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ABSTRACTS

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1. Health Care utilization in COPD: the burden carried by primary care practitioners

Fletcher M, Taylor Fishwick J, Upton J, Van der Molen T, Burke M, Walker S
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Aim: To assess health care utilisation by working age COPD population and relationship with disease severity.
Method: A cross-sectional survey undertaken in Germany(400), USA(404), UK(400), China(398) Turkey(416) and Brazil(408). Participants aged 45-67 years, with diagnosis of COPD, recruited via: telephone lists, patient organisations, door to door visits, practice lists. Disease severity measured using MRC dyspnoea scores.
Results: 2426 people with COPD; 2382 stated severity.
In the last month used health care due to COPD Total Mild(n=849) Mean%(se) Moderate(n=1012) Mean % (se) Severe (n=521) Mean % (se)
Hospital in-patient 289 (12%) m%4.5 (0.7) M%11.5 (1.0) S%25.3 (1.9)
Specialist doctor Out-patient 915 (38%) m%25.9 (1.5) M%39.6 (1.5) S%54.3 (2.2)
Pulmonary rehabilitation 298 (12%) m4.7 (0.7) M12.5 (1.0) S25.0 (1.9)
Family practitioner 1214(50%) m34.3 (1.6) M55.0 (1.6) S67.4 (2.1)
Emergency department 262 (11%) m3.3 (0.6) M11.4 (1.0) S22.5 (1.8)
50% of patients reported they had seen a family practitioner in the preceding 4 weeks due to their COPD. Patients with severe disease made the greatest demands on health care services, although use of FP services was consistently high across all groups.
Conclusion: Family practitioners are delivering a large part of care to COPD patients. As the numbers of COPD patients rise and diagnosis is made earlier, demands are likely to increase. They need to build capacity and capability to cope with demand and improve integration with hospital care.
Conflict of interest and funding: Funded by Unrestricted educational grant Novartis Pharmaceuticals

2. Burden of Obstructive Lung Diseases in Bangladesh (BOLD-BD)

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Aim: To estimate the prevalence of COPD in Bangladesh
Method: Total 3028 subjects of >40 years of age were studied. There were 3 major strata – metropolitan, urban & rural. In all stages, stratified random sampling method was followed. A pre-tested questionnaire was filled-up with face-to-face interview with the respondent. Spirometry with reversibility test was done in all subjects. A Fixed Ratio of FEV_1/FVC <70%, not reversed after bronchodilation with 200 mcg of salbutamol inhalation was taken as diagnostic criterion for COPD
Results: Prevalence of COPD in >40 years population was 21.24% (95% CI 20.77 – 21.78). The over all prevalence is 4.32%. It is highest for rural population 23.15% (OR 1.187, 95% CI 0.987 – 1.429), followed by urban 22.62% (OR 1.130, 95% CI 0.937 – 1.362) and lowest for metropolitan population 17.77% (OR 0.728, 95% CI 0.596 – 0.887 Again from our findings it was obvious that exposure to bio-mass gas (open stove/wood burn) appears to be a significant risk factor in developing COPD, >80.00% (82.21%) COPD patients are exposed to it.
Conclusion: Prevalence of COPD in >40 years population was 21.24% (95% CI 20.77 – 21.78). The overall prevalence is 4.32%. It is highest for rural population 23.15% (OR 1.187, 95% CI 0.987 – 1.429), followed by urban 22.62% (OR 1.130, 95% CI 0.937 – 1.362) and lowest for metropolitan population 17.77% (OR 0.728, 95% CI 0.596 – 0.887 Again from our findings it was obvious that exposure to bio-mass gas (open stove/wood burn) appears to be a significant risk factor in developing COPD, >80.00% (82.21%) COPD patients are exposed to it.
Conflict of interest and funding: Nothings

3. Effect of stone dust on lung and lung function tests of stone quarry workers in Sri Lanka

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Aim: To determine the effects of stone dust on respiratory health of stone quarry workers in Sri Lanka.
Method: Respiratory symptoms of seventy-nine male workers from different sections of industry were assessed followed by a clinical examination. Spirometric indices were recorded prior to a Monday work shift and air borne dust levels were measured.
Results: Workers had a mean work duration of 53 months and an average of 4.2 pack years of smoking. Regarding the respiratory symptoms, 10.1% and 11.4% workers complained of morning and nocturnal cough, respectively. While 2.5% workers had haemoptysis and 30.4% workers complained of wheezing, 30.4% and 5.1% had Grade II and III dyspnoea, respectively. One subject showed evidence of fibrosis on clinical examination. Lung function tests showed a restrictive pattern in 24 (30.4%) workers and among them 16 workers had above normal exposure to dust. Obstructive pattern is seen in 9 (11.4%) subjects with 4 being exposed to higher dust levels. An increasing trend is observed for both restrictive and obstructive lung conditions with increasing duration of employment. There is a statistically significant relationship with duration of work, type of work and the level of dust exposure with the clinical features.
Conclusion: There is a decline in the lung function which is related to the duration of work and amount of dust exposure. It mainly shows a restrictive pattern of impairment
Conflict of interest and funding: This research was funded by IRQUE (Improving Relevance and Quality of Undergraduate Education) World Bank assisted project. Other authors do not have any conflict of interest as the research partners.

4. Glaucoma eye drops in patients with airways disease: evidence for harm and implications for GPs

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Aim: Systemic absorption of glaucoma eye-drops may cause adverse events in patients with airways disease. We identified use of glaucoma eye-drops in

patients with airways disease and potential for harm in a predominantly primary care setting.

Method: Retrospective analysis of the Australian Department of Veterans' Affairs database. Veterans dispensed glaucoma eye-drops between January-April 2008 were identified and their prescriptions in May-August 2008 examined. Veterans dispensed inhaled respiratory medicines were considered to have airways disease. Potential harms were identified using prescription symmetry and prescription event analyses.

Results: 6075 veterans were dispensed medicines for glaucoma and airways disease, 80% were co-dispensed a glaucoma medicine that may aggravate airways disease: beta-blockers 29%, latanoprost 60% and pilocarpine 4%. Timolol initiation was associated with increased risk of initiation of inhaled beta-agonist (ASR 1.48; 95% CI 1.28-1.71), inhaled corticosteroid (ASR 1.43, 95% CI 1.19-1.71), oral corticosteroid (ASR 1.14 95% CI 1.01-1.29) and hospitalization for airways disease (ASR 1.57, 95% CI 1.07-2.29). Latanoprost initiation was associated with increased initiation of inhaled beta-agonist (ASR 1.24 95% CI1.14-1.35), inhaled corticosteroid (ASR 1.13 95% CI 1.00-1.28), oral corticosteroid (ASR 1.14 95% CI 1.03-1.25), but not hospitalization. Pilocarpine initiation was associated with increased initiation of inhaled beta agonist (ASR 1.33 95% CI 1.05-1.69). No associations were found with bimatoprost.

Conclusion: Initiation of glaucoma medicines is associated with increased use of respiratory medicines and hospitalisations for airways disease. Appropriate selection of glaucoma medicines in this population is required.

Conflict of interest and funding: Funded by Australian Government Department of Veterans' Affairs; Veterans' Medicines Advice and Therapeutics Education Service.

5. Chronic Obstructive Pulmonary Disease (COPD) rehabilitation at Health Care Centres in municipalities in Denmark – the KOALA project

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The Municipality of Aalborg, Denmark

Aim: Approximately 430,000 Danes are considered to have chronic obstructive pulmonary disease (COPD) of which only about one third have been diagnosed. Severe COPD cases are often rehabilitated at outpatient clinics in a hospital setting, and documentation of efficacy has until now been reported from this population. With the health legislation dated January 1, 2007 the 98 municipalities in Denmark have gained co-responsibility for COPD. In order to document effects on rehabilitation in this new setting, health centres were offered participation in a quality assurance project in order to document the effects of rehabilitation of patients with COPD.

Method: 30 Danish Healthcare centers participated. Key changes in clinical outcomes and quality of life (QoL) efficacy parameters during rehabilitation were recorded: BMI, MRC, 6 min. walking distance, shuttle walk endurance.

Results: A total of 1209 patients entered rehabilitation. No significant changes were found for BMI and MRC. Pre- and post rehabilitation results for: 6 min. walking test: 390 to 440 meters ($p<0.01$). Shuttle walk: 2:41 to 3:42 minutes ($p<0.01$). 15D (QoL) score 0.81 to 0.83 ($p<0.05$).

Conclusion: Initial, substantial data from rehabilitation of mostly mild to moderate patients with COPD in municipality health care centers in Denmark demonstrates that the new initiative is effective and document significant positive changes in clinical and QoL COPD parameters.

Conflict of interest and funding: OG, NSG, BP, KKA, ML and TBS have received grants/fees from Boehringer/Pfizer Denmark. Others are employees at Boehringer/Pfizer Denmark.

6. The natural history of COPD revised

Jones RCM, Ostrem A, Price D

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Aim: To assess whether the Fletcher–Peto diagram is supported by recent data.

Background: The original Fletcher–Peto diagram was based on data from male transport workers aged 30-59 years in London in 1960s. Data is now available from larger cohorts with long duration and from interventional studies.

Method: Review of published studies which examine the natural history of COPD, synthesis of relevant data and preliminary redrawing of the Fletcher-Peto diagram.

