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ABSTRACTS OPEN

Meeting Abstracts from the 2017 Primary Care Respiratory Society UK (PCRS-UK) Annual Conference: beyond the Respiratory Consultation—Inspiring Lifelong Change

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S3. What types of interventions help young people to quit smoking in Sandwell? The views of Stop Smoking Advisors

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Objective: The aim of the study was to evaluate the effectiveness of interventions that help young people to quit smoking in Sandwell Birmingham. It is anticipated that the evidence will help to improve knowledge and understanding of providers of similar services, which may assist in the improvement and adjustment of practices.
Method: A qualitative method was used to address the research question. Data was collected through filmed recordings with eight participants that formed two focus groups with four participants in each group. The participants were professionals from various backgrounds who all had specific roles as Stop Smoking Advisors. The focus group discussions were run by the researcher and took place in a room in the same building where the Stop Smoking Advisors work in Sandwell.
Results: There is strong evidence that one-to-one interventions and peer support are the most effective interventions that helped young people to quit smoking in Sandwell. There are others that are promising but as yet lack a firm evidence base such as different models and approaches. In contrast, there are interventions that have least effectiveness, in particular motivational interviewing, nicotine replacement therapy, groups, social marketing campaigns, incentives and rewards. Added to this, Stop Smoking Advisors felt that they would need to be provided with more training and how to adapt to the new models. On a whole, implementing change can be challenging as there might be issues with funding for training and some people may not want to adopt to change.
Conflicts of Interest: None.
Funding: None.
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S4. Handgrip strength as correlate and predictor of lung function in apparently healthy young adults

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Aim: This study determined the prediction of lung function using handgrip strength in apparently healthy young adults.
Method: Four hundred participants (200 males and 200 females) were involved in the study. They were apparently healthy students of the College of Medicine, University of Lagos, Nigeria, and aged 16–30 years. Ethical approval was obtained from the Health Research and Ethics Committee of the Lagos University Teaching Hospital (LUTH) Idi-Araba, Lagos. The participants' handgrip strength was assessed using the Jamar dynamometer. Selected lung function variables (forced expiratory volume 1 [FEV1], forced vital capacity [FVC] and peak expiratory flow rate [PEFR]) were assessed using a portable spirometer.
Results: The mean of the dominant handgrip strength in males (38.90 ± 8.30 kgf) was higher than of the female participants (25.80 ± 5.70 kgf). Likewise, the lung function of the male participants (FEV1 = 3.36 ± 0.57 l; FVC = 3.73 ± 0.82 l and PEFR = 7.71 ± 1.77 l/s) was higher than the lung function of the females ($FEV_1 = 2.38 \pm 0.36$ l; FVC = 2.60 ± 0.42 l and PEFR = 5.60 ± 1.37 l/s). There was significant but weak correlation between the dominant handgrip strength and lung function variables assessed in male participants (FEV_1, $r = 0.284$; FVC, $r = 0.302$; and PEFR, $r = 0.180$) and female participants (FEV_1, $r = 0.232$; FVC, $r = 0.184$; and PEFR, $r = 0.283$). The same applied to non-dominant handgrip and lung function. Regression equations were also proposed for predicting lung function using handgrip strength, height, weight and age of the participants according to gender. The regression analysis showed that handgrip strength was a significant predictor for all lung function parameters in all participants except for the PEFR in the male participants.
Conclusion: Handgrip strength was a predictor for FEV1 and FVC in healthy young adults.
Conflicts of Interest: None.
Funding: The Jamar dynamometer and SP 10 Spirometer were provided by Classic Home Care, 259 West 123rd Street, New York, NY 10027.
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S8. Understanding shared decision making in personalised action plan implementation in adult asthma: an exploratory feasibility study

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Aim: Personalised asthma action plans (PAAPs) improve asthma outcomes and reduce the likelihood of hospitalisation from acute exacerbations. Although recommended since the 1990s, implementation is suboptimal. The barriers to implementation are well-established, and shared decision making (SDM) is a potential facilitator, but there is no consensus on what SDM parameters are required for PAAP implementation. This exploratory feasibility study design aimed to address this gap using the participant's views to identify factors integral to embedding SDM in PAAP implementation during asthma reviews.

Method: Purposive samples of eight asthma specialists from across the UK and three patients from a large tertiary centre were recruited. All interview data were audio recorded. Data were thematically analysed using codes from existing theoretical frameworks for SDM (with nine core elements) and the implementation of evidence-based practice.
Results: Four out of nine key elements of SDM were deemed relevant to asthma action plan implementation: (1) clarifying and checking patients' understanding of asthma, (2) establishing patient preferences and values, (3) discussing patients' ability and confidence to self-manage asthma, and (4) regular follow-up. Barriers included a lack of time, restricted access to specialist expertise, lack of support and limited continuing education. The identification of four elements of SDM relevant to PAAP implementation could better assist patient involvement.
Conclusion: Multi-faceted interventions aimed at improving training, the co-ordination of specialist asthma expertise in general practice and hospital settings are required to overcome barriers to effective implementation. Further research therefore is warranted to investigate barriers to partnership working between asthma specialists and generalists through observational studies at the clinical interface of asthma care, to establish if a supportive environment to involve patients in decisions is created.
Conflicts of Interest: NC and VA have no conflicts of interest to declare in relation to this article. KN is a respiratory clinical nurse specialist involved in the service development, asthma education and training.
Funding: This work received no funding.
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S10. Efficacy of Trimbow®, a novel triple extrafine combination treatment in chronic obstructive pulmonary disease (COPD) patients at high risk of exacerbations: a sub-group analysis of the TRINITY Study

