition.

1. Rawson et al, 2010

**Corresponding author:** Laura Grimwood

## **Abstract Number: 23**

### **Increasing pulmonary rehabilitation referral rate for chronic obstructive pulmonary disease patients in a GP setting**

**Authors:** Bannerman AR

**Institution:** NHS

**Introduction:** The British Thoracic Society (BTS) recommends all patients with chronic obstructive pulmonary disease (COPD) are offered pulmonary rehabilitation (PR). However, the referral rate is lower than the number of eligible patients.<sup>1</sup>

**Aim:** The aim of this Quality Improvement Project (QIP) was to increase the percentage of eligible patients within one GP surgery referred to PR by discussing and offering referrals; if referrals were declined, data were collected regarding this.

**Method:** The SystmOne Clinical Reporting Tool was used to identify patients on the COPD register with MRC 3 or above.

**Findings:** Of 72 patients identified, 11 (15.3%) had been referred to PR and 61 patients (84.2%) had no documented referral. Following application of exclusion criteria, 29/61 unreferred patients were eligible for PR; of these, 15 declined and 14 accepted referrals. Reasons for declining referral included: family circumstances, carer role, location, mobility, wanted to consider referral and moving out of area. Later interventions included staff training regarding PR and the referral process with plans to incorporate this into annual COPD reviews. Following this QIP, all eligible COPD patients within the practice had discussed and been offered a referral to PR based on their electronic documentation. However, it is unknown if these patients attended or completed PR or if any clinical benefit was seen. Data collected relied on accurate electronic documentation which could indicate some eligible patients were missed. The next stage would review if this GP referral rate was maintained and whether staff found the training beneficial regarding discussing and referring to PR. The anecdotal reasons for declining referral provided an interesting insight into other factors affecting utilisation of local PR services.

1. National COPD Audit Programme: Resources and organisation of Pulmonary Rehabilitation services in England and Wales 2015. Pulmonary Rehabilitation: Time to breathe Better. National organisational audit report November 2015

**Corresponding author:** Amy Bannerman

## **Abstract Number: 72**

### **A novel respiratory community-facing GPST training post**

**Authors:** Simpson F, Bullard C, MacKenzie Ross J, Walters J, Suntharalingam J

**Institution:** Royal United Hospital Bath

**Background:** Since 2013 the GP Training Programme in Bath has included a six-month rotation in community respiratory medicine during the ST1 and ST2 training years. This job has many elements to it across both primary and secondary care that provide an innovative training experience for prospective GPs.

**Aims:** This post offers an opportunity for GP trainees to develop a greater knowledge and understanding of respiratory medicine through working at the interface between primary and secondary care.

**Methods:** The post consists of four main components:

- Specialist clinics: two respiratory clinics/week (3 new patients/clinic) with 1:1 teaching support from a respiratory consultant.
- Ambulatory care: two ambulatory care sessions/week, seeing subacutely unwell patients who can be managed in an outpatient environment.
- Community work: two days/week working with a community-based multidisciplinary team, consisting of nurses and physiotherapists, who manage patients with COPD, bronchiectasis and domiciliary oxygen. The GPST acts as a medical support to the team and provides a link between the hospital and community.
- Hospital in-reach: daily in-reach visits to the hospital to identify COPD patients suitable for early supported discharge and to help complete the national RCP COPD audit.

**Conclusion:** This GP training rotation differs in that it combines working within both primary and secondary healthcare on a weekly basis rather than traditional hospital rotations that focus only on secondary care and which are currently in use for most GP training programmes in the UK. We feel that this new approach to GP training hospital rotations helps break down the barriers between general practice and secondary care whilst allowing trainees to develop a specialist interest in respiratory medicine with the ultimate aim of creating general practitioners who have the experience to lead respiratory clinics in the community.

**Corresponding author:** Fiona Simpson

## **Abstract Number: 69**

### **Wiltshire Community Respiratory support for patients with interstitial lung disease**

**Authors:** Purvis E, Hunn A

**Institution:** Wiltshire Health and Care

Wiltshire Community Respiratory Team is a small team of 6.2 FTE staff covering North, East and West Wiltshire. It is commissioned to provide respiratory care and a home oxygen service to a population of approximately 253,000 adults and across a rural geographical area of 1,246 square miles in North, East and West Wiltshire.

Referrals from secondary care and interstitial lung disease (ILD) centres for patients diagnosed with ILD have steadily increased over the last year. However, the commissioned service does not reflect this changing service need. In response to this, the respi-

ratory specialist nurses have worked together to address the gaps in care and support provision for all these patients spread over a huge rural area. The team also benefits from having nurses with specialist ILD knowledge and training, enabling them to identify and deliver service improvements for ILD patients across this locality.