Results: The Framingham Offspring cohort (4,391) and a Swiss population sample (9,651) demonstrate that the rate of decline of FEV_1 in non smokers is almost identical to the original Fletcher–Peto diagram. The FEV_1 decline over time in smokers is well documented but the larger robust studies do not separate the populations by COPD severity. Drug trials, including TORCH and UPLIFT, show that in the FEV_1 declines at a much faster rate in GOLD 1-2 than GOLD 3-4 who have a similar rate of decline to non smokers. There are good data that smoking cessation reduces the decline in FEV_1 in early COPD but little data on advanced disease.

Conclusion: The original Fletcher–Peto diagram is correct with respect of FEV_1 decline in non smokers and those with COPD who quit smoking in GOLD stages 1-2. However clinical trials data indicate that FEV_1 decline is faster in early stages than in later stages where the FEV_1 decline is similar to non smokers. Thus detection of COPD in early stages is even more critical than expected if the natural history is to be altered. Smoking cessation in advanced disease may not change the decline in FEV_1.

Conflict of interest and funding: No funding. No conflict of interest.

7. Evolution of pharmacological management of asthmatic pediatric patients in the Balearic Islands (Spain) 2005-2009. Effect of the Pediatric Asthma Plan (PAIB) developed in 2007

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Brief outline of context: Asthma is the most frequent long-term disease in children. Its prevalence in our environment is 10%. Most asthmatic children (0-14 years) are seen in Primary Care settings.

Brief outline of problem: There has always been a great variability in knowledge and skills on asthma among professionals in Pediatric Primary Care.

Assessment of problem and analysis of its causes: These differences among professionals are responsible for the differences in management of asthmatic children and in the prescription of medication.

Strategy for change: With the objective to increase the quality of management of asthmatic children and following the international guides recommendations on local initiatives a Pediatric Asthma Plan was developed in 2007 in the Balearic Island (PAIB). In 2007 all professionals on pediatric primary care settings attended courses and workshops on asthma. A specific computer program was designed for the follow-up.

Measurement of improvement: The evolution of asthma medication in pediatric patients has been used.

Effects of changes: The present study shows the changes in prescriptions for asthmatic pediatric patients from 2005 to 2009 and the influence of the PAIB on these changes. Our study has shown an increase of inhaled medication and a decrease of oral medication for crisis. Inhaled corticosteroids (ICS), Montelukast and ICS/Long acting beta-2 agonist (LABA), show an increase in prescriptions.

Lessons learnt: The development of local plans for asthma management have a positive effect on prescriptions of asthma therapy .

Message for others: Local strategies mean an improvement on the global care of pediatric asthmatic patients

Conflict of interest and funding: None

8. Use of Asthma medicines in Children: Issues from a health care professional perspective

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Aim: Whilst current therapeutic options have the capacity to help children with asthma achieve optimal control, several issues in the actual use of medicines in children with asthma have been reported. The aim of this study was to explore issues with the use of asthma medicines in children as perceived by General Practitioners and Paediatricians in Australia.
Method: Qualitative, semi-structured interviews were conducted with General Practitioners and Paediatricians using an interview template. The template included discussion about the possible role of pharmacists in medicines use in children with asthma. The interviews were audio taped, transcribed verbatim and subsequently analysed thematically using NVivo 8 software.
Results: 17 interviews were conducted and analysed. Medicine usage issues reported by the interviewees could be divided into following emerging themes; communication, misinformation, socioeconomics, physician barriers and issues with treatment. The majority of the issues reported were parent related and stemmed from lack of knowledge and understanding of the disease and its management. Physicians mostly saw the role of pharmacists as reinforcing messages and offering medicines and device related expertise. Some paediatricians envisaged a greater role for pharmacists in parent and child education on asthma.
Conclusion: There is a need for education and information tailored for the receiver to improve the quality use of medicines in children with asthma. Other health care professionals such as pharmacists can potentially a more proactive role in helping parents and children use asthma medicines effectively and widely. Models exploring such roles in collaboration with primary care physicians and specialists should be explored.
Conflict of interest and funding: Conflict of Interest: None Funding: None

9. Asthma prescription patterns for children: can GPs do better?

Uijen JHJM, van der Wouden JC, Schellevis FG, Willemsen SP, van Suijlekom-Smit LWA, Bindels PJE
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Aim: To examine prescription patterns in children with physician-diagnosed asthma in general practice.
Method: Data on children (0-17 years) with ≥1 asthma prescription were analysed. Prescription rates and prescription of continuous versus intermittent asthma medication were calculated. Data (including child/GP characteristics) were analysed using multivariate logistic regression.
Results: During the registration year, 16% of the children received no prescription. Of the 2,993 children receiving asthma prescriptions, 61% received 1-2 and 39% received ≥3 prescriptions. Continuous medication with a bronchodilator and/or a corticosteroid was prescribed in 22%. Almost 5% of children receiving continuous medication were prescribed a bronchodilator only. No child/GP characteristic had an independent effect on prescribing continuous versus intermittent medication.
Conclusion: In general practice, issue of asthma prescriptions per child/per annum is relatively low. That about 5% of children were prescribed a bronchodilator only continuously, indicates considerable room for improvement. No child/GP characteristic proved relevant for targeting educational strategies.
Conflict of interest and funding: None

10. Transition and Turmoil in the families of children with asthma: A Psychological Perspective

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Aim: To study the transition and turmoil in the families of children with asthma.
Method: Psychological stress, anxiety, well-being, quality of life and coping strategies were explored in 300 Indian parents. Both mothers and fathers of fifty children in each group - having asthma, or diabetes or not suffering from any chronic illness, in the age range 30-50 years, having 1-3 children were studied. Spielberger's anxiety scale, stress scale, general well-being, quality of life and coping scales were administered individually to each parent. Semi-structured interviews were also conducted. 3x2 Mixed Design, t ratio, and correlation were applied
Results: Stress was found to be negatively related to general well-being and quality of life. Anxiety was positively related to positive stress in fathers, and to negative stress in mothers. General well-being and quality of life was poorer in mothers of children with asthma as compared to mothers of children with Diabetes. However, mothers as compared to fathers were lower on general well-being and quality of life in case of asthma group and vice a versa in case of diabetes group. No significant differences emerged between mothers and fathers in the control group. Interviews revealed that mothers were perceived to be genetically linked to the child's asthma. Parents reported that diagnosis of asthma/diabetes in their child led to negative changes in their lives which hindered the management of illness. On coping strategies, mothers of asthma group, as compared to other groups, relied more upon emotional and religious coping. Fathers employed more of problem solving and acceptance strategies.
Conclusion: Lack of psychological interventions for parents of children with asthma/diabetes renders them ill-equipped in the management of the illness.
Conflict of interest and funding: NIL

11. Low hospital admission rates for respiratory diseases in children

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Aim: Population-based data on hospital admissions for children aged 0-17 years concerning all respiratory diseases are scarce. This study examined respiratory morbidity and subsequent hospital admission patterns in this age group.
Method: Data on children aged 0-17 years with respiratory diseases included in the Second Dutch National Survey of General Practice (DNSGP-2) were linked to all their hospital admissions in the Dutch National Medical Registration. Admission rates for respiratory diseases were calculated. Data were analysed using multivariate logistic regression.
Results: Of all 79,272 children within the DNSGP-2, 1.8% were admitted to hospital for any respiratory diagnosis. The highest admission rates per 1000 children were for chronic disease of tonsils and adenoids (12.9), pneumonia and influenza (0.97), and asthma (0.92). Boys and children aged 0-4 years were admitted more frequently. Of children with asthma, 2.3% were admitted for respiratory reasons. For asthma, admission rates varied by urbanisation level: 0.47/1000 children/year in cities with ≤30,000 inhabitants, 1.12 for cities with ≥50,000 inhabitants, and 1.73 for the three largest cities (p=0.002). Multivariate logistic regression showed that within two weeks after a GP consultation, younger age (OR 0.81, 95% CI 0.76-0.88) and more severe respiratory diseases (5.55, 95% CI 2.99-8.11) predicted hospital admission.
Conclusion: Children in the general population with respiratory diseases (especially asthma) had very low hospital admission rates. In urban regions children were more frequently admitted due to respiratory morbidity. For effectiveness studies in a primary care setting, hospital admission rates should not be used as quality end-point.
Conflict of interest and funding: None.

