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ABSTRACTS OPEN

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CLINICAL RESEARCH RESULTS ABSTRACTS

CR01. A systematic review of children with asthma aged 5–12 to identify and weight indicators of risk of asthma exacerbations

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Aim: Asthma is the commonest long-term condition in children with exacerbations impacting on both school attendance and quality of life. Factors associated with an increased risk of future exacerbations have been identified, and could inform clinical assessment of risk and targeting of care. The aim of this research was to systematically review the literature to identify and weight factors associated with increased risk of exacerbations in children aged 5–12 years.
Method: We systematically searched six databases and undertook forward citation searches, with no date/language restrictions. Two reviewers independently selected studies for inclusion, assessed methodological quality and the extracted data. Heterogeneity precluded a formal meta-analysis. An expert panel of four clinicians independently assessed each factor for both degree of risk and confidence in that assessment, based on study quality, effect sizes, biological plausibility and consistency of results. Consensus was achieved by discussion and agreed at a multidisciplinary workshop.
Results: We included 48 papers. The panel were very confident that previous exacerbations and African-American ethnicity (US studies) were associated with greatly increased risk of exacerbations. Persistent symptoms were associated with moderately/greatly increased risk. A moderately increased risk of exacerbation was associated with a suboptimal drug regimen and high reliever use, co-morbid atopic diseases and allergic sensitisation, poverty, exposure to tobacco smoke and poor access to care. Younger age and obesity were associated with slightly increased risk. Gender and age of onset of asthma were not associated with risk.
Conclusion: Assessment of these clinical and demographic features will help clinicians to 'spot the child' at increased risk, and institute management to reduce risk. Population level factors (poverty, poor access to care) may be used by health service planners and policymakers to target health-care initiatives.
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Reference:
1. PROSPERO: CRD42016037464 Available at http://www.nature.com/articles/npjpcrm201688.

CR02. Allergic rhinitis is suboptimally managed in the community

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Aim: Allergic rhinitis (AR) is one of the most underestimated respiratory conditions, by both health-care professionals and patients. Its management is frequently complicated by delayed diagnosis and improper treatment because attempts by patients to self-medicate with a wide range of over the counter (OTC) medications available from pharmacies without the need for a prescription or pharmacist consultation. This study aimed to evaluate the appropriateness of medication purchased by patients for the symptoms of AR.
Method: Pharmacy customers who presented to Sydney metropolitan community pharmacies and purchased a nasal related product or approached the pharmacist for advice for nasal symptoms (including with a prescription) were eligible. Data collected included demographic information, symptoms, treatments used and advice received from health-care professionals. The appropriateness of medication used was evaluated by an expert panel of clinical research pharmacists, based on the Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines.[1]
Results: Two hundred and ninety-six pharmacy customers were recruited from 8 pharmacies and 68% (201/296) were identified as having AR and subsequently descriptively analysed. Seventy per cent self-selected their medications over the counter. Thirty per cent interacted with a pharmacist. Although 67% had a doctor's diagnosis of AR, 85% selected suboptimal treatment based on the ARIA guidelines. Furthermore, 98% of the participants reported having moderate-to-severe symptoms with 61% reporting an impact on their quality of life.
Conclusion: This study indicates a high rate of self-management of AR in the community pharmacy with low numbers of patients seeking professional advice. The high rate of suboptimal selection of treatment provides tremendous opportunities for pharmacists to intervene and assist in optimising their treatment choices and AR management.
Declaration of Interest: None
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Reference:
1. Bousquet, J., *et al. Allergy.* **63** Suppl 86, 8–160 (2008).

CR03. Associations with incongruence between patient and informal carer symptom reporting in advanced chronic obstructive pulmonary disease

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Aim: Informal carers provide valuable information on patients' symptom experiences to clinicians and researchers, and accurate carer assessment is

critical for symptom management by carers themselves. However, few studies have investigated the validity of proxy reporting in COPD or the primary care setting. We aimed to assess agreement between patient and carer reports on symptoms, and identify factors associated with incongruence in a population-based sample of advanced COPD.
Method: A prospective, cross-sectional analysis of data from well-characterised patients with advanced COPD and their carers (119 patient-carer dyads), who separately rated patient symptoms on a 4-point scale. Wilcoxon signed-rank tests determined differences in mean patient and carer symptom scores, and weight-kappa assessed agreement on scores. Spearman's correlation and Mann–Whitney *U*-tests identified characteristics associated with incongruence.
Results: There were no significant differences between mean patient and carer scores for any symptom, although carers more frequently underestimated symptoms (Table 1). Patient-carer agreement was only fair to moderate; higher agreement was found for physical symptoms (constipation and diarrhoea) than psychological (anxiety and depression) or those with emotional valence (dyspnoea and fatigue; (Table 1). Greater estimation by the carer was associated with non-spousal relationship, non-cohabitation, lower carer educational level, greater carer anxiety, more carer unmet support needs and greater subjective caring burden, and by the patient was associated with younger age, longer duration of COPD and greater patient anxiety.
Conclusion: Symptom underestimation by carers and poorer agreement on emotional symptoms may reflect patient concealment, long disease trajectories in COPD leading to carer compassion-fatigue and response shift, and lack of symptom awareness in the primary care setting. Incongruence was associated with less patient-carer interaction, greater disease and caring burden, and poorer patient and carer psychological health. Our findings suggest the need to encourage open communication within dyads and educate carers in assessing subjective symptoms.
Declaration of Interest: None
Funding: The authors declare that no funding was received
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[CR03]

Table 1. Agreement between patient and carers on symptom scores

	n	*Difference in mean scores (P value)*	*Weighted kappa[a] (95% CI)*
Dyspnoea	106	−0.151 (0.089)	0.210 (0.053–0.267)
Fatigue	105	−0.067 (0.571)	0.294 (0.161–0.427)
Constipation	91	−0.022 (0.840)	0.423 (0.246–0.599)
Diarrhoea	93	0.086 (0.264)	0.393 (0.231–0.555)
Anxiety	96	−0.021 (0.749)	0.289 (0.137–0.440)
Depression	100	−0.090 (0.342)	0.341 (0.195–0.486)

Abbreviation: CI, confidence interval.
[a] < 0.20 as poor agreement; 0.20–0.39 as fair agreement; 0.40–0.59 as moderate agreement; 0.60–0.79 as substantial agreement; 0.80–1.00 as excellent agreement.

CR06. Changing inhaled corticosteroid/long-acting β2 agonist (ICS/LABA) therapy from dry powder inhalers (DPI) to metered-dose inhalers (MDI): An observational study on asthma outcomes in South Korea

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Aim: Use of inhaled corticosteroid/long-acting β_2-agonist (ICS/LABA) pressurised metered-dose inhaler (pMDI) has been associated with better asthma control outcomes, compared to ICS/LABA dry powder inhalers (DPI).[1] Current prescribing patterns for ICS/LABA treatment for asthma in South Korea are dominated by DPIs. Recently, pMDIs have been introduced and reimbursed under the national health insurance scheme.
Method: This retrospective matched cohort study compared 1-year asthma outcomes for South Korean patients who initiated fixed-dose combination (FDC) ICS/LABA pMDI versus patients who continued ICS/LABA DPI prescriptions. Patients aged 12–80 years with ⩾2 pMDI and no DPI prescriptions after initiating pMDI treatment were matched 1:3 to those who were prescribed ⩾2 DPI on baseline demographic and asthma severity measures in the year prior to change of therapy. The main outcome evaluated non-inferiority of effectiveness (defined as prevention of severe exacerbations, lower limit of the 95% CI of the mean difference between groups in patient proportions with no exacerbations ⩾−0.10), in patients who change from ICS/LABA DPI to ICS/LABA pMDI. If non-inferiority was met, superiority was tested. Secondary outcomes included severe exacerbation rates and short-acting β_2-agonist (SABA) usage.
Results: The pMDI cohort met non-inferiority as the adjusted mean difference in proportion of no severe exacerbations (95% CI) was 0.013 (−0.028, 0.055) between the two cohorts. Compared with the DPI cohort ($n = 1926$), patients in the pMDI cohort ($n = 642$) had a statistically significantly lower rate of severe exacerbations during the outcome year (adjusted rate ratio 95% CI) 0.88 (0.651, 0.954), and lower SABA inhaler average daily dose (adjusted odds ratio 95% CI) 0.713 (0.606, 0.84).
Conclusion: Changing to ICS/LABA pMDI from DPI is associated with non-inferior effectiveness (proportion of patients who are severe exacerbation free), with a lower severe exacerbation rate and improved asthma control compared to continuing with ICS/LABA DPI prescriptions.
Declaration of Interest: Mundipharma funded this study.
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Reference:
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CR07. Characteristics and illness perceptions of asthma/COPD patients with good inhaler medication technique: an inhaler research workgroup study