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Aim: Free triple therapy combining an inhaled corticosteroid with a long-acting beta-2 agonist and a long-acting muscarinic antagonist is commonly used to treat chronic obstructive pulmonary disease (COPD). Such treatment currently involves the use of different inhalers. This analysis aims to evaluate the effect of a fixed triple combination on COPD exacerbations in a sub-group of patients with >1 exacerbation in the previous year.
Method: TRINITY (NCT01911364) was a phase III, double-blind, 52-week study where 2,691 severe/very severe COPD patients with a history of exacerbations were randomised to receive Trimbow® (fixed dose combination of beclometasone dipropionate, formoterol fumarate and glycopyrronium bromide) or Tiotropium or a fixed-dose combination of beclometasone dipropionate and formoterol fumarate (Fostair®)+Tiotropium. The primary analysis demonstrated that Trimbow® was superior to Tiotropium in reducing moderate/severe exacerbations and comparable to the free combination of Fostair®+Tiotropium. Here we report the analysis of the primary efficacy variable performed on the ITT population after stratifying by number of COPD exacerbations in the 12 months before screening (1: $n=2{,}143$ or >1: $n=546$).
Results: Compared to Tiotropium, Trimbow® significantly reduced exacerbations in both subgroups of patients, with a more pronounced effect in patients with >1 exacerbation in the previous year (adjusted rate ratio: 0.836 [95% CI: 0.707, 0.990], $P=0.038$ and 0.724 [0.551, 0.951], $P=0.020$, respectively), thus confirming the results in the overall population. Compared to the free combination, Trimbow® significantly reduced exacerbations in patients with >1 exacerbation in the previous year (adjusted rate ratio: 0.713 [0.511, 0.995], $P=0.047$), whereas in the subgroup of patients with 1 exacerbation the two treatments had a comparable effect (adjusted rate ratio: 1.143).
Conclusion: The results of this pre-planned subgroup analysis showed that beclometasone dipropionate (BDP)/formoterol fumarate (FF)/glycopyrronium bromide (GB) (Trimbow®) confers a superior clinical benefit compared to Fostair®+Tiotropium in a subgroup of COPD patients at higher risk for exacerbations.
Acknowledgment: This abstract has been adapted from an abstract presented at the American Thoracic Society Conference, May 2017.
Conflicts of Interest: M. Scuri, M. Spinola, S. Vezzoli, A. Muraro, S. Petruzzelli, Chiesi Farmaceutici S.p.A., Parma/IT. J.Vestbo has received honoraria from AstraZeneca, Boehringer-Ingelheim, Chiesi, GSK and Novartis.
Funding: The abstract has been funded by Chiesi Farmaceutici S.p.A.
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S12. COMPARATIVE ASSESSMENT OF CARDIOPULMONARY PARAMETERS OF PETROL STATION ATTENDANTS AND NON-PETROL STATION ATTENDANTS

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Aim: In many developing countries, people are still employed to dispense Premium Motor Spirit (PMS) and other petrochemical products at automobile re-fueling stations. They are often referred to as Petrol Station Attendants (PSA) and are constantly exposed to the deleterious effect of inhalation of PMS fumes, particularly on their respiratory system. This study aimed at studying the effects of PMS fumes inhalation on the cardio-pulmonary function of PSA.
Method: The study was conducted in Surulere Local Government Area of Lagos State, Nigeria among 165 participants; 92 PSA and 73 age and gender-matched non-PSA. Data on demographic characteristics, duration of exposure (working hours per day and years of working experience) selected cardiovascular parameters (systolic blood and diastolic blood pressure and pulse pressure) and pulmonary parameters (forced vital capacity, forced expiratory volume in the first second and peak expiratory flow rate) were collected in both groups. Independent T-Test was used to compare the cardiovascular and pulmonary parameters between the two groups and was also used to compare participants with less than 5 years and more than 5 years working experience. Relationship between the duration of exposure and cardiopulmonary parameters was investigated using Persons correlation coefficient. Level of significance was $P<0.05$.
Results: The diastolic blood pressure was significantly higher among PSA and those with greater than 5 years working experience. There was a significant relationship between the number of working hours per day and all the cardiovascular parameters assessed. Self-reported respiratory symptoms were higher among PSA.
Conclusion: PSA may be prone to high blood pressure in addition to respiratory complications. Also prolonged exposure to PMS fumes may increases the risk of developing high blood pressure.
Conflicts of Interest: None.
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S13. Improving spacer delivery for low flow (paediatric) use

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Aim: Choosing the best valved holding chamber (VHC) can seem complicated, with choice influenced by recommendation, prescription status, device utility, and patient age and lung function. Young children are the predominant users of VHCs, mainly because they struggle to receive an effective dose owing to the requirement to coordinate pressurised metered dose inhaler (pMDI) actuation with the inhalation manoeuvre. For these patients, being able to receive an effective dose via tidal breathing is very attractive.
Healthcare advice is rightly influenced by scientific evaluation. VHC assessments are based on standardised 30 L/min flow rate methodologies not representative of paediatric tidal breathing (JAM 1997;10:341-9, https://doi.org/10.1089/jam.1997.10.341). VHC comparisons have noted the limitations