12. A follow up of adolescents and young adults with asthma - Airway hyperresponsiveness and asthma control

Stallberg B, Hedenstrom H, Johansson G, Svardsudd K
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Aim: To investigate the development of asthma and degree of control in a group of adolescents and young adults who had reported asthma six years earlier.
Method: Seventy-one individuals, born in 1981-1989, who reported a physician-diagnosed asthma in a population-based survey in 1997 and were defined as current asthmatics. When reinvestigated in 2003 they answered a questionnaire similar to the one in 1997 and were examined with skin prick test (SPT), methacholine challenge test, eucapnic voluntary hyperventilation test (EVH), and measurement of exhaled nitric oxide (eNO).
Results: In 2003, the definition of current asthma was fulfilled by 50 of the 71 (70%), giving an annual remission rate of 5%. The proportion of current asthmatics using inhaled corticosteroids had decreased from 63% to 36%. In subjects with current asthma, the mean FEV_1 was 101% of predicted, 70% had a positive SPT, 86% a positive methacholine test, 34% a positive EVH test and 30% had increased eNO (>20 ppb in the age group up to 17 and >25 ppb from 18 years and older). One third had achieved asthma control in 2003. Subjects with allergic rhinitis more frequently had uncontrolled asthma ($p<0.001$). There was a difference in methacholine test among the groups: not current asthma, current asthma with and without asthma control ($p<0.01$) and in FEV_1 ($p<0.05$) but no significant difference in EVH test or eNO value. Of the subjects with uncontrolled asthma only one third used inhaled corticosteroids.
Conclusion: This six year follow-up study has demonstrated that many adolescents with current asthma do not achieve asthma control. One reason might be undertreatment with inhaled corticosteroids.
Conflict of interest and funding: No conflicts of interest

13. Asthma, physical and mental well-being in elite swimmers compared to age-matched controls

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Aim: Sporting activity has been reported both as a risk factor and as a factor promoting health. An increased risk of developing asthma has been reported among swimmers exposed to chloramine in pool arenas. The aim of the present study was to compare the prevalence of asthma and respiratory symptoms among aspiring elite swimmers compared to age-matched controls with different degrees of physical activity. We also aimed to relate these findings to life style factors and psychological and physical well-being.
Method: 101 elite swimmers and 1628 age-matched controls answered a questionnaire containing questions about respiratory symptoms, lifestyle factors, mental and physical well-being. The controls were divided into three different groups according to degree of physical activity
Results: Swimmers reported significantly more asthma symptoms, with 36.6% of the swimmers having physician diagnosed asthma, compared to 16.2% among the controls. Use of regular medication was more common (14.9% vs 8.0%) and more swimmers reported an exacerbation of their asthma during the previous 12 months (16.8% vs 5.8%). Despite increased prevalence of asthma symptoms, the swimmers reported the best mental and physical well-being. They had a healthier life style with absence of smoking and low alcolohol consumption. The influence from their home environment seems to be important together with strong motivation achieved as part of the sporting activity per se.
Conclusion: Better control of pool environments is warranted in order to achieve a better balance between the positive benefits of sporting activity and being exposed to a higher risk of developing asthma.
Conflict of interest and funding: Independent grants from AstraZeneca, Schering-Plough and MSD.

14. Retail sales of inhalation devices in Europe

Levy ML, Barnes PJ, Broeders M, Corbetta L, Dekhuijzen PRN, Corrigan CJ, Dubus JC, Hausen T, Lavorini F, Kneussl M, Pedersen S, Ramalho A, Sanchis J, Viejo J, Vincken W, Voshaar T, Crompton GK
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Aim: A variety of inhalation devices are available: pressurised metered-dose inhalers (pMDIs), dry-powder inhalers (DPIs) or nebulised ("wet") aerosols; we evaluated retail sales of these in 16 European countries.
Method: Retail sales of inhalation devices delivering short- and long-acting bronchodilators, corticosteroids and combinations. Data was sourced from wholesalers' sales to retail pharmacies, purchases of panel pharmacies directly from pharmaceutical manufacturers, and from specialist wholesalers and distribution cooperatives during a calendar month, during 2002-2008.
Results: Mean inhaler retail sales (% total) were 47.5% for pMDIs, 39.5% for DPIs and 13% for nebuliser liquids. Distribution of retail sales differed markedly between countries with pMDI sales greatest in the UK, Germany and Spain compared to other countries where DPI sales prevailed. Sales of solutions for nebulisers were very high in Italy. The pMDI being the most frequently used bronchodilator inhaler; while retail sales of DPIs are similar to those of pMDIs for inhaled corticosteroids, and higher in the case of combination inhalers with LABA and steroids.
Conclusion: While pMDIs remain the most frequently prescribed device there is considerable variability of device prescribing in Europe. Cost, health insurance, commercial aspects, prescribers' and patients' preference may explain this variation. These data suggest a need for more uniform, outcome-led inhaler prescribing practice across Europe, better education about the advantages and limitations of specific devices for prescribers and patients to improve the efficacy and cost effectiveness of the treatment of obstructive airways diseases.
Conflict of interest and funding: The Aerosol Drug Management Improvement Team is funded by an educational grant from MEDA Pharmaceuticals.

15. Asthma control is influenced by patients' ability to use their pMDI

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Aim: Patients' inability to use a pMDI results in poor asthma control. We related asthma control and health care utilisation (HCU) to ability to use pMDIs.
Method: Evaluation of 3981 (46% male) asthma patient reviews, including inhaler technique and asthma control (GINA), by specialist nurses in primary care in 2009. Analysis: X2 and Logistic regression (SPSS v18).
Results: Asthma was controlled in 50% of patients. For preventer medication, there was evaluable data for 2887 patients (73%) and of these 68% and 6% were using a pMDI alone and with a spacer respectively; 10% were using easibreathe and 10% turbohalers. The majority of patients (64% of 3686) were using reliever pMDIs alone; 14% with spacers. Incorrect pMDI use was associated with poor asthma control, ($p<0.0001$), more exacerbations (previous 3 mths) ($p=0.03$) and more systemic steroid prescriptions in the last year. ($p<0.05$). Of patients using beclometasone (the most frequently prescribed preventer), more of those using i) a breath actuated pMDI device ($p=0.04$) and ii) a spacer (were controlled compared with those on pMDIs ($p<0.0001$). Males were better controlled than females ($p<0.0001$) who were less able to use their pMDIs ($p<0.0001$).
Conclusion: Patients able to use pMDIs have better asthma control. Beclometasone via a breath actuated device resulted in better control than via pMDI. In this population females seem less able to use pMDIs than males and their asthma control was not as good. Further study is needed.
Conflict of interest and funding: MLL provides paid consultancy for National Services for Health Improvement (NSHI) who provide a clinical service for General Practice sponsored by TEVA UK Ltd.

16. Smoking during pregnancy: Prevalence and associated factors in a sample of Greek female smokers

Boutou A, Ioannidis D, Agrafiotis G, Tsigka E, Farinis D, Kakolyris N, Pataka-Argyropoulou P
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Aim: To assess the prevalence of smoking during pregnancy and to identify the factors that are correlated with
Method: In a retrospective study, a continuous sample of 124 female smokers was assessed at the Smoking Cessation Clinic during a 12-month period of time that had completed a specified questionnaire. The total number of pregnancies, the number of cigarettes smoked per day in each pregnancy, data of smoking history, the educational status and the parents' smoking history were recorded. Student's T-test for independent samples, One-way ANOVA and Paired Samples T-test were employed, where $p<0.05$ was considered significant.
Results: The 71% of female had at least one pregnancy and 59.1% (N1=52) of them were smoking at least in one pregnancy. These females consisted Group A and they had similar age (48.2±7.8 years old), total number of pregnancies (1.9±0.7) and educational status compare to females that had quit smoking during pregnancy, consisting Group B (N2=33). Nevertheless Group A was presenting a higher Fagerstrom index compare to Group B (7.6±1.9 vs 6.5±1.9, $p<0.05$) and they had started smoking at a younger age (18.2±3.9 vs 21.6±6.4, $p<0.01$). However, in the same group, there was a significant reduction (66.7%±20.8%) of the number of cigarettes smoked per day during pregnancy.
Conclusion: Although the prevalence of smoking during pregnancy in Greek females is high, there is a reduction by 66.7% of the number of cigarettes smoked per day. It seems that women who smoke during pregnancy have a higher addiction to tobacco smoke and they have started smoking at an earlier age.
Conflict of interest and funding: None

17. The Information Group, a Solution to Improve the Efficacy of Smoking Cessation Specialized Consultation

Ciobanu M, Panaitescu C, Popescu A, Rascu A, Raileanu M, Todor M, Trailescu AM, Bursuc B, Constantin C, Lica F
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Aim: Since 2007 there has been a Stop Smoking national support programme. The aim was to improve its efficiency.
Method: All smokers who came to the Institute Marius Nasta between 1 and 31 January 2008 were first invited to the Information Group (IG) and then referred to a doctor and psychologist. The results were compared with the total number of patients seen by doctors and psychologists working in the programme in Bucharest.
Results: The total number of patients was 829: 563 went directly to the physician or psychologist and 266 participated first in the IG. From the group seen first only by a doctor 21.9% addressed finally to both specialists; from the group seen first by a psychologist 45.5% addressed finally to both specialists. From the IG 30.8% choose to go to both specialists, 28.2% only to doctor and 9.4% only to psychologist; 31.5% did not return to the programme. The percent of abstinent smokers after three months was 33.4% among those who went directly to doctor and 42.7% among those who participated to IG. The number of patients who could not be evaluated was with 51% smaller among those who participated to IG. The addressability to psychologist increased from 32.1% to 40.2%.
Conclusion: Participation in the IG before a specialized medical/psychological consultation increased the success rate at three months, raised the probability that the smoker attends both specialists and diminished the number of lost patients.
Conflict of interest and funding: Conflict of interest and funding: none; the study used data collected in a programme founded by the Romanian Health Ministry.