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Aim: Inhalation medication is the cornerstone of asthma and COPD treatment. However, an estimated 70–80% of patients have poor inhaler technique which leads to poor health outcomes and increased costs. The purpose of this study is to learn from patients with sufficient inhaler technique and compare their characteristics with patients with poor technique. Our results can be used to improve inhaler instructions.
Method: The study consisted of three phases: (1) Cross-sectional and longitudinal database analysis is performed to evaluate differences in patient characteristics and disease severity (with the Asthma Control Questionnaire (ACQ),[1] Clinical COPD Questionnaire (CCQ)[2] and exacerbations). Good and poor inhalers were compared at baseline ($n = 8151$) and at 1 year follow-up ($n = 766$). We used the real-life database from the Dutch Asthma/COPD (AC)-service where all patients have had their technique evaluated. (2) Differences in illness perception are examined using the Illness Perceptions Questionnaire IPQ-K.[3] Patients with good technique are compared with patients with wrong technique (*n* total = 83, patients recruited from

AC-service). (3) We performed in-depth interviews with 12 asthma and COPD patients with good inhaler technique (patients recruited from AC-service).
Results: The database analysis showed that good inhaler technique is related with female gender (female 39% good, male 36% good, $P < 0.01$), younger age (mean age: good 51 ± 18 year, poor 54 ± 18 year, $P < 0.01$) and having asthma (asthma: 39% good, COPD: 33% good, $P < 0.01$). Patients with good technique are more likely to have allergies and to have had an exacerbation in the past year compared to patients with poor technique. Follow-up comparison of patients at baseline poor inhaler technique showed that 45% have achieved good inhaler technique. At follow-up differences between good and poor inhalers have disappeared except for gender (good: women 49%, men 42%). No differences were found in asthma control (ACQ) or health status (CCQ). Patients with good inhaler technique have more realistic illness perceptions. Remarkable was the poor knowledge of COPD patients with poor technique. Our interviewees used methods to remind them to take their medication. Most patients had sufficient knowledge about their disease.
Conclusion: Patients with good inhaler technique different from patients with poor technique. However, most differences disappeared at follow-up indicating that inhaler technique can be learned regardless of age or diagnosis. Instructors should pay more attention to disease knowledge especially in COPD patients. The results of this study can be used to improve the education to care givers and to develop a good inhalation instruction.
Declaration of Interest: The IRW study has received funding from AstraZeneca, Boehringer Ingelheim, Mundipharma
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CR08. COPD patients in primary care have a poor general knowledge of the disease and self-management

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Aim: To describe the exacerbation prevalence among primary care patients with COPD in GOLD 2 and 3 (ref. 1), assess self-reported information needs and self-management knowledge, and identify characteristics for detecting patients with high information needs.
Method: Spirometry, self-reported data on exacerbation history and health status were collected in randomly selected COPD patients in GOLD 2 and 3 ($n = 567$) from 24 primary health-care centres in Stockholm, Sweden. The Lung Information Needs Questionnaire (LINQ)[2] was used to assess the patient's need for information about COPD.
Results: Sixty-eight per cent were in GOLD 2 and 32% in GOLD 3. In total, 35% had exacerbated at least once during the last 6 months, 29% of GOLD 2 and 46% of GOLD 3 patients ($P < 0.001$). GOLD 2 patients had a higher level of COPD information need (higher total LINQ score; $P = 0.008$), and a lower level of self-management knowledge than GOLD 3 ($P = 0.000$). We found an association between a high LINQ score and patients not capable of self-managing an exacerbation (OR = 4.20 (95% CI 2.70–6.53), not knowing who their responsible GP was (OR = 3.07 (95% CI 1.85–5.07)), lacking contact with a specialised COPD nurse (OR = 2.05 (95% CI 1.31–3.21)), current smokers (OR = 1.87 (95% CI 1.16–3.01), patients with a higher education level (OR = 1.64 (95% CI 1.07–2.53), no history of exacerbations (OR = 1.56 (95% CI 1.00–2.45)), all adjusted to each other. Gender, age, comorbidities, treatment adherence and health status were not associated with the LINQ score.
Conclusion: As patients generally show high information needs and one-third of GOLD 2 patients exacerbate, more attention should be paid to early onset of patient education. Continuity in patient–GP relationship contributes to better knowledge of COPD.
Clinical Trial Registry: NCT02213809.
Declaration of Interest: HS: received an unrestricted research grant (AstraZeneca), honoraria for educational activities (AstraZeneca/Boehringer Ingelheim/Novartis). BS: honoraria for educational activities/lectures/advisory boards (AstraZeneca/Boehringer Ingelheim/GlaxoSmithKline/Novartis/MEDA/TEVA). AN: honoraria for educational activities (AstraZeneca). The remaining authors declare no conflict of interest.
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CR10. Diagnosis of COPD in smokers in family medicine practice: how successful are we?

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Aim: To determine how many smokers were correctly diagnosed with COPD in family medicine practice.
Method: This was a retrospective cohort study. We included 10 family medicine practices. We reviewed the medical documentation of all smokers who visited these practices in year 2015. We reviewed the results of spirometry, pulmonologists' reports, smoking history, and demographic characteristics. T.I. (Tiffeneau Index) lower than 70% was regarded as a pathological one and patients with such T.I. were suspected having a COPD.
Results: We included 359 smokers into the study, out of which 153 (42.6%) were females. The average age of the sample was 58.5 ± 9.8 years. The average duration of smoking was 30.7 ± 11.8 years. Mean FEV1 (forced expiratory volume in first second) was 95.6 ± 23.2%. Mean FVC (forced vital capacity) was 105.8 ± 26.2%. Mean T.I. (FEV_1/FVC) was 97.0 ± 17.1%. COPD was suspected in 43 (12.0%) patients in the sample. 23 (6.4%) of all examined patients in primary care were referred to pulmonologist for the confirmation of the diagnosis of COPD. We got pulmonologist's reports for 17 (73.9%) patients. The COPD was confirmed in 11 (64.7%) of them. Others had mixed air obstruction (asthma and COPD) (3, 17.6 %), asthma (1, 5.9%), thickened bronchi walls (1, 5.9%) and one patient refused consultation with a pulmonologist.
Conclusion: Our study showed that the majority of smokers suspected of having COPD were correctly diagnosed at the primary care level in Slovenia. However, it remains unclear why only some of smokers with pathological T.I. were referred to a pulmonologist. Additional studies on larger samples are needed to determine the guidelines adherence on COPD detection in smokers in Slovenian primary care.
Declaration of Interest: None.
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CR11. Doctors' approach to pulmonary rehabilitation: A multicentered study

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Aim: This study was planned to examine doctors' approach to pulmonary rehabilitation (PR), which is considered to be effective today.
Method: Specialists from five separate hospitals in five cities who see patients with respiratory diseases completed a questionnaire of 17 questions. The data were analysed by the Inc.,S.(2006) SPSS for Windows :Release 15.0.0. SPSS Inc., Chicago, IL, USA.
Results: A total of 119 doctors participated in the questionnaire. In all, 31% of them were internists; 26.9% of them were anaesthesiologists, 24.4 % of them were family physicians, 10.9 % were neurologists and 6.7% of them were pulmonologists. Participants indicated that in their daily clinical practice they most frequently meet people with COPD (75.6%). The proportion of doctors who directed their patients to PR was only 28.6%. COPD patients were the most frequently directed group. In all, 86% of the doctors who did not refer patients said they did not know about rehabilitation or rehabilitation centres. In all, 16.7% of the doctors observed that the benefit to the individual's quality of life was increased exercise capacity. There was a belief that hospital PR methods would be most useful. In all, 14.3 % of the participants recommended treatment at the hospital. In all, 7.6% of doctors said that they did not direct the patients with muscle disease to the rehabilitation and 5.9% of doctors did not direct smokers to rehabilitation. However, mostly they didn't see any obstacle to rehabilitation. In all, 19.3 % of the physicians thought the six minute walk test was appropriate for evaluating exercise capacity. In all, 27 % of the participants thought that yoga was worthless as a PR method. Physicians did not use a scale or questionnaire to evaluate quality of life or dyspnoea.
Conclusion: Pulmonary rehabilitation, which has been proven to be a significant contributor to effective treatment of chronic respiratory diseases is not well known and used by doctors in Turkey. This preliminary study was prepared to raise awareness.
Declaration of Interest: None
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CR12. Educating professionals to implement supported self-management: a systematic review from the IMP2ART (IMPlementing IMProved Asthma self-management as Routine Treatment) programme

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Aim: Supported self-management improves outcomes for long-term conditions: however, implementation is poor. Educating professionals is a core component of implementation strategies. We aimed to synthesise evidence regarding the effectiveness of educational interventions for professionals supporting self-management amongst people with asthma or diabetes (a comparator long-term condition).
Method: Randomised controlled trials or controlled clinical trials published 1990 to 2016 were eligible. We searched in 13 electronic databases and two trial registers; completed citation searching; and contacted study authors. Screening, data extraction, and risk of bias assessment (using the Cochrane Risk of Bias Tool[1]) were completed by two independent reviewers. We also searched grey literature. A narrative synthesis (informed by the Theoretical Domains Framework[2,3]) was performed.
Results: Of 20,366 identified papers, 31 (21 studies) were included. Risk of bias was unclear in most studies. No interventions were effective in improving HbA1c (assessed in 7/8 diabetes studies). The 13 asthma studies assessed a range of health-care professional and patient outcomes. Two of five studies were effective in increasing action plan provision/ownership. In 5/12 studies, patient outcomes improved (rates of uncontrolled asthma and levels of unscheduled care (emergency department visits/ hospitalisations/ urgent primary care visits) decreased). Features of effective interventions included: interactive education, a whole-team focus, opportunities for self-monitoring or reflection, emphasis on positive consequences of support, resources for consultations, and monetary or educational credits. Eight heterogeneous and poorly reported grey literature studies emphasised professional and/or patient involvement in intervention design.
Conclusion: Features of effective interventions will be incorporated into a whole systems intervention aiming to embed supported self-management into routine primary care asthma management.
Declaration of Interest: Monica Fletcher is the Chief Executive for Education for Health, an organisation that provides training for health-care professionals. Amanda Andrews is an employee of Education for Health. The authors declare no further competing interests related to this work.
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CR13. Educational Initiatives for Asthma; How to make it stick!