imposed by permanently open exhaust valves, especially in the context of low (paediatric) flows (*JAMPPD* 2017;30(3):A-12, https://doi.org/10.1089/jamp.2017.ab01.abstracts). We have therefore undertaken valve technology research aiming to improve function at low flows, ensuring improved suitability for children.
Method: The Able Spacer-2 mouthpiece/valve arrangement creates permanently open exhalation ports that inevitably increases the 'valve-open' flow rate. 100 µg salbutamol (Ventolin Evohaler) aerosol performance (mean ± SD) at 30 l/min (Next Generation Impactor, NGI) and 10 l/min dose uniformity (Dosage Unit Sampling Apparatus, DUSA) have been assessed against three adjustments (A1, A2, A3) to valve cut-geometry and shape, and to exhalation port size and valve support.
Results: NGI fine particle fraction (% < 5 µm) for pMDI-alone, A1, A2 and A3 were 47.9 ± 2.4, 55.0 ± 2.0, 51.8 ± 2.4 and 55.4 ± 2.5, respectively. Respective fine particle dose data (µg < 5µm) were 41.7 ± 4.4, 55.8 ± 9.2, 52.2 ± 9.9 and 53.1 ± 10.3. DUSA recoveries (ug, quantifying drug retention within the VHC) for A1, A2 and A3 were 43.6 ± 6.5, 45.1 ± 2.8, and 52.7 ± 4.5; representing 49.4 ± 6%, 56.6 ± 4% and 58.0 ± 2% of the recovered pMDI-alone emitted dose.
Conclusion: Using accepted in vitro product equivalence testing, the data indicate the valve developments should improve drug delivery and demonstrate improvements on previous low flow, dose uniformity comparator research (JAMPPD 2015;28:A-2, https://doi.org/10.1089/jamp.2015.ab02.abstracts).
Conflicts of Interest: MJ Sanders and R Bruin are employees of Clement Clarke International Limited.
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Acknowledgment: This abstract is new, but data presented at 2017 ISAM, Sante Fe New Mexico; published Sanders, M., Bruin, R. & Tran, C. Holding chamber valve technology: effectiveness at low flow rates. *J. Aerosol Med. Pulmon. Drug Del.* **30**, A-21–A-22 (2017). https://doi.org/10.1089/jamp.2017.ab01.abstracts

S14. Objective assessment of inhaler technique with Smartphone App

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Aim: Regular inhaler technique review is recommended in all major guidances. Good technique requires a device-specific inhalation manoeuvre—often concurrent with inhaler actuation—that can only be assessed subjectively. Flow guidance whistles help (Inhalation 2015;9(3):23-24, http://www.inhalationmag.com/Dynamic/BackPage/inh_backpage_2015_06.pdf), but remain a subjective assessment. Currently, healthcare professionals lack the tools to conduct objective reviews. If, however, the guidance whistle and other sounds could be analysed by smartphone, the potential exists for objective, clinical data.
Flo-Tone R (FTR, Clement Clarke) is an add-on guidance whistle used to illustrate/clarify Respimat inhaler technique, field-tested in a broadly based application by Boehringer Ingelheim, Germany. Respimat produces a slow-moving mist of fine droplets with a comparatively long 1.2-s spray duration. Ideally the patient should inhale for this period following actuation. Clin-e-cal Limited has created an App to recognise and record the FTR sound and actuation 'click' of a placebo Respimat.
Method: Healthy volunteers ($n = 25$, 23–85 years, mean 41.4) completed three inhalation manoeuvres with these tools. Two parameters were ascribed to successful use: Respimat actuation during the first second of inhalation and an inhalation duration of ≥ 2.0 s following actuation.
Results: Smartphone display of activity/parameters versus time was achieved. On attempt-1, 13 subjects (52%) actuated the device during inhalation (mean 0.65 s into the manoeuvre), 7 actuated before inhalation, 5 after. By attempt-3, 24 subjects (96%) correctly actuated during inhalation. Those who succeeded on attempt-1 improved mean coordination time to 0.38 s. After attempt-3, 20 subjects (80%) had extended mean post-actuation inhalation duration to 3.27 s.
Conclusion: This preliminary use of placebo Respimat using the FTR-and-App has proved successful with volunteers. Objective data has enabled technique improvements to be recognised. The FTR-App combination is being developed to provide a primary care training tool. It is hoped that availability of objective assessment tools will encourage better inhaler technique.
Conflicts of Interest: MJ Sanders is an employee of Clement Clarke International Limited. MJ Sanders and EA Crawford are Directors of Clin-e-cal Limited which designed and provide the Rafi-Tone App.
Funding: Clement Clarke International Limited provided study funding (no grant number).
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S18. Barriers and enablers for primary health care practitioners when referring patients with chronic obstructive pulmonary disease to pulmonary rehabilitation: a qualitative study

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Introduction: Chronic obstructive pulmonary disease (COPD) is a chronic debilitating disease. Pulmonary rehabilitation (PR) is a cost-effective, internationally recommended intervention for COPD patients suffering breathlessness and/or functional limitation. Referral is predominately health care practitioner led, yet referral numbers and patient uptake to this widely available intervention are poor.
Aims: To understand the barriers and enablers for primary health care practitioners (PHP) when referring or considering patient referral to PR and to explore whether patient characteristics influence the decision to refer COPD patients' PR.
Methods: Semi-structured interviews, underpinned by phenomenology. Questions based on the Capability, Opportunity, Motivation, Behaviour Model (COM-B) with PHPs across General Practices in Cambridgeshire and West Midlands. Participants were purposively selected and asked about their experience and practice in relation to referring COPD patients for PR. Images depicting patients with varying COPD severity were used to stimulate memory and associative recall. Interviews are ongoing but will continue until theme saturation.
Analysis: Interview data were recorded and transcribed. Two-level data analysis will be undertaken: Rapid qualitative analysis for broad themes, then framework analysis mapped to the COM-B Model to understand PHP behaviours.
Results: 10 interviews have been completed so far. Following rapid qualitative analysis, themes that influence referral include patient characteristics, age, employment status, disease variability and severity, PHP knowledge and understanding of PR. PHP combine these elements and independently assess likely PR engagement using a patient benefit vs loss assessment, creating PHP internal conflict. External influencing factors include poor marketing, lack of incentive and PR programme variability. PR is not seen as a core intervention within the management of COPD highlighting a whole systems influence.
Conclusions: PHPs, PR providers and whole systems are important in influencing the referral to PR. PR providers must promote the service better. PHPs must discuss PR and work in partnership with COPD patients.
Conflicts of Interest: Trustee - PCRS-UK, nil else of note.
Funding: Sponsor by University of Birmingham.
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S21. Professional and staff perceptions of financial incentives promoting implementation of asthma self-management: a qualitative study in Northern Ireland primary care practices

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Background: In 2008, Northern Ireland introduced a healthcare scheme that pays a financial incentive to general practices for providing self-management education to patients with asthma.