18. Tobacco cessation advanced intervention in asthmatic patients

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Fundacio Caubet CIMERA, Govern de le Illes Balears

Aim: To evaluate the effectiveness of an advanced intervention for smoking cessation in the improvement of asthma control and inhaled corticosteroid responsiveness
Method: Opened, randomized clinical trial. Patients were randomized in 2 groups, one to follow usual treatment, while the other was offered a 6 week intervention to maximize quitting smoking. We used the asthma control test to measure our main objective and other secondary variables such as smoking cessation rate, pulmonary function, medication and sanitary resources use register and asthma exacerbations during the follow up.
Results: Among 241 selected patients of 6 primary care centres 121 (50%) agree to participate. 61 were randomly assigned to intervention group and 60 to control group. Mean age was 36±8 years and 65% of the sample were women. In the basal assessment mean ACT in the intervention group was 18±5 and 23±2.5 in the control group (p=0.08). After 6 weeks of follow-up 30% of the patients in the intervention group and 1% of the patient in the control group stop smoking. Mean ACT score improves more in intervention group than in control group (1.2 vs. 0.4; p=0.06).
Conclusion: An advanced primary care smoking cessation intervention in asthmatic smokers, could improve their asthma control and the need for long term medication.
Conflict of interest and funding: None

19. The impact and costs of reimbursed smoking cessation using varenicline in Denmark

Poulsen PB, Randskov HJ, Dollerup J, Tønnesen P
Pfizer Denmark, Ballerup, Denmark

Aim: To show the economic consequences of implementing reimbursement of varenicline for pharmacological smoking cessation in Denmark compared with future disease events avoided and corresponding savings in the healthcare sector and society due to reduced smoking.
Method: A costing template developed by the National Institute for Health and Clinical Excellence for implementation of varenicline in smoking cessation in the United Kingdom (http://guidance.nice.org.uk/TA123/CostTemplate/xls/English) was adjusted and applied for Denmark using Danish data on smokers, costs of varenicline and disease events, and Danish reimbursement rules.
Results: The national health insurance costs for reimbursing a quit-motivated smoker 12 weeks of prescribed varenicline amount to 923-1,920 DKK (1 Euro = 7.45 DKK) with co-payment being lower for chronically ill persons. Reimbursing 40,000 smokers will cost the health insurance 37-77 mill. DKK. However, the benefit will be 9,000 abstinent persons (after 12 months), thus preventing respectively 2,110, 3,383 and 5,214 disease events (50% COPD) after 2, 10 and 20 years, respectively, although relapse has to be taken into account. After 2 years, the healthcare sector savings due to an avoided first acute hospital contact amount to 47 mill. DKK or 281 mill. DKK for the society including production lost. At 20 years savings rise to 141 mill. DKK (societal: 846 mill. DKK).
Conclusion: The break-even between higher health insurance costs and costs saved due to avoidance of the first acute hospital contact will for persons with a low reimbursement rate (i.e. DKK 923) appear less than 2 years after reimbursement of varenicline. Varenicline is reimbursed in Sweden, UK, Ireland and Belgium, but not in Denmark.
Conflict of interest and funding: PT has received fees/grants from Pfizer, but not in this project.

20. Cooking with CAT - using a Clinical Audit Tool to deliver better, safer healthcare

Tomlins R
Chair, Quality Care Committee, Royal Australian College of General Practitioners, Australia

Brief outline of context: Australian General Practices have a wealth of clinical information in practice databases. The CAT tool permits ready access to this information to support continuing quality improvement.
Brief outline of problem: While most Australian General Practices utilise proprietary desktop patient management systems that have some reporting functions, systems are generally not interoperable. CAT permits information in 4 leading systems to be displayed consistently and in a clinically relevant fashion. Standard reports are also available for agencies undertaking specific activites in support of general practice.
Assessment of problem and analysis of its causes: As outlined above.
Strategy for change: The utility of the Clinical Audit Tool will be demonstrated along with examples of how it can assist a practice.
Measurement of improvement: Examples of practice quality improvement will be provided. For instance, all accredited practices in Australia are required to record allergies to drugs for more than 90% of their patients.
Effects of changes: Examples of improvement in the frequency of performing and recording spirometry for patients with COPD will be provided.
Lessons learnt: Data-driven quality improvement processes require cost effective tools with ease of use.
Message for others: While CAT is presently targetted at Australian desktop systems, adaptation to other software is feasible.
Conflict of interest and funding: Member of the CAT Clinical Reference Group with recompense for time spent at meetings. The RACGP purchases software development services from Pen Computing. The author has no financial investment in CAT or Pen Computing.

21. Control of Allergic Rhinitis and Asthma Test (CARAT10) – from design to implementation

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Department of Community Health, School of Health Sciences, University of Minho, Portugal

Aim: To describe the design and validation of the CARAT10, a questionnaire to quantify the degree of control of allergic rhinitis and asthma in adult patients.
Method: CARAT10 first phase included a review of the literature, a consensus process and a feasibility study. The second phase was a cross-sectional study, aiming to reduce redundant items and to assess factor structure, internal consistency and concurrent validity. The third phase was a prospective study. A website was developed and is available for researchers, clinicians and patients.
Results: In the first phase, 116 items relating to the control of asthma and rhinitis were identified in a literature review. 34 items were selected for possible inclusion. A final version with 17 questions was developed with the participation of 111 doctors and 60 patients. In the second phase the instrument was tested with 193 patients. The questionnaire was reduced to 10 questions with 2 factors (CARAT10). Cronbach's alpha was 0.85. Correlation coefficients ranged from 0.58 to 0.79.
In the third phase, 53 patients completed CARAT10 in two clinic visits. Seventeen patients (32%) were classified as clinically stable. Reliability was high (0.92) as was the responsiveness to change (1.44).
Conclusion: CARAT10 is a reliable and valid instrument for assessing control of asthma and rhinitis in clinical practice and for comparison of groups of patients in research. The dissemination and clinical implementation of CARAT10 may be supported further by a website.
Conflict of interest and funding: Partially funded by an unrestricted research grant from MSD, Portugal.

22. Diagnostic accuracy of clinical signs and symptoms of patients suspected to suffer from obstructive airway disease

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Aim: Clinical signs and symptoms (CSAS) have a key function for inducing a diagnostic process. Therefore, the high impact of CSAS is emphasised in in guidelines. However, it is suspected that diagnostic accuracy of CSAS in primary care is lower as compared to clinical setting. The aim was to determine the diagnostic accuracy of CSAS in patients suspected to suffer from obstructive airway disease in three different health care sectors.
Method: 219 patients from 10 general practices, 259 patients from a pneumologists´ referral practice, and 300 patients from a specialised pulmonary hospital participated in the study. Patients´ CSAS were documented in a structured questionnaire. The final diagnosis was made with spirometric manoeuvre and bronchial provocation if necessary. 25.6% had asthma (reversible airway obstruction), 31.4% had COPD (irreversible airway obstruction).
Results: Coughing (OR 0.36; 95%CI 0.20-0.63) and expectoration (OR 0.48; 95%CI 0.26-0.88) were negatively associated with asthma in general practice, whereas dyspnoea attacks (OR 2.42; 95%CI 1.32-4.44) were positively associated. In the pneumologists´ referral practice, wheezing (OR 2.10; 95%CI 1.23-3.59), coughing (OR 1.96; 95%CI 1.14-3.36) and expectoration (OR 1.90; 95%CI 1.08-3.36) were positively associated with asthma. Diagnostic accuracy of dyspnoea was highest in hospital (OR 10.26; 95%CI 2.95-35.70) and lower in primary care (OR 4.67; 95%CI 2.22-9.81).
Conclusion: Related to COPD, diagnostic accuracy of CSAS is higher in hospital than in primary care. The negative association between coughing and expectoration and asthma in general practice contradicts the clinical rules of the guidelines. Clinical rules are often derived from clinical setting. However, it is not possible to transfer these decision rules into primary care.
Conflict of interest and funding: No conflicts of interest.

23. Early detection of chronic obstructive pulmonary disease in general practice in Denmark – the TOP study

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Aim: Early detection of cases, including early treatment, may reduce the future burden of Chronic Obstructive Pulmonary Disease (COPD). The Danish National Board of Health recommends, based on expert opinion, that smokers/ex-smokers >35 years with at least one respiratory symptom should be offered a spirometry to facilitate early detection of COPD. The aim of the study was, therefore, to provide evidence for the feasibility and impact of doing spirometry in subjects fulfilling these criteria.
Method: Participating general practitioners (GPs), (n=335; approximately 10% of the Danish GPs) offered spirometry to subjects with tobacco/occupational exposure >35 years, and no previous diagnosis of obstructive lung disease, presenting with at least one of the following symptoms: Cough, dyspnoea, wheezing, phlegm or recurrent respiratory infections. The following data were recorded: age, smoking status, pack-years, body mass index (BMI), and dyspnoea score (MRC).
Results: A total of 3.097 (51% females) subjects were recruited: Mean age 58 years, BMI 27, and 33 pack-years. The majority of subjects (88%) reported MRC 1 or 2. An FEV_1/FVC-ratio < 70 % was found in 35% of the subjects. According to the level of the screening FEV_1: 79% of the subjects with airway obstruction had mild to moderate COPD.
Conclusion: Over one third of the screened subjects were found to have airways obstruction (FEV_1/FVC < 70%). Early detection of COPD is feasible and appears cost-effective in the primary care sector through offering spirometry to adults with tobacco/occupational exposure and at least one respiratory symptom.
Conflict of interest and funding: CSU, AL, RD and KKA have received grants/fees from Pfizer/Boehringer Ingelheim Denmark.