Alan Kaplan, Anthony Ciavarella, Robert Hauptman
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Aim: To review the best method of asthma education for primary care physicians.
Method: A series of educational endeavours on both asthma and COPD and compared outcomes for each step. Participants completed three pop quizzes over the course of the programme—prior to the learning activity, then one three months post-learning activity (midterm), and one nine months post-learning activity, as well as two practice assessments, one prior to the learning activity and one nine months post-learning activity.
Results: A total of 278 clinicians participated. Clinicians' behaviour did change. An asthmatic patient (documented reversibility) with moderate airway obstruction on a low dose ICS and SABA had the correct answer to educate re triggers and adherence. This correct answer actually fell from 88% to 80% over the programme due to a 'Sophistication Bias' as after they were introduced to the concept of challenge testing, they answered with this increased from 6% to 13%. Pharmacologic therapy in the next question correct answer fell from using the ICS regularly as first step (83 to 67%) while increasing in Add LABA from 14% to 27%. Again, they learned that the first step up therapy was to add LABA, but this may not be effective in a non-adherent patient. I call this an 'Educational Bias', i.e., I think I learned the correct answer, so I will use it. Once adherence was taken out of the equation, adding a LABA correctly increased from 47 to 80%. Despite education that low dose ICS was safe, the side effect concerns actually increased with concerns re cataracts (6 to 13%), bone density (13–20%), and no adverse effect on final height going down from 79 to 67%. A 'side effect bias'; once you learn a side effect, it becomes more of an issue in your beliefs. In the self-efficacy assessment, i.e., how they feel about asthma management, all facets improved over the course in rating of effective or very effective including: assessment and diagnosis 55–>71%; treatment strategies 55–>60%; patient education skills for asthma management 53–>73%; follow-up assessments for asthma patients 50–>65%.
Conclusion: Message can be confused if combined with lots of new information. Just telling once does not do it unless motivated. Repeat messages/testing those messages works. Multimodal delivery systems to reinforce. Message for others: Do not quit after a single educational initiative, but reinforce it with other modalities.
Declaration of Interest: Advisory Board and/or speaker's bureau: AZ, BI, Griffols, GSK, Merck, Novartis, Purdue, Pfizer, Teva
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CR14. Educational Initiatives for COPD; how to make it stick!

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Aim: To review the best method of COPD education for primary care physicians.

Method: We undertook a series of educational endeavours on both asthma and COPD and compared outcomes for each step. Participants completed three pop quizzes over the course of the programme—prior to the learning activity, then one 3 months post-learning activity (midterm), and one nine months post-learning activity, as well as two practice assessments, one prior to the learning activity and one nine months post-learning activity.
Results: Five hundred eleven clinicians participated. Clinicians' behaviours did change. The things that they knew, did not change, and overall evaluation of things like lung function levels of severity and dyspnoea were low at ~50% getting this correct, and not changing. Advice re inhaler technique and action plan were surprisingly high at >90%. Likely an 'Expectation Bias' as they knew they were supposed to say they did this? Evidence is clear that use of Action Plans in COPD continues to be quite low. Pharmacotherapy messages did get through however, with the biggest changes being in the addition of a LABA to a patient with a LAMA and SABA who was still quite symptomatic (44à 75%) and not the automatic addition of an ICS/LABA which went down as next step therapy (47à10%) in this non-exacerbating symptomatic patient. However, in the self-efficacy assessment, i.e., how they feel about COPD management, all facets improved over the course in rating of effective or very effective including: assessment and diagnosis of COPD patients 45% to 67%; treatment and strategies for COPD management 41% to 69%; patient education skills for COPD management 37% to 71%; follow-up assessments for COPD patients 41 to 69%.
Conclusion: Previous learning gaps are not filled if not felt to be relevant (measurements of lung function). Just telling once does not do it unless motivated. Repeat messages and testing those messages works. Multimodal delivery systems to reinforce. Message for others: Do not quit after a single educational initiative, but reinforce it with other modalities.
Declaration of Interest: Advisory Board and/or speaker's bureau: AZ, BI, Griffols, GSK, Merck, Novartis, Purdue, Pfizer, Teva.
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CR15. Estimating exacerbation rates from routine UK primary care data: an exploratory validation from the IMP2ART (IMPlementing IMProved Asthma self-management as Routine Treatment) programme

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Aim: Observational and implementation studies detect asthma exacerbations using the codes recorded in anonymised routine datasets (e.g., unscheduled care/steroid courses). Inconsistent coding challenges the accuracy of this secondary use of data collected for clinical purposes. We aimed to determine the accuracy of codes for detecting exacerbations in routine data from UK primary care compared to data extracted by inspecting the record, and to explore alternative codes and proxies to improve accuracy.
Method: The medical records of 50 randomly selected asthma patients (⩾5 years) from each of 10 general practices were examined by a trained researcher to determine if the patients had had an exacerbation within a given year (the reference standard). We analysed the sensitivity and specificity of (a) precise read codes for an exacerbation; (b) imprecise codes that might indicate an exacerbation and (c) explored algorithms using a range of codes to optimise detection of exacerbations.
Results: We analysed the data from 500 people with asthma; mean age 50 (s.d. 20) years; 59% female. Precise codes for primary care unscheduled consultations for exacerbations had a sensitivity and specificity of 19 (CI 1 to 26) and 97 (CI 95 to 88), respectively. Including imprecise codes improved the sensitivity and specificity to 35 (CI 27 to 42) and 83 (CI 79 to 87). The best performing algorithm (precise codes+imprecise codes and codes for steroid courses) gave a sensitivity and specificity of 72 (CI 64 to 78) and 81 (CI 76 to 85). For all unscheduled care (including admissions and emergency department visits) we achieved a sensitivity and specificity of 71 (CI 63 to 80) and 82 (CI 77 to 86).
Conclusion: Our validated algorithm, that detects exacerbations using coded data from UK primary care, will be of value to clinicians, researchers and health-care planners.
Declaration of Interest: None.
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[CR15]

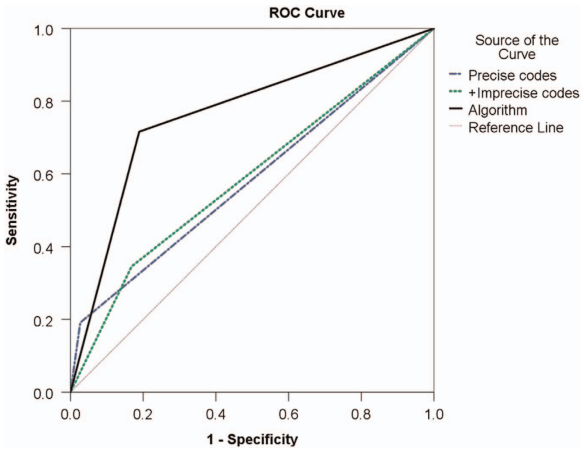

Figure 1. Estimating exacerbation rates from routine UK primary care (1).