This presentation poster will:

- Illustrate how Wiltshire Community Respiratory Team provides a high level of care and support for patients with ILD, whilst sharing care with palliative and community services.
- Provide data identifying the subgroups of ILD referrals received over the past year.
- Highlight the high level of integrated and multidisciplinary team working and the collaboration between primary care and secondary care, palliative care and specialist ILD centres to optimise the support and care offered to these patients in a rural setting.
- Demonstrate that this proactive service can already deliver many elements in the four key principles of care.<sup>1</sup>
- Identify areas for further service development:
  - (a) Supporting and the setting up of a Pulmonary Fibrosis Support Group in Wiltshire.
  - (b) Develop a specific pulmonary rehabilitation programme for ILD patients.

1. British Lung Foundation. A Map for Better Care: making effective care pathways for people with interstitial lung disease. September 2017.

**Corresponding author:** Ella Purvis

## **Abstract Number: 60**

### **BreathChamps: brightening the future of children with asthma in fun ways**

**Authors:** Henry HL

**Institution:** Brightness Management

**Brief outline on the context:** BreathChamps ([www.BreathChamps.com](http://www.BreathChamps.com)) is an initiative developed by entrepreneurial independent Queen's Nurse Heather Henry. It engages communities to increase the herd knowledge of children's asthma. The project has reached the 'beta-testing' phase, so outcomes are not yet available.

**Details of the issue(s):** BreathChamps is modelled on the Dementia Friends/Champions programme, a cascade learning model. People learn through fun using memorable children's songs, stories, poems, games and crafts.

**Analysis of the problem:** The NHS struggles to cope with asthma reviews, exacerbations and A&E attendances:

- Workforce numbers have fallen
- Asthma affects not just the child but also families, schools, community groups and neighbours who want to know what to do
- Asthma is therefore a shared problem requiring a shared solution
- Children prefer to learn through play and doing things they enjoy

**Strategy for change:** BreathChamps democratises health knowledge and makes it into a national social movement. BreathChamps' ideas have been co-produced with communities and clinicians, so tools make sense to all. Group consultations become 'asthma parties'. School assemblies help The Big Bad Wolf puppet (who has asthma!) to blow the Piggies' houses down.

**Measurement of improvement:** Fun asthma education in schools can improve students' asthma knowledge by 45% in just 20 minutes (AIR charity, 2017).

Wellbeing survey tools are in development derived from the 'What Works for Wellbeing' guide.

**Effects of changes:** BreathChamps creates wellbeing by offering local people meaning and purpose in their lives (see <https://www.youtube.com/watch?v=2HEgTFXjQag&feature=youtu.be>)

**Lessons learned:** So far BreathChamps tools have been shared with 569 community members and clinicians.

"Awesome work Heather. Absolutely needs to be recognised and delivered in primary care" (Katherine Parker, Alvanley Surgery)

**Messages for others:** Community leaders such as Brown Owls, mums and tots leaders, librarians and teaching assistants can become part of the extended respiratory team.

**Corresponding author:** Heather Henry

## **Abstract Number: 54**

### **Training community pharmacist teams to offer appropriate management of asthma**

**Authors:** Attar-Zadeh D, Guirguis A, Heading CE, Shah U, Bancroft S

**Institution:** London North West Local Practice Forum of the Royal Pharmaceutical Society

**Context:** A COPD project undertaken by community pharmacists in NW London in 2015 illustrated how high-value interventions could be delivered. NHS RightCare is now utilising those findings and materials as a case study. A comparable asthma-specific study is now in development, with an initial collaborative stage of designing a focused training package for pharmacists.

**Problem:** Many asthma patients have a poor understanding of the role of different inhalers for managing their condition optimally. In particular, there is an over-reliance on short-acting beta agonists (SABAs).

**Assessment and analysis:** A new training pack, including an 'Asthma Right Care' tool to help pharmacists change patient behaviour has been designed. It is undergoing testing with community pharmacists in London.

**Strategy:** Community pharmacists see asthma patients frequently in a context of medication discussions. They are in an ideal position to show patients how to modify their behaviour and thereby improve control of their condition. New tools can facilitate this.

**Measurements:** Effectiveness of the training pack is assessed using pre- and post- training questionnaires, with a key measure being change in awareness of the relationship between the number of SABA inhalers prescribed per year and the number of breathless episodes experienced by a patient each week.