24. Comorbidities associated with chronic obstructive pulmonary disease (COPD) in general practice: frequency, relation to COPD, and treatment consequences

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University Medical Center Groningen, University of Groningen, the Netherlands

Aim: Patients with COPD may have multiple concurrent comorbidities that extend beyond the lung. Comorbidities can affect the perceived severity of COPD and may alter treatment choices. This analysis explores the most frequent comorbidities of COPD seen in general practice and discusses the implications for treatment.
Method: PubMed was searched for articles including the terms COPD and anxiety, asthma, cachexia, cardiovascular disease, depression, diabetes, or lung cancer, published between 2000 and 2009. In all, 606 studies were identified and 59 were considered relevant.
Results: Patients with COPD are at increased risk of developing coexisting conditions in several organ systems (cardiac, respiratory/thoracic/mediastinal, hepatobiliary), as well as infections/infestations, psychiatric illness, and immune disorders. The most commonly observed comorbidities are chronic conditions, such as asthma, cardiovascular disease and type II diabetes. The persistent, low-grade pulmonary and systemic inflammation associated with COPD may be involved in the development of these comorbidities, which appear to increase in prevalence with the severity of COPD. Other common comorbidities include depression, loss of fat-free mass, malignancy (particularly lung cancer) and osteoporosis. Comorbidities of COPD are associated with increased morbidity and mortality but often remain undiagnosed. However, when multiple comorbidities are diagnosed and are being treated, the physician needs to consider the potential for drug–drug interactions.
Conclusion: Multiple comorbidities may commonly coexist in patients with COPD, increasing morbidity and mortality. In primary care, patient management should not be limited to assessing pulmonary function and health status. Greater awareness, better diagnosis, and improved management of comorbidities will ensure optimal patient care and may improve patient outcomes.
Conflict of interest and funding: TVDM has received funding from Novartis and Nycomed.

25. Role of cardiovascular risk factors in patients with chronic obstructive pulmonary disease

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Aim: The objective of this study was to investigate the presence and control of cardiovascular risk factors in patients with chronic obstructive pulmonary disease (COPD).
Method: 57 family physicians registered all patients with a diagnosis of COPD during regular office visits. All physicians performed detailed physical examinations and completed the special designed questionnaire. Blood samples were taken for lipid profile and glucose level. We used data from the paper medical record about cardiovascular risk factors and their treatment.
Results: We studied 975 patients (457 males and 498 females). Mean age 62.3±10.4 years. 63.2% of patients had arterial hypertension, 36.5% had BMI≥30 kg/m^2, 21.4% had diabetes, and 49.6% had hyperlipidemia. 72.6% of patients had at least two important modifiable risk factors for cardiovascular disease (hypertension, hyperlipidemia, smoking, obesity, diabetes); 32.6% of patients had all three risk factors. 24.5% of patients had the target blood pressure, 32.4% of patients had the target values of total cholesterol, and 82.1% of patients were non-smokers. Obese patients were less efficient in achieving therapeutic targets. Only 86 (9.2%) of patients were non-smokers and had optimal control of blood pressure and cholesterol level. The pharmacotherapy of risk factors in COPD by family doctors was found in some instances not to conform to recommended guidelines.
Conclusion: It has been shown that modifiable cardiovascular risk factors in patients with COPD were poorly controlled. Controlling hypertension, diabetes mellitus, body weight, lipid profiles and also educating people not to smoke, will help to reduce the cardiovascular risks and prevent the development of cardiovascular complications.
Conflict of interest and funding: No

26. Simplified, inexpensive COPD case-finding using a hierarchical approach reduces unnecessary tests

Nelson SB, Thomashow BM, Enright PL, Mannino D
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Aim: Globally, COPD is grossly underdiagnosed. Many primary care offices have a spirometer; however, literature shows poor utilization over time. Reasons include staff turnover, inability to provide lively demonstrations, and understanding need for good patient instruction. We sought a simpler way to find cases of COPD.
Method: 5323 volunteer subjects were recruited at public events using a hierarchical approach to detect obstructive lung disease. Subjects answered 6 questions related to COPD risk factors, then performed peak flow maneuver using an inexpensive device. If there were >=2 risk factors and PEF was <70% predicted, they performed spirometry. A random sample was selected for spirometry regardless of PEF result. Tests were performed by RTs or RNs with pulmonary function experience. Quality was reviewed throughout the day.
Results: Risk factors and peak flow were obtained from 4901 subjects. 119(2%) had >=2 risk factors and low PEF and performed spirometry. 89(75%) had obstruction (OBS-S), 30(25%) did not. The risk factor questionnaire alone would have resulted in 1526 spirometry tests, with increased cost and time. 599 performed acceptable spirometry. 418(70%) had normal PEF and normal spirometry. 99(17%) had low PEF and OBS-S. 36(11%) had low PEF and normal spirometry. 46(8%) had normal PEF and OBS-S. In this last group, 14 had mild (FEV_1%predicted > 70%) obstruction, 8 had severe (FEV_1%predicted < 50%).
Conclusion: Combining risk factor questions and PEF reduces the overall number of spirometry tests required to find a person with COPD. This represents significant cost savings. Fewer than 5% of subjects with significant COPD were misclassified using a stepwise approach. PEF is a simple test, does not require expensive equipment, and can be easily performed repeatedly to obtain best patient efforts.
Conflict of interest and funding: No conflicts. Funding by COPD Foundation.

27. Early detection of citizens with suspicion of chronic obstructive lung disease in a Danish municipality

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Aim: Around 430,000 Danes suffer from chronic obstructive lung disease (COPD) with only around 1/3 diagnosed. The National Board of Health (NBH) recommends early detection, focusing on smokers/ex-smoker above 35 years with at least one respiratory symptom. Danish municipalities have been suggested by a governmental committee to be responsible for early detection of COPD. The aim was to investigate the success of screening for COPD at the municipality level using the Municipality of Esbjerg - fifth largest (115,000 inhabitants).
Method: By local newspaper advertisement the municipality offered spirometry to citizens with no previous COPD diagnosis fulfilling the criteria issued by NBH. Citizens with airway obstruction (FEV_1/FVC<70%) were requested to visit their GP for further diagnosis. Telephone follow-up after 2-3 months investigated, whether GPs were visited, GPs actions in terms of diagnosis and treatment, etc.

Results: 150 citizens were included (50% females, 58 years, 51% smokers, 31 pack-years, MRC 1.5). 50.7% of the subjects had airway obstruction. The screening spirometry suggested that 69% had moderate to very severe COPD. Follow-up interviews showed that 7 out of 10 obstructive citizens visited their GP afterwards: 80% of these were diagnosed with COPD. Medicines were prescribed to less than 50% and only 20% were trying to stop smoking.
Conclusion: Early detection of COPD at the municipality level after self-referral is worthwhile and successful. Together with early detection at the GP-level, municipality screening seems to be succesfull in order to identify new COPD patients.
Conflict of interest and funding: Pfizer and Boehringer Ingelheim funded the project database and assisted in analyses. JD,CBA and PBP are employees of Pfizer.

28. Myth of Mild: What is your patient's COPD severity level?

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University of Toronto, Canada

Aim: Surveys in a number of countries suggest that COPD is diagnosed late and at a more advanced stage by Primary Practitioners (PCPs). This may be related to misunderstanding of what constitutes mild, moderate, and severe disease. Misclassification of COPD patients may therefore lead to undertreatment with subsequent consequences on patients' quality of life and utilization of health resources. This study was performed to determine if a similar gap between perceived and actual COPD severity was common amongst Canadian PCPs.
Method: We surveyed 491 Primary Care offices across Canada, asking COPD patients in the office to complete a brief questionnaire inquiring about activity limitation, need for urgent care, antibiotics and/or steroids in last 24 months, and prescription of COPD medications.
Results: 2094 questionnaires were completed by patients and then reviewed by their PCP. The PCPs gave a severity rank to the questionnaires as mild, moderate, or severe based on patient responses. The PCPs determined that 34% of the patients were mild, 42% moderate and 24% severe.
The patients established their severity rating according to their own interpretation; 16% were in fact mild, 40% moderate and 44% severe. Of the 16% that were mild, 8% of these patients claimed they did not have any activity limitation at the time of assessment, although did report symptoms of COPD such as shortness of breath 28%, coughing 40%, wheezing 16%, phlegm/mucus 25%
Conclusion: There is a wide discrepancy between actual and perceived COPD severity classification in Primary Care. This gap could be a barrier to optimal management of the disease limiting options outlined in the most recent Canadian COPD Guidelines.
Conflict of interest and funding: This program was supported by GSK Canada.

29. Enhanced COPD care through quality improvement

Tomlins R
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Brief outline of context: COPD is increasingly a problem in Australia as the population ages, with significant costs for hospitalisation of people with advanced COPD. Increasing the knowledge and confidence of primary care practitioners and practice teams can result in earlier intervention and better community-based care delivery.
Brief outline of problem: In Australia, the majority of people with COPD have a history of smoking. Early intervention aimed at smoking cessation and targetted screening, diagnosis and management of COPD in its early stages will reduce the cost of this health problem.
Assessment of problem and analysis of its causes: The crucial issues in Australia are raising awareness of doctors and the community of the benefits of early intervention.
Strategy for change: The methods used by the Improvement Foundation (Australia) (IFA) will be described. The program started in late 2009.
Measurement of improvement: Performance indicators used by practices in the IFA program will be descibed.
Effects of changes: Some examples of changes in the way practices approach screening and identification of patients at risk of COPD will be discussed.
Lessons learnt: Continung quality improvement has been shown to work in Australia for people with chronic diseases. It is too early to say whether the COPD program will also be sucessful.
Message for others: Quality improvement requires a structured approach to care delivery.
Conflict of interest and funding: The author is Chair of the COPD Expert Reference Group of IFA, receiving recompense for time spent at meetings.