CR16. Evaluating a simple lung monitor as a screening test for COPD in primary care

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Aim: COPD is widely underdiagnosed worldwide; there is a drive to identify and treat patients earlier. Diagnostic spirometry is not widely available in many countries. The Vitalograph lung monitor (Vitalograph, UK) is a simple screening test which measures FEV_1/FEV_6 and could be used as a screening step in primary care to identify patients suitable for spirometry referral. We present the performance of this simple post bronchodilator (postBD) COPD screener device compared to postBD quality diagnostic.
Method: We conducted a nested case–control study within the Birmingham COPD Cohort study. Patients with chronic respiratory symptoms at the final visit received postBD lung function assessment with the Vitalograph lung monitor (Index) followed by the Ndd Easy on-PC sensor (Spiroson-AS) (Ndd, Switzerland). Cases were defined using the lower limit of normal (LLN–GLI), based on gold standard spirometry data. Correlation, agreement and discrimination (*c* statistic) was calculated.
Results: A total of 546 patients had reference and index test data. Reference and index tests were highly correlated for FEV1 ($r = 0.97$; $P < 0.001$) and FEV6 (screener) with FVC(spirometry; $r = 0.91$; $P < 0.001$). In all, 325 (59.5%) patients had airflow obstruction according to the reference test. The index test showed good discrimination ($C = 0.92$; 95% CI 0.89, 0.94). Using the LLN as the cutoff, the index test had only 32.9% sensitivity (95% CI 27.8%, 38.3%) but 98.6% specificity (95% CI 96.1%, 99.7%); (PPV = 97.3%, NPV = 50.0%).
Conclusion: Excellent correlation was observed between the postBD lung monitor and diagnostic spirometry, however the optimum cutoff for the lung monitor should be identified as use of the LLN cutoff has low sensitivity.
Declaration of Interest: This abstract presents independent research funded by the National Institute for Health Research (NIHR) National Schools of Primary Care. The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.
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CR17. Evaluating real-life effectiveness in patients who change from a DPI to pMDI for ICS/LABA treatment

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Aim: This study aimed to evaluate the proportion of patients that continue after a change from a dry powder inhaler (DPI) to a pressurised metered-dose inhaler (pMDI), for inhaled corticosteroid (ICS)/long-acting β_2-agonist (LABA) treatment, and assess the proportion that subsequently remain severe exacerbation-free. Unlike previous studies investigating changing inhaler device, the study population had a high proportion of patients with poor asthma control, thus asthma control was deemed a more relevant primary outcome.
Method: This was a historical cohort study, using data from 2010-2016, extracted from Ajou University Hospital. Persistence of change was defined as $\geqslant$70% of patients receiving $\geqslant$1 prescriptions for ICS/LABA pMDI, and no prescription for ICS/LABA DPI, during a 6-month outcome period, and included sub-analysis by type of ICS/LABA pMDI. The proportion of patients with risk domain asthma control (RDAC) during 1-year after the change of therapy that continued with pMDI treatment for a year, was compared to the year prior.
Results: A total of 117 patients changed to ICS/LABA pMDI in the study period. 76% (95% CI 69, 100) persisted with the change over 6 months, with sub-analysis showing persistence of change to fluticasone/formoterol 75% (95% CI 64, 100) and to beclomethasone/formoterol 76.9% (95% CI 67, 100). RDAC represented by the proportion of patients experiencing no antibiotics, no oral corticosteroids, no emergency care, and no admissions ($n = 85$), was higher ($P = 0.001$) after prescription of pMDI ICS/LABA compared to prior to change. Patients changing to pMDI treatment had superior overall asthma control ($P = 0.02$), and significantly decreased ICS average daily dose ($P < 0.001$) in the year following treatment change, with results driven by those changing to fluticasone/formoterol.
Conclusion: Most patients persisted with the change from a DPI to a pMDI inhaler for ICS/LABA treatment. Changing to a pMDI from a DPI inhaler is associated with improved asthma control in those who persisted with change.
Declaration of Interest: Mundipharma funded this study.
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CR18. Evaluating the prevalence and improving diagnosis records in a Portuguese primary healthcare

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Aim: The aim of the present study is to evaluate the prevalence of COPD among Portuguese health centre 'USF Odisseia' users, performing a spirometry in all of the patients with risk factors and improving the records of smoking in all the covered population.
Method: Through a programme of scheduled spirometry testing, a spirometry was performed on a convenience sample formed by users above 40 years and with present or past exposure to smoking, notified by their nurse or family physician during a consultation. In addition, spirometry was accomplished in all users without consultation above 54 years with actual smoking and respiratory symptoms. Selection of the performers and spirometries underwent during 2015.
Results: From a total of 15,288 users, smoking records at the beginning of the study were about 16.2 and 17.6% at the end of 2015. During the present study, 167 users above 40 years with past or actual smoking were notified to perform a spirometry, only 80 did it. A group of 109 patients above 54 years and with actual exposure to smoking were contacted, 19 met the respiratory symptoms criteria to perform a spirometry and only 11 did it. Among a total of 91 patients that accomplished the spirometry, 20 had COPD diagnosis, increasing COPD prevalence on 'USF Odisseia' from an initially 0.8 to 1.3% at the end of 2015.
Conclusion: We need to improve awareness of COPD symptoms in order to match clinical criteria to spirometry leading to more accurate COPD prevalence rates.
Declaration of Interest: None
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CR20. Gender differences in a primary care COPD real-life population

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Aim: To analyse clinical differences related to gender in a COPD cohort population in primary care.
Method: Retrospective real-life cohort study using MAJORICA. All patients older than 18 years who had a physician-confirmed diagnosis of COPD (ICD-9 codes: 491, 492, 496) and/or asthma (ICD-9 code: 493) registered in the primary care health computerised system from the Balearic Islands were included. Sociodemographic and clinical variables, pulmonary function, treatment and clinical outcomes were available.
Results: We analysed 27,871 COPD patients, 65% men. Median age was 66.1 years in men and 64.3 years in women. The proportion of non-smokers was significantly ($P < 0.001$) higher in women (46.1% vs 19.6% in men). Only 33.83% of patients had spirometry data registered (men 35.8% vs. women 30.1%), and 25.6% of men had a spirometry confirmed diagnosis (FEV1/FVC $< 70\%$) compared to 18.1% of women. Asthma/COPD overlap (ACOs) appeared in 5,930 (18.3%) and was more frequent in women (27.9%) than men (13.1%). Cardiovascular comorbidities were more frequent in men, whereas in women, osteoporosis, allergic rhinitis, depression and anxiety had significant higher prevalence. There were no significant differences in treatment patterns but influenza vaccination (48.1% in men vs 41.2%in women, $P < 0.05$). Exacerbations requiring emergency consultation or work absence were similar in both gender groups.
Conclusion: There are considerable differences related to gender in a COPD primary care real-life population. The large proportion of non-smokers and ACOs, the small number of spirometry test performed and the higher proportion of not confirmed COPD in women could be showing a less accurate COPD diagnosis and a great proportion of asthma misdiagnosed with COPD among women.
Declaration of Interest: MRR has developed lectures and received grants from different pharma companies: Astra-Zeneca, Boehringer-Ingelheim, Chiesi, GSK, Mundipharma, Novartis, Pfizer, Teva. JVB's institution received grants from GSK, Boehringher Ingelheim and Astrazeneca and consultancy fees from Astrazeneca. The rest of the research group declare no conflicts of interest related to this work.
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CR21. Health workers' practices in management of respiratory illnesses among 'under-fives' in primary care settings in Uganda: a descriptive study

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Aim: The global burden of childhood asthma is high and increasing steadily. Diagnosis of childhood asthma is highly dependent on clear, simple and good history and physical examination but asthma in under-fives remains largely under-diagnosed. Little is known about the management of asthma among under-fives in primary care settings in low-income countries. We aimed to describe the health workers' practices in diagnosis and management of respiratory illnesses among children in rural primary care centres in Uganda.

Method: Clinicians who regularly attended to children less than 5 years of age were observed during a clinical consultation for children with respiratory symptoms such as cough and difficult breathing. A pre-coded tool with items in the history and physical examination that are important in making a diagnosis of asthma in children according to Global Initiative for Asthma (GINA) guidelines was used to record the questions asked and examination performed by the clinician. Caretaker exit interviews were also conducted to determine the information provided by the clinician regarding the diagnosis of their child's illness, medicines prescribed and follow-up plans. Descriptive statistics were used to determine the proportion of consultations in which appropriate history and physical examination for diagnosis of asthma were done.
Results: Overall, there were few consultations in which history relevant to childhood asthma was elicited. Key symptoms of asthma such as recurrent cough, difficult breathing and wheezing were elicited in only 11.6% (16/122) of the consultations. Similarly, a physical examination relevant to diagnosis of asthma was performed in only 13% of the consultations. The most common diagnoses were; pneumonia (22%) and asthma (11%). In majority (>95%) of consultations, health workers did not explain the diagnosis and management plan to the caregivers.
Conclusion: The majority of health workers in primary care settings do not elicit sufficient information for diagnosis of childhood asthma. Interventions such as training and guidelines on management of childhood asthma should be implemented in order to improve the health worker's awareness, knowledge and skills for diagnosis and management of asthma are urgently needed
Declaration of Interest: None
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CR23. Identifying perceptions of parents as children transition into autonomous inhaler use