Aim: We aimed to explore how primary care practices responded to the financial incentive scheme, their strategies for achieving the required standards, and the impact on implementation of asthma self-management, including provision of asthma action plans.
Methods: We aimed to recruit up to 20 general practices across Northern Ireland and undertake a telephone interview with a representative from each practice involved with delivering the scheme. An incentives framework was used to underpin questions in the interviews, which were recorded, transcribed verbatim and analysed using a Grounded Theory approach.
Results: Interviews have been conducted with 12 practice staff members involved with the financial incentive scheme within their practice (1 GP, 2 nurses and 9 administrative staff). Themes clustered around targeting poor asthma control; communicating with patients; strategies for achieving targets; financial incentives. All participants highlighted the difficulty of getting patients with asthma to attend appointments, with some expressing feelings of frustration at lack of patient involvement. Developing processes and strategies to increase attendance for patients with asthma was discussed in the majority of interviews, with a number of participants specifically targeting patients with poorly controlled asthma. Participants were generally positive about receiving financial incentives for the extra work undertaken, but the main motivator was to provide the best quality of care for patients.
Conclusions: Primary care practice staff view financial incentives positively; however, patient health was the highest priority when delivering care. Practices are continually developing strategies to increase patient attendance for annual reviews, particularly among those with poorly controlled asthma. Understanding how practices responded to this financial incentive scheme could inform future policy on similar initiatives.
Conflicts of Interest: None.
Funding: This work is funded by The University of Edinburgh, College of Medicine and Veterinary Medicine (CMVM) PhD Studentship [Asthma UK Centre for Applied Research PHD/14/16].
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S22. Investigating asthma comorbidities: a systematic scoping review

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Aim: Asthma is a common long-term disorder with several related comorbid conditions, which may impact asthma outcomes. There is a need for greater appreciation for understanding how these comorbidities interact with asthma to improve asthma outcomes. The aim of this study was to systematically scope and map out the range and nature of key asthma comorbidities.
Methods: We systematically searched the following electronic databases for all research relating to comorbidities in people with asthma: Medline, EMBASE, ISI Web of Science, Cumulative Index to Nursing and Allied Health Literature (CINAHL), PsycINFO, and Google Scholar.
Results: We identified 10,888 studies through our literature search of which only 23 studies fulfilled our predefined inclusion criteria. We found evidence of a lack of uniform way of defining and measuring comorbidity. Much of the available literature was around prevalence of comorbidities among people with asthma. Less is known about how these comorbidities vary by age or gender, and how these affect asthma outcomes and prognosis.
Conclusion: The prevalence of comorbidities in asthmatics is high. Although additional studies are needed to clarify the concept of defining and measuring comorbidities, the evidence from our systematic scoping review provides a comprehensive overview of asthma comorbidities. There is a need for more research looking at the mechanisms and pathological pathways of comorbidities on asthma outcomes.
Conflicts of Interest: None.
Funding: Asthma UK Centre for Applied Research (AUKCAR); Chief Scientist Office (CSO).
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Acknowledgment: It has been presented at IPCRG 2017 Slovenia.

S23. Use of soft mist inhalers versus dry powder inhalers in patients with chronic obstructive pulmonary disease (COPD): a Clinical Practice Research Datalink (CPRD) study

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Aim: Long-acting muscarinic antagonists (LAMA) are available in different inhaler devices for patients with chronic obstructive pulmonary disease (COPD), dry powder inhalers (DPI) or soft mist inhalers (SMI), of which DPI are the most commonly prescribed. The Respimat® device (launched 2007) is the only commercially available SMI. We studied the demographic and clinical characteristics of patients newly initiating LAMA in either DPI or SMI, to determine if patient characteristics affect prescribing of these devices.
Method: This was a retrospective study analysing primary care data from the UK Clinical Practice Research Datalink (CPRD). The patient cohort included people with a prior diagnosis of COPD registered at their GP practice from January 2008 to December 2015. The demographic and clinical characteristics of patients at either first initiation of a DPI or an SMI were compared.
Results: 30,635 patients met the inclusion criteria and were studied. The average age was 67.5 years and 54% were male. The majority (90%) of patients were in the DPI group. There were no significant differences between the groups in either age, smoking status, body mass index or the following co-morbidities: myocardial infarction, cerebrovascular disease, cancer, stroke, eosinophilia, peripheral vascular disease or renal impairment. Small differences ($P < 0.05$) were observed in the following characteristics: severe airflow limitation (21% vs. 23% DPI vs. SMI respectively); GOLD stage B (33% vs. 37%); historic/concurrent asthma (9% vs. 10%); atrial fibrillation (7% vs. 6%); congestive heart disease (14% vs 13%); diabetes (11% vs. 10%). Annual differences in SMI initiations (14% in 2010 to 4% in 2016) were observed, as were regional differences in DPI prescription (83% in South Central England to 98% in North East England).
Conclusions: Patient characteristics do not appear to have a meaningful impact on the choice of DPI vs. SMI. This is consistent with recommendations in the relevant summaries of product characteristics.
Conflicts of Interest: AG, AT and GC are employees of Boehringer Ingelheim Ltd.
Funding: This study was funded by Boehringer Ingelheim Ltd.
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S25. How to secure better outcomes for everybody in asthma management: The International–Medicines Use Review Health Technology Assessment (International-MUR HTA)