**Changes:** In spontaneous and structured feedback from the 2015 COPD project, pharmacists reported that the training received improved their understanding of key indicators of medication-related respiratory management. Early signs are that similar improved understanding can be achieved with the asthma training pack, but further testing is needed.

**Lessons:** The value of time spent by community pharmacists supporting patients in the management of COPD has already been established and benefits identified from focused training of pharmacists.

**Messages:** It is expected that the current training programme being developed will prepare pharmacists to provide behaviour-changing support to asthma patients visiting their pharmacies.

**Corresponding author:** Christine Heading

## **Abstract Number: 41**

### **The Morecambe Bay Respiratory Network: integrating from the ground up**

**Authors:** Haslam P, Gatheral T, Atkinson G

**Institution:** Morecambe Bay CCG

In Morecambe Bay we have developed our own integrated respiratory service – the Morecambe Bay Respiratory Network (MBRN). QOF data have highlighted a higher than average prevalence of both asthma and COPD. NHS RightCare data identified higher than average non-elective admissions, spend on prescriptions and bed-days.

Practices within Morecambe Bay CCG are grouped into 11 GP-led Integrated Care Communities (ICCs) which bring together local health and care organisations. The MBRN has been structured around these ICCs. The guiding principle has been to develop an integrated model of care which can have a profound impact on all patients from diagnosis to end of life by focusing investment on primary care.

**Method:** In the initial phase of the roll out (October 2017 to July 2018), five of these ICCs were provided with funding to develop ICC respiratory teams. These teams could then focus on the implementation of common diagnostic pathways, facilitating early review of complex or deteriorating patients and in-house referral pathways to reduce referrals into secondary care. Monthly Respiratory MDT's were then attended by the ICC teams, respiratory consultants, specialist nurses as well as physiotherapists and pulmonary rehabilitation teams.

**Findings:** Initial data found that there has been a 54% reduction in referrals to secondary care from the ICCs involved (non-2-week wait patients) as well as consistently positive feedback from patients. An independent assessment by the University of Cumbria has highlighted the strong support for this model of care from all staff involved so far. Work continues to standardise pathways and protocols across the CCG, increase community provision, develop an online respiratory dashboard and then towards a full hospital at home service.

**Conclusion:** Integrating care from the ground up, based around primary care with regular access to specialist input, is having a significantly positive impact on patients and staff within the whole healthcare system.

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## **Abstract Number: 24**

### **A review of the delivery of education to healthcare professionals in the Mission ABC project**

**Authors:** Heiden E, Longstaff J, Chauhan AJ

**Institution:** Portsmouth Hospitals NHS Trust

**Introduction:** The importance of high-quality healthcare professional (HCP) education and training has never been greater. With ever-increasing demands on the NHS workforce to see more patients with complex medical conditions, the need for busy staff to undertake continued professional development means HCP education has a greater need in a highly time-pressurised environment.

**Background:** The Mission ABC (MABC) project was a novel, specialist-led, multidisciplinary approach to delivering respiratory care in the community. It was a priority that secondary care respiratory expertise remained in GP surgeries following completion of the project and that educational activities were accessible and relevant for all HCPs in primary care.

**Methods:** A Training Needs Analysis (TNA) was developed for all HCPs attending MABC clinics in order that their individual educational needs could be identified and addressed. HCPs attended Mentorship Clinics, where they followed patients on their journey as they were reviewed by the multidisciplinary specialist team. HCPs were also invited to attend education events which reflected the structure of the clinics and provided multidisciplinary respiratory teaching. TNAs were analysed to identify common themes which, combined with feedback from the Mentorship Clinics, influenced the content of the educational events.

**Results:** All the educational activities were well attended by a wide variety of HCPs and self-reported understanding and confidence to manage respiratory conditions subsequently improved. The educational needs of primary care HCPs were addressed and many requested further learning opportunities in their feedback: "I learned more from this morning than from all the other respiratory updates I've attended in recent years put together".

**Lessons learned:** HCPs benefit from inter-professional education which can be effectively delivered in clinical and non-clinical environments by the multidisciplinary team. Utilising a TNA can help direct continued professional development.

**Conclusion:** Novel approaches to education can benefit both HCPs and patients and should be encouraged.

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## **Abstract Number: 33**

### **Retrospective multi-practice audit identifying sub-optimal uptake of high value interventions within COPD patients at risk of hospitalisation**

**Authors:** Anderson A, Canavan M

**Institution:** Respiratory Care Solutions

**Introduction:** Leeds has one of the highest admission rates and some of the poorest outcomes for chronic obstructive pulmonary disease (COPD) in the country. We aimed to identify gaps in current care provision for COPD patients in primary care, who have been identified at high risk of exacerbation and hospitalisation, to inform and prioritise care against high-value interventions.