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Aim: Parents play an important role in the transition of children to adult self-management. There are many barriers to this transition and if poorly planned, the young adult may face a multitude of consequences. This research explored the perceptions of parents in managing transition towards autonomy in asthma medication management of their children.
Method: A mixed methods, cross-sectional study design utilising researcher collected semi-structured and structured questioning as well as participant completed questionnaires, used a theoretical and empirical approach to explore five domains: demographics, asthma history, knowledge and skills, health network mapping and support needs.
Results: Several themes around the domain of asthma management, autonomy and medication use emerged: Parent's lack of understanding and skills around their inhaler technique and spacer use, there is a physician unawareness regarding children self-managing their medication from school age, parents understanding the benefits of medications outweigh the risks of side effects, however, a fear of steroid use persists, parents take responsibility of asthma management most of time, with a majority of parents satisfied with having more responsibility in management than their children and parents lack of the skills to recognise asthma triggers and the management of acute flare ups.
Conclusion: These results suggest that the perceptions of parents in managing the transition towards autonomy in asthma medication management of their children are complex and multi-dimensional. There remains a need to support the multitude of misunderstandings and misconceptions experienced by parents, which not only impact on parent's knowledge but also their medication related skills. In light of these findings, it will be important to explore the impact of parent's perceptions on the actual ability of children to use their inhalers independently.
Declaration of Interest: None
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CR25. Improved quality of care by the PRISMS form in supporting self-management in patients with COPD; A Randomised Controlled Trial (RCT)

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Aim: To investigate whether Patient Report Informing Self-Management Support (PRISMS) could improve quality of care when supporting patients with COPD in self-management.
Method: A RCT was conducted in 11 Primary Health Care centres in 2016 and included an intervention group ($n=93$) and a control group ($n=116$). The intervention group used PRISMS in consultation with the COPD nurse. PRISMS contain 17 items concerning the most common problems patients with COPD experience in daily life. The patients marked three items for which they wanted self-management support. The patients in the control group received usual care. Quality of care at the consultation was assessed with the, modified for COPD-nurses, questionnaire Quality from the Patients Perspective (QPP) in five domains; information (i.e., examinations, medical regimens, results and self-management), personal attention (i.e., understanding, contact, sympathy, respect, interest and engagement), medical knowledge and assessment, patient-participation, and satisfaction with the clinic. The items in QPP estimate in two ways, perceived reality and subjective importance.
Results: Mean ages of the patients were 71 years (s.d.$\pm$9.05) and 71 years (s.d.$\pm$8.14), respectively. The patients in total were retired from work (81%), 2% were current smokers and 57% were cohabiting. The perceived reality in the intervention group indicated a better quality of care regarding personal attention compared to the control group, though not statistically significant ($P=0.064$). The subjective importance of personal attention showed a difference between the groups, where the intervention group estimated a higher quality than the control group ($P=0.046$). The information, the COPD-nurse medical knowledge and assessment, patient-participation, and satisfaction with the clinic showed no differences between groups in either perceived reality or subjective importance.
Conclusion: PRISMS could be a useful tool to improve quality of care in supporting self-management. Personal attention is an important part of a person-cantered approach.
Declaration of Interest: None
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CR27. Is the psychological health of patients and informal carers related in advanced chronic obstructive pulmonary disease?

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Aim: Anxiety and depression are highly prevalent in patients with COPD and their informal carers, and are associated with numerous risk factors. However, few studies have investigated these in the primary care setting, and little is known about the link between patient and carer anxiety and depression. We aimed to determine this association, and factors associated with anxiety and depression in patients, carers and both in the dyad in a population-based sample of advanced COPD.
Method: Prospective, cross-sectional analysis of the data from 119 pairs of well-characterised advanced COPD patients and their carers. Cases of anxiety and

[CR27]

Table 1. Binary logistic regression analysis of factors significantly associated with patient or carer PM

	Patient PM cases (n = 40)	*Patient PM non-cases* (n = 72)	*Odds ratio (95% CI)*	*P value*
Carer PM cases, n *(%)*				
Y	17 (43.6)	13 (18.6)	3.860 (1.006-14.817)	0.049*
N	22 (56.4)	57 (81.4)		
Patient age, median (IQR)	69 (64–74)	73 (66–79)	0.982 (0.907–1.064)	0.658
No. of exacerbations at home, median (IQR)	3 (2–6)	2 (0–3)	1.294 (0.992–1.690)	0.058
CRQ dyspnoea score, median (IQR)	2 (1.6–2.8)	2.8 (2–4)	1.211 (0.626–2.342)	0.570
CRQ fatigue score, median (IQR)	2.5 (2–3)	3.75 (3–4.5)	0.423 (0.179–1.001)	0.050*
CRQ mastery score, mean (SD)	3.2 (1.1)	4.9 (1.0)	0.254 (0.119–0.540)	< 0.0005*
No. of patient physical comorbidities, mean (s.d.)	4.3 (1.9)	3.4 (1.8)	0.837 (0.577–1.215)	0.349
R^2	62.9%			
	Carer PM cases (n = 31)	*Carer PM non-cases* (n = 82)	*Odds ratio (95% CI)*	*P value*
Patient PM cases, n *(%)*				
Y	17 (56.7)	22 (27.8)	4.398 (1.067-18.123)	0.040*
N	13 (43.3)	57 (72.2)		
Carer sex, n *(%)*				
M	2 (6.5)	29 (35.4)	9.640 (1.454-63.903)	0.019*
F	29 (93.5)	53 (64.6)		
No. of carer physical comorbidities, mean (s.d.)	1.8 (1.5)	1.1 (1.2)	1.148 (0.756-1.745)	0.517
No. of CSNAT carer unmet support needs, median (IQR)	5 (3-8)	1.5 (0-4)	1.390 (1.146-1.686)	0.001*

Abbreviations: F, female, IQR, interquartile range; M, male.

depression were defined as Hospital Anxiety and Depression Scale (HADS) scores ⩾11 and a dichotomous 'psychological morbidity' (PM) variable represented having either anxiety or depression. Chi-square, independent-*t*, and Mann–Whitney *U*-tests determined characteristics significantly associated with patient or carer PM, which were evaluated by binary logistic regression.
Results: Prevalence of anxiety and depression was 31.3% ($n = 35$) and 16.1% ($n = 18$) in patients, and 26.5% ($n = 30$) and 10.6% ($n = 12$) in carers, respectively. In univariate analysis, patient and carer PM were significantly associated ($P = 0.005$), with odds ratio 3.388 (95% CI 1.414–8.118). Patient PM was also associated with younger age, more physical comorbidities, more exacerbations at home, greater dyspnoea, fatigue, poorer mastery and carer PM with female, more physical comorbidities, greater subjective caring burden, more unmet support needs and more exacerbations at home. Table 1 shows the results of multivariate analysis. Finally, dyad PM was associated with male patients/female carers, living apart, parent-child relationship, and more exacerbations.
Conclusion: Psychological health of patients and carers are independently associated with each other, and with fatigue and poorer mastery, and female sex and unmet support needs, respectively, in advanced COPD. It is necessary to identify and address carer psychological morbidity and unmet support needs.
Declaration of Interest: None
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CR29. Managing allergic rhinitis in primary care: the perspectives of general practitioners and pharmacists

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Aim: Allergic rhinitis (AR) is an underestimated, respiratory condition that can be managed in primary care, however rates of poor control remain high. To optimise the patients' self-management, we need to understand the experiences and perceptions of general medical practitioners (GPs) and pharmacists in the management of AR. Exploring their perspective will allow us to describe the environment in which they practice and potentially identify shortcomings that contribute to the suboptimal management of AR in the community. The aim of this study was to explore the perspectives of GPs and pharmacists with regards to AR management and identify the missed opportunities to optimise management.
Method: GPs and pharmacists practicing in metropolitan Sydney were invited via letter, utilising a snowball approach. A semi-structured questionnaire was used to facilitate in-depth exploration of their experiences with AR management. Interviews were transcribed and analysed descriptively.
Results: Thirteen GPs and pharmacists participated in this study. GPs reported that many patients reported symptoms without recognising that the cause of their symptoms was AR, often mistaking them for an upper respiratory tract infection and requiring antibiotics. If they believed they had AR, it was usually at the advice of a pharmacist or friend. Pharmacists reported that most presentations of AR were from people who are experiencing troublesome symptoms for the first time and others who were seeking a more effective treatment than one previously tried. Pharmacists also reported that a substantial number of people self-select products without seeking their advice.
Conclusion: GPs and pharmacists both feel that people with AR need to be better informed about AR to improve their management. Health care providers feel they need further education in the management of AR and we need to explore ways in which management guidelines can be better disseminated and translated into practice in primary care.
Declaration of Interest: None.
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CR31. Patient perspectives with regards to how they measure allergic rhinitis severity and allergic rhinitis control

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Aim: Despite the prevalence, chronicity and burden imposed on individuals and society, allergic rhinitis (AR) continues to be trivialised

by some patients. This study sought to understand how people with AR gauge its severity as well as their perception of what constitutes disease control.
Method: Explorative semi-structured qualitative interviews were conducted with adults with self-reported allergic rhinitis. Participants were recruited via traditional print media, social media and invitations to a volunteers' database. Interviews were transcribed and analysed thematically.
Results: Forty-five people with AR participated in an interview. Several factors were identified with which people with AR use to gauge severity of their condition. These included: their response to non-prescription medicines (i.e., it is not severe if can be treated with over the counter medicines); the frequency of medicines use required to reduce the impact of AR on their quality of life (QOL; i.e., the more frequent their medicine use of medicines, the more severe the AR); the need to consult a health-care professional to obtain medicine to provide symptom relief that is prescription only and the existence of comorbidities and the impact of AR on them. Control was perceived to be achieved when symptoms were not hindering them from their daily activities and were not at the forefront of their minds.
Conclusion: People with AR use their personal experience with over the counter medicines with which to gauge their AR severity and control. Resources need to be developed for people with AR to accurately measure and assess their AR severity and control. This would facilitate better self-management and identification of the need to consult a health-care professional for assistance.
Declaration of Interest: None
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CR32. Patient's nasal symptom management within a community pharmacy