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Aims: This project is looking at the development and application of the novel tool (International–Medicines-Use-Review-Health-Technology-Assessment; International-MUR HTA) in community practice that for the first time is able to meet better asthma control and secure added value service in asthma management. More specifically it allows to: evaluate the quality of care delivered in terms of economic impact (for patient-provider-society), health outcomes and patient benefits; collect real-world evidence and evaluate long-term effect of care; provide different stakeholders with evidence-based information that would help formulate health policies in community practice that are safe, effective, patient-focused and cost-effective, balancing access to innovation and cost containment. Crucially, the tool can also support the delivery of a cost-effective and cost-saving intervention for asthma patients based on the success of the Italian-Medicines-Use-Review (I-MUR) trial [1].
Methods: Evidence from the Italian-Medicine-Use-Review (I-MUR) trial showed that the I-MUR intervention provided by the community pharmacists in asthma is effective, cost-saving and cost-effective.[1] The trial allowed to model a novel framework (International-MUR-HTA) that would enable to routinely deliver the intervention, but also collect and analyse patient relevant data on

its clinical-effectiveness, quality-of-life and cost-effectiveness. I-MUR-HTA was discussed within three expert-panel discussions including policy-makers, commissioners, academics, healthcare-professionals and patient-representatives in Italy,[2] UK[3] and Brussels/Europe.[4] The current plan includes testing the use of the tool in RW environment across European regions.
Results: Evidence collected from the expert discussions confirmed that International-MUR-HTA information is relevant to meet current NICE target for cost-effective service delivery and this is what is needed to support the evaluation of innovative effective and cost-effective health policies and promote their implementation across nations. Its implementation is underway and real-world pilots are planned to take place in different European regions.
Conclusion: the International-MUR-HTA appears to be an innovative tool to promote active patient involvement into policy-decision-making and community service implementation.
Conflicts of Interest: None.
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Corresponding author: Michela Tinelli.
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3. Manfrin, A., Tinelli, M., Thomas, T. & Krska, J. Putting Community Pharmacies at the Heart of the NHS. Public Policy Exchange (London, UK, 2016).
4. Manfrin, A., Tinelli, M., Thomas, T. & Krska, J. Effectiveness and cost-effectiveness using asthma as a model. European Pharmacists' Forum (Pharmaceutical Group of the European Union (PGEU), Brussels, Belgium, 2016).

S27. Assessing technology-assisted asthma administration in enhancing inhalation and prescription compliance

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Asthma is highly prevalent in children and adolescents, and inhaled anti-inflammatory agents are a mainstay of treatments. However, compliance amongst children and adolescents is low with poor inhaler usage and inhalation technique. Spacer devices attached to metered dose inhalers (MDI) can assist in drug delivery. Recently, SmartAir Medical Ltd. (based at the Clinical Translational Research and Innovation Centre in Londonderry, Northern Ireland) developed AIRBRIO, an electronic product for patients who use a spacer-MDI combination that can record compliance data and relay it to a smartphone. This abstract investigates the use of the example technology, AIRBRIO, in enhancing inhalation and prescription compliance. A pilot study was undertaken with 29 participants (step II or III asthma) and were aged 8 to 18 (half had attended Accident and Emergency (A&E) or been admitted to hospital owing to their asthma condition in the past). At baseline, participants completed asthma control questionnaires, underwent lung function testing and received instruction on the use of AIRBRIO. These measures were repeated at the end of the 8-week study with opinions on AIRBRIO provided. In 43% of participants, spirometry readings improved significantly in 2% predicted results over the course of the study with percentage increase change for forced expiratory volume 1 (FEV^1) % predicted = 5.0% and forced vital capacity (FVC) % predicted = 5.5% ($P < 0.001$). In addition, 78% reported that they 'always'/'most of the time' used a spacer when taking their inhaler compared to 45% baseline Care of the spacer improved with 82% washing it at least once a month. While the results from this study warrants a further larger-scale study, its note that over 80% were in total agreement that it taught them how to inhale their medication better, with 65% 'very strongly agreeing' that it had improved their inhalation technique. In summary, the study found that AIRBRIO improves inhalation and prescription compliance and may therefore prove useful as a tool in the management of asthma and chronic obstructive pulmonary disease (COPD).
Conflicts of Interest: None.
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S28. Endotypes of chronic obstructive pulmonary disease (COPD): their role in determining response to inhaled corticosteroids

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Aim: To identify the endotypes of chronic obstructive pulmonary disease (COPD) which may be predictive of treatment response to inhaled corticosteroids. Endotypes are disease subtypes defined by a distinct functional or pathophysiological mechanism.
Method: We conducted a scoping literature review to investigate the predictive value of endotypes in the treatment of COPD with inhaled corticosteroids. The definition and application of endotypes in COPD made a systematic review impractical. We searched the Pubmed index for all articles including the terms "COPD endotypes" & "COPD endotype" & "COPD endotypes and phenotypes".
Results: We found 32 articles which referred to COPD endotypes. Ten articles discussed the relationship between endotype and phenotype and its relevance to treatment decisions. Six review articles described specific endotypes of COPD. Five endotypes of COPD, and their respective biomarkers, were most frequently proposed. These were the T-Helper 2 (TH2) inflammatory response endotype (serum/sputum eosinophilia, fractional exhaled nitric oxide (FeNO), perisotin, immunoglobulin E (IgE), cytokines interleukin (IL) 4, IL-5, IL-13), the persistent systemic inflammation endotype (C-reactive protien [CRP], fibrinogen, cytokines IL-6, IL-8), the bacterial colonisation of the airways endotype (sputum culture), the neutrophilic endotype (cytokine IL-8) and the Alpha-1 antitrypsin deficiency endotype (α1AT genotyping). Of these, the TH2 inflammatory response endotype represents an opportunity to define a subgroup of patients with COPD who show steroid responsiveness.
Conclusion: Defining COPD endotypes may improve our understanding of the underlying pathophysiology of COPD and lead to more rational approaches to prescribing of inhaled corticosteroids. Progress in identifying reliable and accessible biomarkers of these endotypes should improve targeted treatment of COPD patients.
Conflicts of Interest: None.
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S31. Examining licensed and unlicensed spacer use with non-extrafine beclometasone dipropionate treatment in a real-life patient population with asthma in the United Kingdom