30. Comfort in Diagnosing COPD: A Survey of Canadian Physicians

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[1]Chair, Family Physician Airways Group of Canada [2]University of Saskatchewan, Saskatoon, Saskatchewan, CANADA

Aim: To assess physician comfort in diagnosing chronic obstructive pulmonary disease (COPD).
Method: A questionnaire developed by an expert steering committee was administered to family physicians to assess physician comfort diagnosing COPD and prospectively assess their COPD practice patterns. All patients assessed in their offices for any reason were screened. Those ≥40 years of age, smoker or ex-smoker, who answered yes to any of the Canadian Lung Association questions[1] were eligible to have their visit included in the practice assessment. [1]*Can Respir J* 2007;**14**:Suppl B
Results: 166 Canadian family physicians participated and 3,275 patient visits were assessed between May and July 2009. 43.4% of physicians reported being somewhat to not at all comfortable in diagnosing COPD. 52.4% were somewhat to not at all comfortable differentiating between asthma and COPD. Physicians in practice <10 years were more likely to report discomfort diagnosing COPD, while physicians who worked >50 hours per week were more likely to report comfort in diagnosing COPD. Practice size did not affect comfort in diagnosing COPD. Years in practice, number of hours worked per week, and practice size did not affect self-reported ability to differentiate between asthma and COPD.
Conclusion: A significant proportion of participants reported lack of comfort in diagnosing COPD, and also in differentiating between COPD and asthma. This finding has real implications in patient management, as treatment options and goals are very different for these diseases. These findings suggest that further physician awareness, education and competency with regards to the diagnosis of COPD are required.
Conflict of interest and funding: Research funded by Boehringer-Ingelheim (Canada) Ltd./Ltée and Pfizer Canada.

31. The course of health status during an exacerbation of COPD in hospitalized patients versus out-patient treated patients

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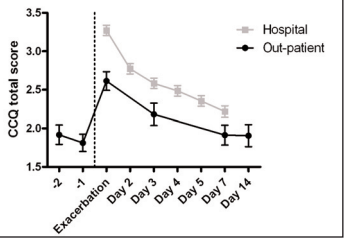
Department of General Practice, University Medical Center Groningen, Groningen, The Netherlands

Aim: To describe the course of health status changes during exacerbations requiring hospitalization and during exacerbations treated at home.
Method: Data from two randomized controlled trials was used to describe day-to-day health status changes measured by the Clinical COPD Questionnaire (CCQ). Study I: patients admitted to the hospital (n=210, age 70.6(8.4), FEV_1% predicted 36.9(14.7), CCQ total score 3.3(0.93); Chest. 2007 Dec;132(6):1741-7) were treated either with oral or intravenous prednisolone. Study II: patients treated at home (n=45, age 64.1(8.1), FEV_1% predicted 50.1(12.9), CCQ total score 2.6(0.79); COPD. 2008 Oct;5(5):282-90) were treated either with budesonide/formoterol or placebo.

Results: As expected, health status was more impaired in hospitalized patients. Patients' health status improved rapidly in both studies. However the improvement shows a remarkably similar pattern (figure 1). The mean improvement of the CCQ in hospitalized patients was -0.16 points/day versus -0.12 points/day in out-patient treated patients (difference in improvement between groups not significant).

Figure 1: Course of Clinical COPD Questionnaire total scores in hospitalized and out-patient treated patients during the recovery of an exacerbation of COPD. Time points -2 and -1 represent run-in visits.



Conclusion: Health status can be measured during an exacerbation of COPD using the Clinical COPD Questionnaire (CCQ). While CCQ scores in hospitalized patients are significantly higher than in patients treated at home, recovery patterns with time were remarkably similar.
Conflict of interest and funding: None, University Medical Center Groningen.

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32. DOSE - can we use it in our community GP specialist clinics?

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Aim: To assess whether using the DOSE score alongside the CCQ and CAT score was a useful way of assessing risk in our patients with GOLD stage III and IV COPD.
Method: 20 patients with an FEV_1 of <=40% predicted (GOLD stage III and IV) were identified from patients seen in a specialist respiratory community clinic based in three locations around Norfolk. Spirometry, CCQ scores, admission data, SaO2 levels, smoking status and pulmonary rehabilitation data were collected.
Results: Mean DOSE score was 5.75, mean% FEV_1 27%, mean ccq score 3.36 Only 3 patients out of 20 had been admitted to hospital in the preceding 12 months - and so we had insufficient data to assess risk of hospital admissions. There was however a relationship between CCQ and DOSE score. We had insufficient data to compare the CAT score
Conclusion: Using the DOSE score in our specialist clinics may be able to help us predict those patients at high risk of exacerbation and or admission - and help us target resources in the community aimed at supporting them in their homes if possible. Using it in a Primary Care setting may be of more benefit - and needs assessing.
Conflict of interest and funding: DF has received funding from multiple pharma companies- for service delivery support and lecture fees. AM- none

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33. Improvements in quality of life for patients undergoing COPD rehabilitation at municipality healthcare centres in Denmark

Dollerup J, Poulsen PB, Godtfredsen NS, Grann O, Pors B, Andersen KK, Larsen HB, Dalsgaard LS, Søndergaard JD, Lavesen M, Sørensen TB
Pfizer Denmark, Denmark

Aim: More than 400,000 people in Denmark suffers from chronic obstructive lung disease (COPD) with implications for quality of life (QoL). In Denmark rehabilitation of COPD is the responsibility of the municipality healthcare centres in cooperation with general practice and hospitals. The aim was to investigate the improvement in QoL for the COPD patients entering the healthcare centres for rehabilitation.
Method: In a longitudinal cohort study 22 Danish municipality healthcare centres, each with their own rehabilitation strategy, included COPD patients undergoing rehabilitation. QoL was measured using the 15D instrument due to its high correlation with COPD symptoms, pulmonary function and test capacity. Besides QoL data, 6 minutes walking distance and shuttle walk, demographics were recorded in a database before and after rehabilitation.
Results: 958 patients initiated rehabilitation (40% males, 68 years old, 96% smokers/ex-smokers) with 701 patients completing it and 466 patients followed-up after 6-12 months. Comparing pre- and post-rehabilitation QoL increased from 0.8 to 0.84 (quality-adjusted life years, $p<0.01$) having rehabilitation, which is regarded a clinically significant change (>0.03). The highest impairment for COPD patients was related to breathing and usual activities. Also 6 minute-walking distance and shuttle walk were both significantly improved.
Conclusion: The rehabilitation activities of COPD patients in Danish municipality healthcare centres are considered to be relevant and important as they improve QoL of the COPD patients - both clinically and statistically significant.
Conflict of interest and funding: The study was funded by Pfizer Denmark and Boehringer Ingelheim. JD, PBP and JDS are employees of Pfizer, whereas HBL and LSD are employees of Boehringer Ingelheim.

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34. Evaluation of a Six-Month Pilot Project on Respiratory Education and Care in the Emergency Department with an Interprofessional Focus

Seah J, Klutt J, Enriquez S
St. Joseph's Health Centre, Ontario

Aim: An Assertive Interprofessional Respiratory (AIR) team comprised of a nurse (RN), a respiratory therapist (RRT) and a pharmacist (RPh) was developed and dedicated to providing enhanced care and education to patients with respiratory illness in the Emergency Department (ED).
Method: Clinicians were required to become Certified Respiratory Educators. This was followed by a two-week orientation in the ED where the team became familiar to both the policies and procedures, as well with the exchanges of scopes of practice. Medical directives and pre-printed orders were created in accordance with current respiratory guidelines and the OLA Emergency Department Asthma Care Pathway. Access and flow indicators and various dimensions of patient care were collected during implementation and compared with data obtained during the same time frame a year earlier. A 15-item tool was developed for team and ED clinicians to assess their own knowledge related to respiratory care
Results: Decreased length of stay in the ED (on average 3.8 hours for admitted patients) and readmission rates at 72 hours, 2 weeks and 1 month. Patients rated their experience of care higher than those receiving standard care. ED RNs rated their perceived knowledge higher in the post-survey for 14 of the 15 statements and team clinicians rated higher for all 15 statements
Conclusion: Implementation of an interprofessional respiratory team in the ED not only improved patient flow but also enhanced the patient experience and knowledge of their condition. Additionally, the program contributed to clinicians' perceived knowledge of respiratory care.
Conflict of interest and funding: HealthForce Ontario initiative on Optimizing Use of Health Providers' Competencies Fund.

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35. Evaluation of a primary care asthma program (PCAP) in Ontario, Canada

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The Hospital for Sick Children, Toronto, Canada

Aim: To implement and evaluate whether an evidence-based primary care asthma program (PCAP) leads to improved clinical outcomes in asthma patients.
Method: A community-based participatory research pilot project was implemented at 8 primary care practices across Ontario, Canada. The PCAP and tools (asthma care map, program standards, management flow chart, and action plan) which were based on the Canadian Asthma Consensus Guidelines were evaluated using a pre- and post-intervention design.
Results: From 2003-2006, a total of 1408 patients aged 2-55 years

participated. At 12-month follow-up, there were statistically significant reductions in self-reported asthma exacerbations from 77.8% to 54.5% (OR=0.35, 95% CI: 0.28, 0.40); uncontrolled daytime asthma symptoms from 62.4% to 41.4% (OR=0.34, 95% CI: 0.27, 0.42); uncontrolled nighttime asthma symptoms from 46.4% to 25.4% (OR=0.29, 95% CI: 0.23, 0.37); emergency room visits due to asthma from 9.9% to 5.5% (OR=0.47, 95% CI: 0.32, 0.62); and productivity loss in adults from 12.0% to 10.3% (OR=0.49, 95% CI: 0.34, 0.71). Since publication of the results of the pilot project in 2008, the uptake of the research evidence has been encouraging. The PCAP has been successfully implemented in 103 sites (Community Health Centres, Family Health Teams, and Aboriginal/First Nations Communities) in Ontario, reaching over 9300 asthma patients.