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Aim: People predominantly self-medicate their nasal symptoms with treatments available over the counter without a prescription, from community pharmacy and often do not consult a health-care professional (HCP) for advice. This study aimed to gain a better understanding of the management of nasal symptoms in the Australian context, in particular, to describe the nature and frequency of nasal symptoms experienced and treatment choices made by people managing nasal symptoms in the community pharmacy setting.
Method: Participants included people who visited community pharmacy and purchased medication for their nasal symptoms with or without speaking to the pharmacist about their nasal symptoms. A research-administered questionnaire was used to collect data relating to: patient demographics; symptoms; medication history and advice received from HCPs.
Results: Data was collected from 296 pharmacy customers who purchased medications for their nasal symptoms. Seventy per cent of participants self-selected medications over the counter. Seventy eight per cent of participants reported multiple symptoms, the most common being rhinorrhoea (72%), nasal congestion (74%) and sneezing (68%). The most common medications purchased were oral antihistamines (45%), followed by intranasal corticosteroids (27%), intranasal decongestants (18%) and saline (12%). Fifty per cent of participants stated that effectiveness was the reason for purchase; 40% stated it was based on HCPs recommendation.
Conclusion: The majority of patients presenting to the community pharmacy with nasal symptoms self-select their medications. This places a significant burden on pharmacists, requiring the pharmacist to actively encourage patients to seek out their assistance and be involved in the process of medication selection. Further research is required to assess the appropriateness of self-selected treatments within this Australian public.
Declaration of Interest: None
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CR33. Patients' self-care for common colds

Jeanette Hrovat, Marija Petek Šter
Slovenian Association of Family Doctors

Aim: To discover which treatment methods visitors to our ambulatory services use for the common cold.
Method: In a cross-sectional study, we asked 133 consecutive adult patients to fill in the questionnaire, of which we received 120 completed forms (90.2%). The questionnaire was originally designed as part of the European General Practice Research Network's (EGPRN) project 'European study about patients' self-care for common colds.' It includes questions on patients' knowledge about the natural course of the common cold, self-care during common colds and questions about basic patients' data and their comorbidities.
Results: Of the 120 consecutive adult visitors to our health centre, 38 men were (31.7%) and 82 were women (68.3%). Their average age was 43.7 years (s.d. 14.4 years). 78 individuals (65.0%) were misinformed about the primary cause of the common cold/natural course of the common cold. 57.5 % respondents were informed about self-care by their parents, fewer by their physician (29.2 %) or by their friends and neighbours (27.5%). The misinformed patients more often asked their doctor ($P = 0.018$) or other family members ($P = 0{,}021$) for advice about self-care and self-medication. Age and education had no influence on the understanding of the natural course of the common cold. In all, 101 respondents (84.2 %) believed that rest is important for treating the common cold. Self-grown plants were used in 93 (77.5 %) and over-the-counter medicines in 99 cases (82.5 %). On average 12.5 (SD 15.7) EUR (range 0–100 EUR) was spent on self-medication for the common cold. Younger patients were prepared to spend more money than older people ($P = 0.015$).
Conclusion: Among the public, there is still a widespread belief that the common cold needs active treatment because they lack understanding about the self-limiting nature of the condition. Methods of self-care are passed down from generation to generation and self-medication is very commonly used. Being aware of the prevalent use of self-care and self-medication, the physician should ask each patient about their methods of treatment of the common cold in order to provide safe and quality care.
Declaration of Interest: None
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Reference:
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CR34. Penicillin prescribing in primary care in Portugal: a cluster-randomised controlled trial

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Aim: One important quality indicator of antibiotic prescribing is the relation between broad- and narrow-spectrum antibiotics. Accordingly, the aim of this study is to assess the impact of an educational intervention in penicillin prescribing in primary care in Portugal.
Method: We designed a cluster-randomised trial in the Centre Health Region of Portugal, with a sample size of ~1,100 primary care physicians. The multidisciplinary and multifaceted intervention targeted attitudes and knowledge about antibiotic prescribing and resistances and included educational outreach visits, and, included also an intervention in community pharmacists and the distribution of educational materials to the patients. To measure the impact of the intervention on the quality of penicillin prescribing, we've assessed two quality indicators validated by ESAC group: (i) the prescription of β-lactamase sensitive penicillins (J01CE) expressed as percentage and (ii) the prescription of combination of penicillins including β-lactamase inhibitor (J01CR) expressed as percentage. The prescription was

evaluated in number of packages *per* 1000 inhabitants per day. Intention-to-treat analysis was adopted and Linear mixed models were performed.
Results: The level of participation was high (64%; ~ 309 primary care physicians) in a total of 25 counties where the intervention was applied. Regarding the prescription of penicillins, a beta-lactamase sensitive penicillins increase was found (~8%; − 0.26 to 16.42) simultaneously to a statistical significant decrease of the combination of penicillins including beta-lactamase inhibitors (~ −5%; − 8.26 to − 2.82).
Conclusion: Multifaceted and multidisciplinary interventions, and focused in physicians' attitudes and knowledge can effectively improve the quality of penicillin prescribing, which is one of the main concerns regarding antibiotic use in primary care.
Declaration of Interest: None
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CR35. Portugal in numbers: clinical trials from the last 10 years

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Aim: Clinical trials have a decisive role for economics and health policies in developed countries. Understanding its trends and evolution is paramount for resources' management, cost minimisation and efficient tackling of human diseases. In this study, the evolution of clinical trial statistics in Portugal is presented and dully discussed
Method: Search of the data published in Medicines National Authority website
Results: The number of submitted, authorised and rejected Clinical Trial Applications (CTA) in Portugal has remained constant from 2006 to 1016. During this period, commercial sponsors have dominated CTA (~95%). Substances of pure chemical origin dominate CTA (~70%), being followed by those of biological/biotechnological origin (~28%). However, in the last 5 years, applications regarding Advance Therapy Investigational Medical Products began to emerge. Anti-neoplastic and immune-modulating agents (~37%), nervous system (~12%), cardiovascular system (~9%) and anti-infectives for systemic use (~8%) are among the most representative in the CTA. On the other hand, CTA for substances targeting Sensory organs and Blood and blood-forming organs have been declining (from 8% to 2% and 11% to 6%, respectively). Behind an overall stability trend, some remarkable shifts have emerged. Namely, while CTA for phase III (68 to 58%) and phase IV (18 to 6%) trials have been declining in proportion and absolute numbers alike, phase I (1 to 18%) and phase II (13 to 18%) applications have been increasing in proportion and absolute numbers. In addition, the number of both submitted and authorised substantial amendments notified for authorisation have dramatically increased (~7.4-fold). Despite this increase, notable efficiency is to be acknowledged, as the average time for authorisation has remained constant.
Conclusion: The Portuguese market reveals openness to the introduction of novel but more advanced products. The dominating ATC codes for CTA in Portugal reflect the prevalence of the main pathologies among the Portuguese population
Declaration of Interest: None
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CR37. Qualitative evaluation of a pulmonary rehabilitation programme in Greece: results from the FRESH AIR project

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Aim: To qualitatively evaluate a 6-week pulmonary rehabilitation (PR) programme, involving exercises and education for patients with chronic respiratory diseases (CRDs), established in a primary health-care centre in rural Crete, Greece.
Method: Theoretical input from the Health Belief Model has been utilised to guide the study. In-depth interviews were performed to 6 purposively selected patients, pre and post PR, to explore CRDs' impact on every-day life, expectations, barriers, potential PR improvements and sustainability. A focus-group including the PR supervising team and certain stakeholders was also conducted to assess programme's implementation and adaptation. All activities were audio-taped, transcribed verbatim and analysed using thematic content analysis.
Results: Before PR, patients had knowledge and recognised the symptoms of their disease. Although most were physically active, all reported significant functionality restrictions due to breathlessness and cough. Their expectations from the programme included overall health improvement and less medication dependence. Patients positively assessed the programme, noting the significant symptoms' reduction and the benefits of education on disease self-management. The opportunity for socialising while improving health was mentioned by both patients and stakeholders as a major component enhancing participation. For patients, barriers to attending PR mainly concerned daily responsibilities, in contrast to stakeholders who indicated transportation issues respectively. Improvements suggested by patients included programme's personalisation according to age and enrichment of exercises and equipment. Stakeholders identified timely information and comprehensive GPs' referral as core elements for optimal recruitment. Patients reported maintaining PR at home and stressed the necessity of implementing similar programmes in remote areas.
Conclusion: In a period of austerity, these results highlight that evidence-based and low-cost PR programmes may constitute a feasible, acceptable and effective approach against CRDs in primary care.
Declaration of Interest: I. Tsiligianni serves as IPCRG president-elect and Chair of the Conference Scientific Committee. Presented data are only preliminary results of the European Horizon 2020 FRESH AIR (Free Respiratory Evaluation and Smoke-exposure reduction by Primary Health Care Integrated Groups) project.
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CR38. Qualitative Understanding of health-care providers Experiences on Teaching Inhaler techniques to asthma and COPD patients (QUETI)