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Aim: Spacer devices reduce dependency on correct inhaler technique. Asthma management guidelines recommend spacers for use with pressured metered

dose inhalers for patients prescribed high dose inhaled corticosteroids (ICS)[1] and children < 16 years[H. The aim of this study was to assess spacer co-prescription and device-type in a real-life population of patients with asthma treated with non-extrafine (non-EF) beclometasone dipropionate (BDP), in groups where spacers are recommended.
Method: A cross-sectional study using data extracted from the Optimum Patient Care Research Database. Patients were characterised over a 1-year study period prior to the date of medical records extraction. Spacer co-prescription with non-EF BDP was considered if within 1 year. Patients with asthma, aged ≤65 years, with ≥2 prescriptions for non-EF BDP were studied. Patients were categorised by age (< 16, 16–65 years) and ICS dose (< 1,000 µg/day vs ≥1,000 µg/day). Spacers studied included the licensed Volumatic® and unlicensed Able®, Aerochamber®, Pocket Spacer®, generic and 'other' branded devices.
Results: 50,467 patients were studied, mean age 41 years, 70.2% of whom were not co-prescribed a spacer. Of the total population prescribed spacers (29.8%), the most commonly prescribed were the unlicensed Aerochamber® (59.0%) followed by the licensed Volumatic® (20.5%) and 'other' branded unlicensed spacers (10.5%). 71.1% of patients on high-dose non-EF BDP ($n = 3,126$) were not co-prescribed a spacer; for the 28.9% co-prescribed a device, 55.2% had an Aerochamber®, 26.0% a Volumatic® and 8.4% 'other' spacers. 45.9% of the 12,883 patients aged < 16 years received a spacer; the Aerochamber® (55.9%) and Volumatic® (18.9%) devices were most commonly prescribed.
Conclusion: In real-life practice, despite being unlicensed, the Aerochamber® spacer is most commonly prescribed with non-EF BDP, ahead of the licensed Volumatic® device. Co-prescription of spacers, as recommended by guidelines, is not followed for the majority of patients.
[1] National Institute for Clinical Excellence Asthma Guidelines 2002.
[2] HBTS/SIGN Asthma Guideline 2016.
Conflicts of Interest: Dr S Wan Yau Ming and Dr SI Thornhill are employees of the Observational & Pragmatic Research Institute (OPRI). Observational and Pragmatic Research Institute Pte Ltd conducted this study with funding from Chiesi and has conducted paid research in respira.
Funding: This study was funded by Chiesi UK.
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S32. Teleconsultation sleep clinic review in Dumfries and Galloway—a patient acceptability survey

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Aim: To assess patient acceptability and experience of teleconsultation review in people with obstructive sleep apnoea hypopnoea syndrome (OSAHS) who are using continuous positive airway pressure (CPAP) therapy, and to quantify any efficiency savings in terms of reduction in mileage traveled for patients and clinical staff, fuel consumption and reduction in carbon footprint impact.
Methods: 120 service users diagnosed with OSAHS who were utilising CPAP therapy were asked to complete a postal survey regarding their experience and views of remote teleconsultation in May 2017.
Results: 50 people returned completed surveys, representing a 42% response rate. The majority of respondents rated their teleconsultation review as satisfactory with only one person disliking this approach, and preferring the standard clinic follow-up. The reduction in distance traveled for the service users equated to a saving of 7,000 miles and 1,700 miles for clinical staff, with approximately 2.62 tonnes in reduced carbon emissions. The reduction in clinical staff travelling time equated to 42 h.
Conclusion: Our results demonstrate that teleconsultation is very acceptable to the vast majority of service users who received this intervention and there are significant departmental financial benefits and environmental economies for sleep medicine healthcare providers. The time saved by clinicians not travelling to distant clinic sites can be reinvested in other service areas. We now offer this method of clinical review as part of our mainstream service and are looking ahead at home teleconsultation possibilities using current technology. Delivered at scale this method of clinical review can offer significant financial savings for the National Health Service (NHS) and we would encourage other Sleep medicine providers to explore the use of teleconsultation in their service.
Conflicts of Interest: none.
Funding: none.
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S33. Investigation health related quality of life adult patients with asthma

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Aim: To assess health related quality of life (HRQoL) of adult patients with asthma using generic and disease-specific questionnaires, to identify the factors (atopy, severity, smoking, therapy, immunotherapy) that affects it, the comparison with other studies and finally the comparative evaluation of the questionnaires themselves.
Methods: HRQoL was assessed using the Asthma Control Questionnaire (ACQ), Asthma Quality of Life Questionnaire (AQLQ), short form (SF)-36 and Euroqol (EQ)-5D questionnaires in 104 adult asthma patients. The study was held in the Allergy Department at Laiko Athens General Hospital.
Results: Asthma is a chronic disease that affects 300 million patients worldwide. It is usually characterized by chronic airway inflammation and is defined by the history of respiratory symptoms such as wheezing, shortness of breath, chest tightness and cough. Asthma is a serious challenge to public health and has large effects on school and work performance of patients, as well as in use of hospital emergency services. Patients with allergic asthma and more specifically those who were under immunotherapy treatment had higher HRQoL. Asthma severity affected negatively HRQoL in all questionnaires, but it affected only Mean SF-36 Physical Component Summary and had no impact on the mental component score (MCS). Smoking had not statistical correlation with HRQoL. Obesity (higher body mass index [BMI]) affected negatively HRQoL in only some subscales of the questionnaires concerning physical activity. Finally there is a significant correlation between the specific ACQ and AQLQ and the generic SF36 and EQ5D questionnaires.
Conclusions: Measuring asthma HRQoL in addition to standard clinical parameters in clinical medical practice using specific and generic questionnaires, would provide useful details that could improve patient's everyday life. Using them on patients with different asthma phenotypes and endotypes would help to better evaluate and validate the results.
Conflicts of Interest: none.
Funding: none.
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S34. A qualitative study on the use of electronic alerts to identify excessive prescribing of short acting beta2-agonist (SABA) inhalers in people with asthma: the views of asthma experts and primary care staff