**Methods:** We virtually reviewed 200 patient records from across 11 GP practices in Leeds, auditing the use of high-value interventions. The audit included patients who had two or more exacerbations in a year.

**Results:** From 200 records, we found that there were low rates of high-value interventions. 23% did not receive flu vaccine, 53.5% continued to smoke with 5.5% recorded as never smoked, 2% had completed pulmonary rehabilitation, 43% were on triple therapy, 43% had moderate disease and 20.5% had potentially the incorrect diagnosis. There are also issues with anticipatory medication on repeats. Audit findings were presented and discussed at a multidisciplinary meeting which included the Clinical Commissioning Group, secondary care and community respiratory team in Leeds.

**Discussion:** This audit identified that there are issues with correct diagnosis of COPD patients in primary care, the same as the Na-

tional COPD Audit (2017). Of those correctly diagnosed, this audit identified that moderate disease patients are the group that are exacerbating more frequently with no specialist input. A focus towards this cohort of patients should be considered. It is evident that there is low uptake of high-value interventions. It is up to the commissioners to use this data to inform decision-making surrounding the provision of care and services within primary care if they would like to see a reduction in exacerbations and hospital admissions alongside improving outcomes for COPD patients in Leeds.

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## **Abstract Number: 63**

### **Implementation of local guidelines into a population of COPD patients: 'Going for GOLD' – a real world experience**

**Authors:** Rowlands S-J, Dobson L, Roberts I, Roberts J

**Institution:** South Devon and Torbay Clinical Commissioning Group

Prescribing in chronic obstructive pulmonary disease (COPD) has not kept pace with advances in evidence or Global Initiative for Chronic Obstructive Lung Disease (GOLD) strategy recommendations, evident in high inhaled corticosteroid (ICS) prescribing, frequently at high doses, and low dual bronchodilator uptake. Implications include high primary care drug spend and lost opportunities to improve patient outcomes (reduced symptom burden and exacerbation rate, reduced harm from ICS adverse effects) and reduce non-elective activity and spend in primary and secondary care. Barriers to optimal prescribing include confusion amongst physicians caused by the plethora of treatment options. Two respiratory consultants and CCG Medicines Optimisation Team developed local prescribing guidance based on GOLD, then piloted its implementation and measurement of change method in two GP practices.

**Method:** Seven consultant-led education events attended by 177 local GPs and nurses described implementing the prescribing guidance alongside holistic best practice, diagnostics including co-existing asthma and unindicated ICS withdrawal. Primary care undertook face-to-face 'Going for GOLD' reviews for 4,420 patients (total COPD population 6,200) alongside routine care in <18 months supported by a work plan and package of paper, human and IT resources with excellent consultant leadership.

**Results:** Outcomes achieved between August 2016 and February 2018 include: £256k net savings (75% in year), LAMA/LABA uptake increased from 9.4 to 130 items/month/1000 patients, reduction in high-dose ICS from 53rd to 9th percentile nationally (26.3% to 16.0%), 217 undertreated patients offered treatment (cost £79k/year), formulary compliance increased 26.4% to 60.3%. Evaluation continues for longer-term outcomes (eg, exacerbations).

**Conclusion:** We describe advantages of 'Going for GOLD' over traditional medicines management work and share our experiences of embedding guidelines and medicines optimisation principles into routine COPD care for the benefit of patients utilising an approach replicable at both GP practice and CCG-wide levels which encompasses multidisciplinary work at pace and scale, focused on quality whilst delivering significant cost savings.

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## **Abstract Number: 21**

### **Free inhaled corticosteroids in asthma: do they really work?**

**Authors:** Longstaff J, Dominey R, Turner C, Chauhan AJ

**Institution:** Portsmouth Hospital Trust

**Introduction:** Making prescription charges exempt for people with asthma is a key policy for Asthma UK. The service evaluation project provided free steroid inhalers for a year as an incentive to people with poorly controlled asthma who pay for their prescriptions, alongside asthma reviews, to improve their quality of life and asthma control.

**Method:** An expression of interest letter was sent to loW practices. Each practice aimed to recruit 20 patients. Patients attended structured practice asthma and local pharmacy reviews in return for free steroid inhalers.

**Result:** Two loW practices were enrolled (population of 22,900). 188 patients were identified and 107 were approved by the practice. 23 patients were recruited and 8 attended one follow-up appointment. No patients completed the project. Data from 96 patients were analysed 12 months after project completion. Short-acting beta agonist (SABA) usage decreased in the recruited group compared with the non-recruited group; however, inhaled corticosteroid usage, exacerbation rates, OOH and unscheduled GP visits decreased in both groups.