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Aim: To investigate the experiences and opinions of different Health Care Providers (HCP) with regard to inhalation technique education (ITE).
Method: This study is embedded in an international study (Netherlands, Spain and Greece) initiated by the Inhaler Research Working group (IRW) to optimise inhaler technique education. A qualitative approach was used, with 2 different focus groups. Seven (4 women and 3 men) inhalation technique expert trainers, medium training experience 22 years, from the Spanish primary care society (semFYC) were selected for the first group. Seven primary care practising nurses (PCPN) involved in day to day asthma and COPD management, medium practising experience 15 years, formed the second. Both groups were conducted by the same trained interviewer. Different themes (based on previous qualitative research performed in patients) were covered: current practice in inhaler technique education, training for HCP, cooperation between different HCP, eHealth tools, patients' needs/views. Qualitative data were coded and analysed using NVivo Version 11 (ref. 1) looking for divergences and agreements.
Results: Both groups highlighted the wide existing variability and the lack of ITE activities both for patients and HCP. No protocolled approach is commonly done. ITE is mainly conducted in first prescriptions and in an opportunistic way. They emphasise the importance of nursing in health education, although nurses believe that their role is hardly recognised. In contrast, other chronic

non-respiratory diseases are strongly established in their current practice. Nurses demand practical guidelines adaptable to different patients' situations and knowledge, available in the health-care information systems and containing a range of educational resources. Both groups believe that more emphasis should be placed on health education for respiratory problems.
Conclusion: Inhalation technique expert trainers and primary care practising nurses have common experiences and opinions with regard to inhalation technique education Long-term good quality training of HCP, public awareness of chronic respiratory diseases and planned inhaler education interventions are key points for ITE improvement.
Declaration of Interest: MRR has developed lectures and received grants from different pharma companies: Astra-Zeneca, Boehringer-Ingelheim, Chiesi, GSK, Mundipharma, Novartis, Pfizer, Teva. The rest of the research group declare no conflicts of interest related to this work
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Reference:
1. Nvivo software that supports qualitative and mixed methods research. Available at http://www.qsrinternational.com/

CR40. Using primary care electronic medical record administrative data linked database to identify chronic obstructive pulmonary disease in Ontario, Canada

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Aim: Chronic obstructive pulmonary disease (COPD) is a leading cause of morbidity. Although administrative data have demonstrated validity in identifying patients with COPD, there is ongoing research on the feasibility of electronic medical records (EMRs) to accurately identify COPD patients. This is an important step for managing the quality of care for COPD patients. The aim was to develop EMR algorithms for accurately identifying patients with COPD recorded in primary care EMRs.
Method: A retrospective chart abstraction study was conducted on data from the Electronic Medical Record Administrative Data Linked Database (EMRALD) housed at the Institute of Clinical Evaluative Sciences. At the time of abstraction, the database consisted of 73,003 patients rostered with 83 family physicians in ON, Canada. The abstraction provided a reference standard based on physician-diagnosed COPD, prescription of COPD-specific medications or confirmed pulmonary function tests. A variety of EMR algorithms identifying patients with COPD were tested using terminology in the cumulative patient profile (CPP) problem list, medical history, physician billing codes and medication list. Their sensitivity, specificity, and predictive values were calculated.
Results: A total of 364 patients had COPD in 5889 randomly sampled cohort aged $\geq$35 years (prevalence = 6.2%). Maximising the PPV, the optimal algorithm consisted of three physician billing codes for COPD in one year, documentation in the CPP, prescription for tiotropium or a prescription for ipratropium along with a history of COPD billing. This algorithm had sensitivity of 76.9% (95% CI: 72.2–81.2), specificity of 99.7% (99.5–99.8), PPV of 93.6% (90.3–96.1), and NPV of 98.5% (98.1–98.8). When the billing code, CPP documentation and relevant prescriptions were tested alone, the sensitivities were 51.6%, 56.3% and 52.2% respectively. There was a considerable increase in sensitivity from combining these data components together as compared to using them independently.
Conclusion: EMR algorithms can accurately identify patients with COPD in primary care records. Prior studies capturing COPD in EMRs reported sensitivities comparable to our results, but our algorithms achieved the highest PPV to date. The efficient ability to identify patients with COPD within primary care EMRs will enable further studies in practice patterns and COPD management in primary care.
Declaration of Interest: None
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CR41. What are the key influencers on patient's decisions about their allergic rhinitis management?

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Aim: Allergic rhinitis (AR) management is frequently complicated by delayed diagnosis and suboptimal management. This is partly due to patients self-medicating with over the counter (OTC) medicines without consulting a health care professional. It is unknown what factors influence a patient's decisions regarding AR management and medicine choices. This study aimed to identify and understand the key factors influencing AR management, from the patients' perspective.
Method: Explorative semi-structured qualitative interviews were conducted with adults with self-reported allergic rhinitis. Participants were recruited via traditional print media, social media and invitations to a volunteers' database. Interviews were transcribed and analysed thematically.
Results: People with severe and persistent AR who had their symptoms since childhood relied mostly on their own experimentation with OTC medicines, as they felt that over their lifetime they had exhausted all health-care professional (HCP) recommendations with limited perceived benefit. They felt that they would only revisit a HCP about their AR, if they were alerted to a breakthrough in AR treatment via media outlets. They were also more likely to explore alternative therapies because they felt traditional medicine was unable to provide adequate relief. People with milder and intermittent AR were more likely to consult a general practitioner or pharmacist for advice on medicine selection. They reported an influence by the media with regards to initially searching for a product but the subsequent selection would be made based on perceived effectiveness from previous use of a product. People with mild and severe AR reported being heavily influenced by their immediate family and friends, particularly if they were a fellow AR sufferer. Few people reported consulting reputable resources or materials that provided information on AR and its management.
Conclusion: Many people with AR heavily rely on their own experimentation with over the counter medicines to find a treatment which they feel effectively controls their symptoms. Although HCPs are a wealth of knowledge and can facilitate a patient with optimal management of AR, they are often not consulted. There is an overwhelming need to develop resources for patients to learn about their AR and make informed decisions with regards to its management that are available at point of purchase of over the counter medicines for AR.
Declaration of Interest: None
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CR42. When should we think about infections of *M. pneumoniae*?

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Aim: To increase the awareness of atypical causes of respiratory tract infection in patients with prolonged respiratory tract signs. *M. pneumoniae* infection is a mild illness with prolonged period of respiratory and non-respiratory symptoms.[1] It commonly causes infection of the respiratory system.[1] In children, symptoms are upper respiratory tract infection, while in young adults, who are more vulnerable to infection, it is a common cause of community acquired pneumonia.
Method: Thirty patients (14 male and 16 female patients) aged 15–36 years with suspected atypical pneumonia in the period from May to August were studied. Clinical signs, physical examination and laboratory investigations from medical records were analysed. Analytical and descriptive methods were used.
Results: Prolonged cough was the cause of presentation to a doctor in all 30 patients. In clinical findings, only 6 (20%) of the 30 patients had fever. On auscultation in 6 (20%) had findings of crepitations while in 3 (10%)

obstruction was present. Normal lung findings were found in 21 (70%) patients. Twenty patients had had a cough for two or more weeks. 14 patients with *M. pneumoniae* had stayed for extended periods in air-conditioned rooms and 6 of them had returned from holiday in a humid climate. In 28 (93.3%) of 30 patients CRP, SE, LE were in normal range, while in two patients (6.6%) inflammatory markers were raised. In 20 (66.6%) of patients serology test showed positive finding of *M. pneumoniae* IG M; 3(10%) of them were positive for legionella pnemophilia, and in another 7 patients viral causes were detected. Treatment of patients with clinical and laboratory diagnosis of *M. peumoniae* was provided with macrolid which speeded recovery of symptoms.

Conclusion: Bacteria *M. pneumoniae* usually occurs with an atypical clinical picture. In patients who have prolonged cough and who have resided in areas with a humid climate and/or in air-conditioned rooms an atypical cause of infection[2] should be considered. Antibiotic treatment can speed recovery.

Declaration of Interest: None

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IMPLEMENTATION SCIENCE/SERVICE DEVELOPMENT ABSTRACTS

IS01. Breaking down barriers for our patients with Chronic Respiratory Diseases (CRD)

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Brief Outline of Context: Our overall goal is to enable cost-effective management of respiratory diseases.