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Aim: The National Review of Asthma Deaths (NRAD) highlighted that 39% of people with asthma who had died were prescribed more that 12 short acting beta2-agonist inhalers (SABA) in the year before death, with 4% prescribed more than 50.[1] NRAD recommended the electronic surveillance of SABA to alert clinicians to excessive SABA prescribing,[1] with those prescribed more than 12 SABA in the previous 12 months brought to the clinician's attention and invited for urgent review of their asthma control.[1,2] In this study we aimed to determine the type of alert system that general practice teams want, and would use, to identify excessive SABA use in primary care.
Method: Qualitative research purposefully sampled 33 participants including asthma experts (13), general practitioners (9), nurses (2), receptionists (7) and pharmacists (2). Semi-structured interviews (in-person and telephone), a discussion group and observations were carried out. Data were digitally recorded and/or observational notes taken. Thematic analysis is on going.
Results: Emergent themes have shed light on the design and usability of alerts to identify high SABA prescribing in primary care. Four initial themes have emerged: methods to identify high SABA use; the repeat prescribing process for SABA; the challenge of identifying and managing high SABA use; how these challenges could be overcome. Alerts to identify high SABA use have been positively welcomed however many challenges exist, for example in determining who alerts should target, when they should present and the appropriate action to be taken. End users should be considered in system design and implementation to increase usability and improve asthma management.
Conclusion: Findings will inform the development of an alert system to identify patients prescribed high numbers of SABAs in primary care.
1. Royal College of Physicians. Why Asthma Still Kills-The National Review of Asthma Deaths (NRAD) Confidential Enquiry report (2014).
2. British Thoracic Society and Scottish Intercollegiate Guidelines Network. British guideline on the management of asthma (2016).
Conflicts of Interest: none.
Funding: Queen Mary University of London/Asthma UK Centre for Applied Research.
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S35. Are chronic obstructive pulmonary disease (COPD) outcomes different in patients who have also been diagnosed with anxiety and/or depression: a real-life UK cohort study

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Aim: To assess whether those also diagnosed with anxiety and/or depression within a UK primary care chronic obstructive pulmonary disease (COPD) cohort have different outcomes and demographic characteristics compared to those without.
Method: A retrospective observational study using individual patient-anonymised routine data in the Hampshire Health Record Analytical Database, which contained linked primary and secondary care clinical data for around 1.4 million patients in Hampshire, UK.
Clinical terms (Read codes) were used to identify a cohort with prevalent COPD as at 31/12/2010. Patients were categorised by smoking status, age, sex and body mass index (BMI) and by a range of comorbid conditions, including psychological disorders such as anxiety and depression.
All respiratory-cause unplanned hospital admissions and respiratory-cause Accident and Emergency department (A+E) attendances were the outcomes recorded over a 3-year period (2011–13).
Survival analysis and cox regression was used to estimate hazard ratios (HR) for each outcome, adjusting for potential confounders and testing for interactions between psychological distress (anxiety and/or depression) and the main demographic variables.
Results: Of a total of 16479 COPD patients (53.7% men, mean age 70.1 years), 6,392 (38.8%) also had a diagnosis of a psychological disorder at some time in the medical record.
Adjusting for confounding factors (age, gender, smoking status, BMI, forced expiratory volume 1 (FEV1) % predicted, FEV1/FEV ratio, presence of comorbidities), it was observed that in COPD patients with co-existing anxiety and/or depression there was an increased incidence of attendance at A&E (HR 1.47, 95% CI = 1.30–1.67, $P < 0.001$) and admission to hospital (HR 1.26, 95% CI = 1.15–1.38, $P < 0.001$).
Conclusion: Over one third (38.8%) of all patients diagnosed with COPD in a large primary care cohort also had a diagnosis of anxiety and/or depression documented in their medical history. The presence of anxiety and/or depression significantly increased the likelihood of attendance at A+E and admission to hospital, even after adjusting for potential confounders.
Conflicts of Interest: none.
Funding: Funding for the project was provided by the Collaboration for Leadership and Applied Health Research and Care (CLAHRC) Wessex.
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S36. The relationship between anxiety and quality of life in patients with asthma: findings from the Breathing REtraining for Asthma Trial of Home Exercise (BREATHE) trial

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Aim: The mechanisms behind breathing retraining for asthma are unknown, but this therapy may affect psychological dysfunction, independently to any lung function improvement.[1] Recent calls have emphasised the importance of understanding how psychological/behavioural mechanisms impact upon asthma outcomes.[2] We explored the importance of anxiety in relation to outcomes for the Breathing REtraining for Asthma Trial of Home Exercise (BREATHE) trial.[3]
Method: 655 primary care patients with asthma (64% female, mean(SD) age: 53.1(13.6); forced expiratory volume 1 (FEV1): 91(20)% predicted; FEV1/forced vital capacity (FVC): 0.7) completed a face-to-face ($N = 261$) or DVD-based ($N = 132$) self-guided breathing retraining intervention vs. usual care ($N = 262$). Participants completed self-report questionnaires of anxiety/depression (HADS), quality of life (AQLQ), asthma control (ACQ), dysfunctional breathing (Nijmegen) and lung function measures at baseline, three-, six- and 12-month follow-up.
Results: Stepwise linear regression (including age, gender, asthma control, anxiety, depression, dysfunctional breathing, FEV1/FVC) found improved asthma control ($t = 4.71$) and anxiety ($t = 3.65$) to predict improved quality of life ($B = 5.18$, SE = 0.06, $t = 93.3$, $P < 0.001$) across all patients.
Repeated-measures analysis of covariance (ANCOVA) of asthma-related quality of life from 0-12 months found an interaction between time and treatment arm [$F = 5.14$, $P = 0.006$], subsumed by an interaction with high vs low anxiety, [$F = 3.57$, $P = 0.03$]. Quality of life improved in breathing retraining vs. control in patients with high baseline anxiety (mean difference = 0.46, $F = 12.3$, $P < 0.001$) but not in patients with low anxiety (diff = 0.12, $F = 0.9$, $P = 0.33$).
Conclusion: Our findings suggest that non-pharmacological treatments like breathing retraining may improve quality of life by reducing anxiety. Future research should explore how treatments can be personalised for people with high anxiety to maximise effectiveness.
Conflicts of Interest: none declared.
Funding: The BREATHE project was funded by an National Institute for Health Research (NIHR) Health Technology Assessment 09/104/19. BA is funded by an NIHR Post-doctoral Translational Fellowship (School of Primary Care).