Conclusion: Implementation of an evidence-based PCAP can lead to reductions in exacerbations, symptoms, urgent care use and productivity loss related to asthma. The PCAP also represents an example of putting research evidence into practice. The next step will be monitoring the ongoing effectiveness of the PCAP on patient outcomes and quality of life.

Acknowledgement: This abstract utilised some data previously published in: To T, Cicutto L, Degani N, *et al*. Can a community evidence-based asthma care program improve clinical outcomes? A longitudinal study. *Medical Care*. **46**(12):1257, © 2008 Lippincott Williams & Wilkins, Inc., and reproduced with permission from Wolters Kluwer Health.

Conflict of interest and funding: No conflicts of interest to report. Supported by the Government of Ontario.

To T, Cicutto L, Degani N, McLimont S, Beyene J. Can a community evidence-based asthma care program improve clinical outcomes? A longitudinal study. *Medical Care* **46**(12):1257

36. Selection of inhaler devices in primary care: an international survey

Levy ML, Barnes P, Broeders M, Corbetta L, Dekhuijzen PRN, Corrigan CJ, Dubus JC, Hausen T, Lavorini F, Kneussl M, Pedersen S, Ramalho A, Sanchis J, Viejo J, Vincken W, Voshaar T and Crompton G

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Aim: It is unclear how health professionals decide on prescribing inhaler devices. The Aerosol Drug Management Improvement Team (ADMIT) did an international survey.

Method: A modified Delphi technique was used to develop a 14 item questionnaire on deciding to prescribe asthma inhalers; administered to convenience samples of health professionals attending educational meetings.

Results: 360/450 (80%) questionnaires returned; 32% declared a respiratory interest; 172 sole-practitioners; Mean age 48 (SD 9.2) years; qualification from 1958 - 2007. 54% agreed or strongly agreed the drug they wanted to prescribe determined choice of device. Patients' age influenced prescribing: 5% newly diagnosed children <6 would be prescribed a pMDI alone; 46% aged 7-70 yrs a DPI and 15% a breath actuated pMDI; 11% of patients >70 a pMDI alone, for the rest DPIs, Breath Actuated devices, and pMDIs + Spacers. 12% respondents never or hardly ever take the patients' preference into account when prescribing, and 8% hardly ever or never check patients ability to use their device. 37% agreed or strongly agreed it is easier for patients to use DPIs. 10% partly agreed or disagreed that specific instruction is needed for different devices. 45% checked inhaler technique before prescribing, 18% when asthma is uncontrolled and 31% at routine regular visits.

Conclusion: As patients' ability to use their inhaler device is important, these worrying survey findings indicate a need for more intensive education for prescribers.

Conflict of interest and funding: ADMIT is funded by an unrestricted educational grant from MEDA Pharmaceuticals.

37. Differences in local and systemic inflammatory markers in patients with obstructive airway disease

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Aim: Asthma and COPD are characterized by airway and systemic inflammation but little is known about differences in local and systemic inflammatory markers. Therefore the aim was to investigate inflammatory markers in exhaled breath and blood among subjects with asthma, COPD and partial reversibility of airflow obstruction.

Method: In 210 adult patients presenting with symptoms suggestive of obstructive airway disease lung function, fractional exhaled nitric oxide (FENO), blood eosinophils and serum levels of high-sensitivity CRP (hs-CRP) and IgE were measured.

Results: Serum hs-CRP levels were increased in COPD patients when compared to asthma patients ($p = 0.009$). FENO, IgE and eosinophils were increased in asthmatics when compared to COPD patients ($p = 0.009$; $p = 0.041$ and $p = 0.009$, respectively). Serum hs-CRP levels correlated with the number of pack years ($r = 0.218$; $p = 0.001$) and inversely with spirometry including FEV_1 ($r = -0.190$; $p = 0.006$), FEV_1/VC ($r = - 0.213$; $p = 0.002$), maximum expiratory flow rate at 50% of vital capacity (MEF50) ($r = -0.187$; $p = 0.007$) and maximum expiratory flow rate at 25% of vital capacity (MEF25) ($r = -0.292$; $p < 0.001$).

Conclusion: Although COPD and asthma share some clinical features and thereby making differentiation difficult, levels of serum hs-CRP, IgE, blood eosinophils and FENO may reflect differences between the diseases. The characteristic inflammatory patterns in COPD and asthma merit further investigation.

Conflict of interest and funding: The authors declare that they have no conflicts of interest. The trial was funded by the Federal Ministry of Education and Research (BMBF), Germany; grant no. 01GK0515.

38. Influence of CRP testing and clinical findings on antibiotic prescribing in adults presenting with acute cough in primary care

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Aim: To determine the independent influence of a near patient C-reactive protein (CRP) test on antibiotic prescription for patients with acute cough or lower respiratory tract infection (LRTI), and how clinicians weigh symptoms and chest examination when the test is, and is not used.

Method: Prospective observational study of presentation, management and outcome of adults presenting to primary care with acute cough/LRTI, in three networks in Norway, Sweden and Wales. Predictors of antibiotic prescribing were evaluated in those tested and those not tested with the CRP test using logistic regression and Receiver Operation Characteristics (ROC) curve analysis.

Results: 803 patients were recruited in the three networks. When the CRP test was carried out, the CRP value was the strongest independent predictor of antibiotic prescribing, with an odds ratio (OR) of CRP>50 mg/L of 98.1. Discoloured sputum, crackles on auscultation and GP's perception of patient preference for antibiotics were the strongest predictors of antibiotic prescribing when the CRP test was not done.

Conclusion: CRP point of care test results strongly influence GP's decisions whether or not to prescribe antibiotics for acute cough/LRTI. The influence of discoloured sputum and abnormal lung sounds, which are poor prognostic markers, is diminished when a CRP test result is available. CRP testing could prevent undue reliance on clinical features which poorly predict benefit from antibiotic treatment.

Conflict of interest and funding: No conflict of interest reported by any of the authors. The study has been funded by EUs 6th framework program, and the Norwegian General Practice Research Fund.

39. Impact of the utilization of C-reactive protein rapid testing on antibiotic prescription for lower respiratory tract infections

Llor C, Cots JM, González B, Bjerrum L, Munck A, Hernández S; and HAPPY AUDIT investigators

University Rovira i Virgili. Primary Healthcare Center Jaume I, Tarragona, Spain

Aim: Happy Audit is a study financed by the European Union, the main objective of which is to strengthen the surveillance of lower respiratory tract infections (LRTI) in primary health care through the development of intervention programmes targeting general practitioners (GPs) and changing people's habits towards prudent use of antimicrobial agents. The aim was to evaluate the impact of performing C-reactive protein rapid testing on antibiotic prescribing in LRTIs in Spain.

Method: A total of 210 GPs registered all the cases with LRTIs during a 3-week period after an intervention consisted in courses for GPs, guidelines, patient information leaflets, workshops on rapid tests the use of the C-reactive protein test in their consulting offices.

Results: The C-reactive protein test was used in 545 contacts out of a total of 1,488 LRTIs (36.6%). The test was carried out in 91 patients with acute exacerbations of chronic bronchitis or COPD. Antibiotic prescription was lower among the physicians using the C-reactive protein rapid test (43.9%) compared with the GPs who did not use the test (61.8%; p<0.001). Prescription was also lower when the results of C-reactive protein were less than 10 mg/L, with these values being observed in 51.2% of the total number of determinations noted in the registry sheets and in these cases antibiotics were only prescribed in 35 contacts out of a total of 253 determinations (13.8%).

Conclusion: GPs carrying out the determination of C-reactive protein prescribe fewer antibiotics than those who do not use it.

Conflict of interest and funding: None

40. Association between C-reactive protein testing and adherence to antibiotics in lower respiratory tract infections

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Aim: To evaluate the association between the performance of C-reactive protein (CRP) testing on treatment adherence among patients aged 18 or more with lower respiratory tract infections (LRTI) treated with thrice-daily antibiotic regimens.

Method: Prospective study from 2003 through 2008 We compared the adherence of patients prior to the use of CRP –until 2007 no test was available– with the adherence associated with the use of CRP tests for suspicion of bacterial infection in LRTIs. Patient adherence was assessed by electronic monitoring.

Results: A total of 162 with LRTI were recruited. Nobody refused to give informed consent; however, one patient did not return the container. Of the 161 patients with LRTI, CRP testing was performed in 43 cases (26.7%). The percentage of container openings was 76.8±17.4%. The results of adherence were better when the patient underwent this test than among those not receiving the test, with regard to the percentage of container openings (83.3% ± 14.8% vs. 74.4% ± 17.7%; p<0.01) and the good timing adherence during at least 80% of the antibiotic course (32.6% vs. 16.9%; p<0.05). The percentage of patients who took at least 80% of the doses was slightly better when the patient underwent the rapid test (72.1% vs. 55.1%), although this difference was not statistically significant.

Conclusion: Greater antibiotic treatment adherence is observed among patients with LRTIs on performing CRP testing at the consultation prior to administration of the antibiotic treatment.

Conflict of interest and funding: None. Funding: GlaxoSmithKline provided the MEMS containers and C-reactive protein was provided by AXis-Shield and Orion Diagnostica.