Brief Outline of What Change you Planned to Make: The specific aims of the proposed research are: (1) to empower primary care physicians for complete implementation of protocols and evidence-based guidelines; (2) to establish positive collaboration between primary care and respiratory specialists; (3) to set acceptable guidelines for diagnosis, treatment and follow-up and agree on indications for referral to a specialist respiratory clinic.[1,2,3]

Assessment of Existing Situation and Analysis of its Causes: Respiratory diseases in the Republic of Macedonia have a high prevalence and morbidity. Management of these diseases by practicing primary care clinicians (especially chronic), is extremely limited by generic drug list and limits in referral to respiratory specialists. Despite these limits, it seems that the number of referrals to secondary and tertiary care are still high, which is not cost effective, either to the health system, or to the patients (national referral system, HIF). The reasons for this are different (malfunctioning of the health-care system: generic drug list, limited investigations, lack of knowledge of primary care clinicians and so on).[4]

Strategy for Change: AFMS—Respiratory group is planning to invite representatives from secondary and tertiary care, through their respiratory societies in order to agree on diagnostic, treatment and follow-up pathways, and establish referral criteria for respiratory diseases.[5,6,7,8,9] Initially, we aim to focus on asthma, COPD, lung cancer, pneumonia, pulmonary embolism and obstructive sleep apnoea. In a second approach, we will include other rarer respiratory conditions such as bronchiectasis, lung fibrosis, pneumothorax, sarcoidosis and tuberculosis.

Measurement of Improvement: Reduction in hospital admissions.

Effects of Change: Improving service integration through the advancement of optimal evidence-based pathways of care, clear role differentiation and lead accountability.

Lessons Learnt: Effective communication between primary, secondary and tertiary care.

Expected Outcomes: We hope that results of this project will be used by service planners and developers, clinicians in primary care, respiratory clinicians.

Declaration of Interest: None.

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IS03. Dutch health-care providers' perspectives on inhaler technique: an Inhaler Research Workgroup (IRW) study

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Brief Outline of Context: The optimal use of inhaled medication, the mainstay of treatment for asthma and COPD, remains a major challenge. Despite many efforts, incorrect inhalation technique is common in patients as well as in health-care professionals (HCPs). Developing new approaches to improve inhalation technique (education) have to be encouraged. Incorporating the views of patients, HCP as well as knowledge of educational theories might provide valuable information in order to optimise inhalation technique education.

Brief Outline of What Change you Planned to Make: This study aims to investigate the experiences and opinions of HCP involved in the management of asthma and COPD with regard to inhalation technique education.

Assessment of Existing Situation and Analysis of Its Causes: This study is embedded in an international study (The Netherlands, Spain and Greece) initiated by the Inhaler Research Workgroup (IRW) to optimise inhaler technique. A qualitative and a quantitative approach was used, respectively, focus group meetings and a questionnaire for triangulation. First two focus group meetings (respectively, 9 and 11 HCP) have been performed in the Netherlands. HCP involved in the management of asthma and COPD (i.e., pulmonologist, general practitioner, respiratory nurse, pharmacists, pharmacy assistant, pulmonary function assistant, nurse practitioner and home care worker) participated. Different themes were covered: current practice in inhaler technique education, training for HCP, cooperation between different HCP, eHealth tools, patients' needs/views from previous

performed interviews. Second, a self-developed questionnaire to validate these results was filled out by 193 Dutch HCP in the field.
Strategy for Change: The results revealed lack of uniformity and (organisational) difficulties (e.g., time, financial, drug preference policy, cooperation between involved HCP) with regard to inhalation technique education. Providing information, demonstration, practicing and feedback are considered crucial in teaching correct inhaler use. Visual aids might be helpful. Proper training in inhalation technique education for HCP is required. Second, a questionnaire to validate these results was filled out by 193 Dutch HCP in the field. The results demonstrated consistent findings with regard to the content as well as the organisational requirements.
Lessons Learnt and Message for Others: This study identified the experiences and opinions of HCP with regard to inhalation technique education. The optimal content of inhaler technique education needs to be elaborated. Moreover, time, appropriate training of HCP and fine-tuning the cooperation between HCP are considered crucial to optimise inhalation technique and subsequently the management of asthma and COPD.
Declaration of Interest: The IRW study is funded by Astrazeneca, Boehringer Ingelheim and Mundipharma and University of Groningen, University Medical Center Groningen
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IS04. Inhaled steroids in COPD withdrawal tool: a desktop helper

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Brief Outline of Context: Inhaled corticosteroids (ICS) are overprescribed in COPD.[1] ICS have significant side-effects and adequate bronchodilation may be as good/better for exacerbation prevention,[2,3] so ICS withdrawal would benefit many patients. A minority of COPD patients have concomitant asthma requiring ICS3; therefore, a systematic approach is needed to ensure appropriate evaluation, and safe ICS withdrawal.
Brief Outline of What Change you Planned to Make: In partnership with the IPCRG, a desktop helper was created to educate and guide clinicians on ICS withdrawal, when appropriate.
Assessment of Existing Situation and Analysis of its Causes: ICS are over-prescribed in GOLD A and B patients, contrary to current recommendations.[1,4] In addition, ICS combinations are often started inappropriately at early stages of COPD1, when benefits may be negligible. Newly available LABA (Long-Acting Beta-Agonists)/LAMA (Long-Acting Muscarinic Antagonist) combinations improve symptoms and reduce exacerbations,[2] providing an ICS-free pharmacotherapy option.
Strategy for Change: Implementation will require a significant change in thinking and behaviour, and clear communication around: why change (evidence); who says (guidelines); and who supports (IPCRG). Literature reviews were conducted to create algorithms to: determine appropriateness of ICS therapy; provide a stepwise process for ICS withdrawal to maximise outcomes and minimise harm. An existing algorithm[5] was modified to improve clinical utility, while ensuring appropriate safety. Data from FLAME[6] and WISDOM[7] support moving from LABA/ICS or triple therapy to LABA/LAMA.[2,3] Algorithms also describe the required follow-up to minimise risk during ICS withdrawal.
Measurement of Improvement: Validation studies are planned to measure physician understanding, utility, efficacy and safety.
Effects of Change: Reduce inappropriate exposure to ICS in COPD, while effectively managing symptoms and exacerbation risk.
Lessons Learnt: Clinicians are reluctant to make changes in therapy, even in light of new guidelines and evidence, unless provided with clear, practical and efficient processes to do so.
Message for Others: The right drug for the right condition in the right patient is a clinicians' mantra. Do no harm by safely adjusting medications to appropriate treatments.
Declaration of Interest: This project was funded by Novartis. No payments were made to the authors to prepare this desktop helper.
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IS07. To shake or not to shake, that's the question! Important suggestions for improvement provided by the International Inhaler Research Workgroup

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Brief Outline of Context: In 2014, the Inhaler Research Workgroup (IRW) was formed by an international and interdisciplinary group of scientists and health-care professionals. Aim of the IRW is to improve inhaler technique in patients with asthma and COPD using a unique and novel approach.
Assessment of Existing Situation and Analysis of its Causes: This is necessary because 70–80% of patients have poor technique (GINA/GOLD Global Initiative for Asthma/Global Initiative for Obstructive Lung Disease) leading to poor outcomes and higher costs. An estimated 334 million people have asthma and over 65 million people suffer from COPD according to the World Health Organisation.[1,2] Inhalation medication is the cornerstone of treatment. Improvements in inhaler technique can substantially increase the care for many patients worldwide.
Brief Outline of What Change you Planned to Make: Current inhaler education methods are not effective enough and it is time to develop a more effective and evidence-based approach.
Strategy for Change: The unique concept of the IRW is our multidisciplinary approach. Knowledge from psychology, educational sciences, pharmacy, movement sciences and clinical practice are combined. Moreover, opinions from all involved stakeholder in 3 European countries (Netherlands, Spain, Greece) are evaluated to evaluate current problems and preferred options for improvement. Our study consists of the following parts: (1) interviews with more than 100 asthma and COPD patients; (2) six focus groups with professionals; (3)Review to gather effective strategies to teach small motor handling (e.g., brushing teeth and injecting insulin).
Measurement of Improvement: All these findings will be combined into a new inhaler instruction method based on science and opinions from stakeholders. This method will be tested in a randomised controlled trial.
Lessons Learnt: Preliminary results show that 70 patients have been interviewed showing that although all patients have received and instruction, inhaler technique is poor. Patients would like to practice their device and receive feedback during the instruction. The focus groups with professionals in Spain and the Netherlands showed that the organisation of inhaler instructions is poor and professionals often lack time

and knowledge to provide a good instruction. Our review shows several promising educational theories that might be incorporated in the new inhaler instruction method like Peyton's 4 step approach. At the IPCRG we will present the progress of our proceedings that will be of interest of HCPs and policymakers. We have patients' permission to show videos of inhaler technique. These videos are very informative and will definitely launch discussion.

Message for Others: Inhaler instruction is complicated, in a few seconds many different steps need to be performed. Moreover, many different devices and an unstructured organisation regarding inhaler instruction make it more complicated. Evidence-based instruction methods are needed. The IRW provides suggestions for improvement.

Declaration of Interest: The IRW study is sponsored by Astrazeneca, Boehringer Ingelheim, Mundipharma

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