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1. Thomas *et al. Prim. Care Respir. J.* **20**, 250–256 (2011).
2. Edwards *et al. Eur. Respir. J.* **49**, 1602448 (2017).
3. Bruton *et al. Prim. Care Respir. J.* **22**, PS1–PS7 (2013).

S39. The development and implementation of a personal health organiser for patients diagnosed with idiopathic pulmonary fibrosis (IPF): a pilot study

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Background: The British Lung Foundation (BLF) advocates for supported self-management approaches. There were no patient-held-records or personal healthcare organiser (PHO) initiatives for people with Idiopathic Pulmonary Fibrosis (IPF) in 2014. We proposed to develop, test and evaluate a PHO adapting models employed by Diabetes UK and Macmillan.
Methods: The structure, format and content was informed by patients and Interstitial Lung Disease (ILD) healthcare professionals; cross referenced by The National Institute for Health Care Excellence (NICE) guidelines and British Lung Foundation (BLF) resources. Participants completed a hard copy of the PHO over 6 months. Pre-study and 2 weeks post-study, a 13-item questionnaire to assess knowledge and confidence in managing IPF was completed. Participants affirmed level of agreement on a 5-point Likert scale (scores 0-4). Post-study focus groups (FG's) were held, one at each of the recruiting specialist centres. The FG sought to evaluate patients' perceptions of the usefulness of the PHO as an adjunct to the medical record and as an aid to self-management.
Results: Twenty-nine patients completed pre-pilot questionnaires. Ages <60 years = 3; ≥ 60 years = 9; ≥ 70 years = 7; ≥ 80 years = 9. Two participants had been diagnosed with IPF within 6 months; seven <2 years ago and eighteen >2 years. Seven patients died before the PHO phase. Twenty patients completed the PHO. 60% male. Mean % predicted forced vital capacity (FVC) 70.75 ± 15.7. Thirteen patients and seven family members participated in FG's. Mean change between pre and post study questionnaire is 5.65. Median score changes were noted for two 'confidence' items relating to self-management of medication and solution-focused-thinking for new health problems. This supports themes identified in FG transcript analysis.
Outcomes: The IPF PHO was to easy understand and used regularly by two thirds of participants. It contributed to increasing knowledge, skills and confidence, further supporting self-management. Patients shared the PHO with nurses and hospital doctors who perceived it helped to facilitate discussion. Participants rarely used the PHO in GP consultations which requires further exploration.
Conflicts of Interest: None.
Funding: British Lung Foundation.
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S41. Rhythm & song: breath management in idiopathic interstitial pneumonias (IIP). Pilot study

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Introduction: Breathlessness is a distressing symptom. Current therapies offer little relief in Idiopathic Interstitial Pneumonias (IIP). Breathlessness management utilising techniques for breathing control, mindfulness and posture, specifically tailored to IIP may be helpful.
Methodology: Participants attended a 12 week programme. Weekly sessions were based on concepts of Singing for Breathing[1] using physical and vocal warm-ups; breathing exercises; rhythm / pitch games; songs and relaxation. Participants completed a diary recording reflective, retrospective thoughts before and immediate responses after each class. The music therapist completed a weekly reflective diary. Later sessions were audio recorded. Measures of symptom burden were completed at weeks 1 and 12.
Results: Ten participants, 7 male; mean age 72 (range 64-81 years) enrolled. Participants completed questionnaires and forced vital capacity (FVC) was recorded at week one and week twelve. There were improvements in mean scores from week one to week twelve in depression Patient Health Questionnaire (PHQ)-9: 4.5 (±3.12) to 3.8 (±3); anxiety Generalized Anxiety Disorder (GAD)-7: 2.11 (±2.42) to 1.60 (±1.67); quality of life St. George's Respiratory Questionnaire (SGRQ) Symptoms: 55.60 (±29.39) to 48.60 (±26.83); SGRQ Activity: 58.38 (±30.49) to 51.23 (±41.06); SGRQ Impacts: 33.71 (±22.58) to 19.98 (±12.81) and SQRQ Total 43.97 (±28.00) to 30.18 (±20.64). Perceptions of breathlessness improved according to modified Medical Research Council (mMRC) scale. There was no meaningful change FVC. Emotional Thermometers Visual analogue Scale demonstrated a reduced need for help at the end of the 12 week programme. Diaries were subjected to thematic analysis; the following themes were identified: Physical experience; psychological wellbeing; cognitive ability and social functioning. Participants agreed the course was a positive experience physically, emotionally and socially offering skills for better symptom management.
Discussion: The study provides a positive baseline for which to plan and continue future work. A larger multicentre centre study is needed to confirm these findings in a larger population integrating a robust end point model.
Conflicts of Interest: None.
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Reference:
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