**Discussion:** Difficulties with identifying patients who paid for prescriptions resulted in the low recruitment numbers despite various recruitment methods. High turnover of project staff caused delays to project deliverables. Gaps in the delivery of care resulted in patients not receiving action plans or inhaler technique checked. Patients recruited to the project appear more in control of their disease than those who did not attend, evident by the reduction in SABA use, numbers of exacerbations and unscheduled GP visits.

**Conclusion:** A small number of patients were recruited and retained. They were not fully motivated to attend the project, adopt lifestyle and health changes. Offering patients free steroid inhalers and regular asthma reviews is inconclusive as an effective incentive to maintain good asthma control.

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## **Abstract Number: 37**

### **The use of inhaled corticosteroids (ICS) in COPD: are patients being prescribed ICS unnecessarily?**

**Authors:** Carnegie AJA, Hamilton J, Moran HV

**Institution:** University of Birmingham

Inhaled Corticosteroids (ICS) help prevent COPD exacerbations (1) However, their well-known side effects should be considered and discussed with patients (2). NICE specifies that only patients with severe airflow obstruction (FEV1% predicted <50) or frequent exacerbations ( $\geq 2$  a year) be prescribed ICS/LABA (3). GOLD 2017 stratifies patients on symptomology and exacerbation risk instead of quantitative airflow obstruction, using their ABCD classification, to reduce ICS overuse (1).

This audit explored ICS use in COPD patients at a GP practice in Dudley, West Midlands with a list of 6044 patients. Electronic patient data was searched for patients with a formal COPD diagnosis and FEV1% predicted >50. A range of data was collected

including medication and exacerbation history. 115 patients have COPD (2% of the list) and 81 have an FEV1%predicted >50. 38 patients were prescribed ICS in the past year. However, only 8 of these patients have  $\geq 2$  exacerbations a year, suggesting the overuse of ICS in the remaining patients. 23 patients are also on unlicensed inhalers for COPD. Some patients also had a diagnosis of asthma which can co-exist with COPD (4), whether these patients benefit from LABA/ICS could be assessed. New GOLD guidance suggests using LABA/LAMA over LABA/ICS in exacerbators which could help to reduce the number of patients on ICS (1). This audit suggests that ICS may be prescribed unnecessarily and in incorrect doses and recommends using current GOLD guidance to reduce this.

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### **Abstract Number: 14**

### **IMPACT: the next steps**

**Authors:** Freeman D, Gerrard V, Turton J

**Institution:** Norfolk Community Health & Care

Following on from the IMPACT project (Improving the Management of Patient Assigned COPD Treatment) undertaken in North Norfolk CCG, a primary care-based respiratory service was designed and implemented. The need for this was based on a three-fold difference between COPD admission rates across practices within the CCG. It was felt that any improvement in the variability should be focused in primary care and a service was set up to be run primarily by D Freeman (DF) and V Gerrard (VG). The service had two phases: a practice visit identifying the train-

ing levels of healthcare professionals delivering the service, discussing with practice managers, admin staff and where relevant dispensers, how their roles could be used in identifying patients who may require referral to the service, and then a mentored clinic with the Practice Respiratory Leads.

The second phase was a series of practice-based clinics run by DF and VG, seeing patients referred by the Practice Respiratory Leads. The Practice Leads were encouraged to refer patients who had been admitted to an Acute Trust, who had been seen in A&E, seen by OOH, seen by the Ambulance Service or who had had two or more exacerbations in the previous 12 months. The Practice Respiratory Leads were encouraged to attend the clinics too as an ongoing mentoring and educational process.

Each practice gave the visiting clinician access to their clinical computer system and notes were made co-temporaneously in the GP record in order to ensure that recommendations were carried out and that the Primary Health Care Team could see – not only what had been done – but why.

The primary outcome important to the CCG was a reduction in admissions. This was demonstrated in the practices visited on a regular basis where not only a reduction in admissions was seen but a cost saving.

Sadly the CCG decided that the service should be terminated mid 2017. This was as a result of the repeated concerns of the clinicians over the lack of IT and admin support leading to a large degree of clinical concern. Had the service been set up with full support – as had been originally suggested – it would have continued.

Both clinicians are very experienced and had repeatedly voiced their concerns over the way the overall support for the service had been designed. It was felt that, should the process be repeated, it would be imperative that the implementation should include full IT and admin support. The Norfolk & Waveney STP has a Respiratory Working Group which is looking at providing a similar project across the entire STP footprint.

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