41. Interleukin-6 gene polymorphism and susceptibility to asthma in Eastern China

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Division of Life Science and Biotechnology in Ocean University of China and Asthma Laboratory of Qingdao Municipal Hospital

Aim: Recent studies have shown that frequency of genetic mutation in atopic asthma varies among ethnic populations and geographical territories. The aim of this study was to pursue potential risk factors and reveal the relationship between the polymorphism of interleukin-6 (IL-6) gene promoter region -634 C/G and incidence of atopic asthma.

Method: We analysed a single nucleotide polymorphisms (SNP) -634 C/G in the IL-6 gene in the atopic asthma patients (n = 481) and the health population (n = 479) of Han people in Eastern China. Genotyping was conducted using polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP).

Results: The results show that frequencies of CC, CG and GG genotypes were found to be 47.2%, 44.7% and 8.1% in the patients, and 53.0%, 38.2% and 8.8% in the health respectively. There was not significantly different in the frequency distribution of IL-6 genotype between the patient and the health groups (P>0.05). However, Binary Logistic analysis indicated that the susceptibility to atopic asthma increases respectively as genotypes vary from GG, to CG and to CC (P=0.041; OR=1.307; 95% CI = 1.011-1.691).

Conclusion: Genotype CC is more likely susceptible to atopic asthma than both genotypes CG and GG. Further studies will be focused on loci of some other candidate genes in a large-scale population and in family pedigree, in order to reveal the mechanism of atopic asthma and to prevent and cure the disease at early stage.

Conflict of interest and funding: This work was supported by Qingdao Municipal Science and Technology Foundation, China (No. 06-2-2-3-nsh).

42. Symptom- and sign-based clinical predictors of asthma and COPD in a resource-limited primary care setting

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Aim: To determine clinical features that best distinguish asthma from COPD in patients with respiratory symptoms without the use of spirometry, in a community health centre.

Method: Subjects, 15 years and older, presenting to primary care with cough or difficulty breathing were independently assessed by (1) a general practitioner who examined the patient and performed spirometric assessment and (2) a respiratory physician who reviewed all clinical data. Stepwise multiple regression analysis was performed to determine the clinical predictors for asthma and COPD.

Results: Data for 1392 participants were analysed. 63% were female; 24% reported never having smoked; 33% reported smoking ≥ 20 pack years. 66% had FEV_1/FVC ratios of < 70%, and 23% had FEV1 values < 80% predicted. COPD predictors were: previously diagnosed COPD (LR+ 3.46), pack-year history ≥ 20 years (LR+ 2.07); cannabis use (LR+ 1.29); previous tuberculosis (LR+ 1.32); deterioration of symptoms (LR+ 1.56). The cut-off for diagnosing COPD was ≥ 5 predictors (sensitivity of 86%; specificity 87%). Asthma predictors were: previously diagnosed asthma (LR+ 2.27); symptoms before the age 20 years (LR+ 1.73); wheeze on auscultation (LR+ 2.20). Response to bronchodilator therapy, nocturnal dyspnoea, and symptoms triggered by emotions were moderately predictive. The cut-off for diagnosing asthma was ≥ 4 predictors (sensitivity 82%; specificity 92%).

Conclusion: It is possible to differentiate between asthma and COPD using symptom and sign-based clinical predictors in settings where spirometry is not available. Previous tuberculosis and cannabis use have been identified as predictors for COPD in this setting.

Conflict of interest and funding: Nil. WHO Stop TB Partnership

43. Spirometry quality improvement program in a health area

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Brief outline of context: 48 primary care practices in a Health Service caring for one million population

Brief outline of problem: Low spirometry implementation in our health area despite the growing evidence about its feasibility in primary care and importance to manage respiratory conditions

Assessment of problem and analysis of its causes: Underdiagnosis of COPD was high. Spirometry waiting list more than 2 months and all primary care doctors considered spirometry as a feasible, essential test for good care. A lack of spirometers, poor training and low level of implication were detected. Pneumologists had interest in spirometry implementation in primary care. An structured logistic and educative intervention was the best apoach to solve this problem

Strategy for change: Our group, working with Health Service resources developed a structured training and logistic practical approach consisting of a 4 hours workshop for doctors and nurses in the totality of the 42 practices with a week stay at the pulmonary function laboratory in the hospital and continuing feed-back, and assistance.

Measurement of improvement: Continuing evaluation, critical incidents analysis, yearly based surveys and care process indicators

Effects of changes: Only 4 practices from 42 don't still adequately use spirometry. An increasing number of good quality spirometries and more accurate COPD diagnosis and management. However, lack of interest and implication in several centres, repeated nurses changes in the practices and other unsolved problems makes continuity of activities essential

Lessons learnt: Any quality improvement activity for a health area requires large resources and continued leadership.

Message for others: A practical structured approach is needed to improve primary care spirometry quality and performance.

Conflict of interest and funding: None

44. Efficacy and safety of roflumilast in patients with chronic obstructive pulmonary disease (COPD) concomitantly treated with tiotropium or salmeterol

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Aim: Roflumilast is an oral, selective phosphodiesterase 4 inhibitor that improves lung function and other clinical outcomes in moderate-to-severe COPD. Here, we describe results from 6-month studies of roflumilast as concomitant therapy.[1]

Method: Patients with moderate-to-severe COPD (M2-127) or moderate-to-severe COPD with cough and sputum (M2-128) were randomised 1:1 to roflumilast, 500 µg once daily, or placebo with concomitant salmeterol twice daily (M2-127) or tiotropium (M2-128) once daily for 24 weeks. The primary endpoint was mean change in pre-bronchodilator FEV_1 from baseline.

Results: Overall, 933 (M2-127) and 743 (M2-128) patients were randomised and treated. Roflumilast and salmeterol improved mean pre-bronchodilator FEV_1 by 49 mL ($p<0.0001$) versus salmeterol alone. The concomitant regimen also reduced the mean annual exacerbation rate (moderate or severe) by 36.8% ($p=0.0315$; post-hoc) and increased median time to first moderate or severe exacerbation (hazard ratio 0.6, $p=0.0067$). Roflumilast and tiotropium improved mean pre-bronchodilator FEV_1 by 80 mL ($p<0.0001$) versus tiotropium alone and increased median time to first exacerbation (hazard ratios 0.7 [$p=0.0264$] for mild, moderate or severe, and 0.8 [$p=0.1959$] for moderate or severe). Concomitant treatment non-significantly reduced the mean annual exacerbation rate (moderate or severe) by 23.2% (rate ratio=0.768; $p=0.196$). Most common adverse events were diarrhoea, nausea and weight loss. Weight loss was more pronounced in obese/overweight patients than in normal/underweight patients.

Conclusion: Roflumilast shows additional clinical benefit in patients with moderate-to-severe COPD already receiving salmeterol or tiotropium.

[1] Fabbri LM, Calverley PMA, *et al*. *Lancet* 2009;**347**:695–703.

Conflict of interest and funding: Authors have received compensation for consulting/research by multiple pharmaceutical companies. The trials were supported by Nycomed.

45. Potential of roflumilast for COPD in primary care – which patients would benefit most?

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Aim: The new oral phosphodiesterase 4 inhibitor roflumilast has anti-inflammatory properties and is currently in development for the treatment of COPD. Here, the pivotal trials are reviewed to assess which patients are most appropriate for treatment with roflumilast 500 µg once daily.

Method: Review of 1-year (M2-124/M2-125)[1] and 6-month (M2-127/M2-128)[2] trials. The 1-year trials enrolled patients with GOLD stage III or IV COPD (post-bronchodilator FEV_1 ≤50% predicted) associated with cough, sputum production and a history of exacerbations. Approximately half the patients used a long-acting beta2-agonist (LABA) and a third used a regular short-acting muscarinic antagonist (SAMA); inhaled corticosteroids were not allowed. The 6-month trials enrolled patients with GOLD stage II or III COPD (post-bronchodilator FEV_1 40–70% predicted), and chronic cough and sputum (M2-128 only); roflumilast was given concomitantly with salmeterol or tiotropium.

Results: In the 1-year studies (n=3091 randomised), roflumilast improved lung function and reduced exacerbations versus placebo; this improvement was not influenced by either LABA or SAMA usage. In the 6-month studies (n=1676 randomised), roflumilast improved lung function versus salmeterol/tiotropium alone and reduced some measures of exacerbation, although the exacerbation rate was already low. In all studies, weight loss was more common with roflumilast than placebo.

Conclusion: These findings indicate that roflumilast can improve lung function and reduce exacerbations when used in addition to LABA, SAMA or tiotropium in patients with stage II, III and IV COPD. Whether roflumilast adds to inhaled corticosteriods remains to be seen.

[1]Calverley PMA, Rabe KF, *et al*. *Lancet* 2009;**347**:685–94.
[2]Fabbri LM, Calverley PMA, *et al*. *Lancet* 2009;**347**:695–703.

Conflict of interest and funding: Authors have received compensation for consulting/research from multiple pharmaceutical companies. The trials were funded by Nycomed.

46. COPD patients under 50 years of age: 4-year follow-up in the UPLIFT trial

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Aim: Relatively little is known about the course of COPD in younger patients.

Method: Analysis of 356 patients <50 years old in the 4-years UPLIFT trial (randomized double-blind, placebo-controlled trial in 5,992 COPD patients permitted use of all respiratory medications other than inhaled anticholinergics). Inclusion criteria: post-bronchodilator (BD) FEV_1<70%, age >40 yrs, >10 pack-years smoking.

Results: Younger patients had similar disease severity compared to older patients but had a higher % continued smokers: 51% vs. 42% (50-60 yrs), 28% (60-70 yrs), 15% (>70 yrs). Sustained improvements in spirometry and health-related quality of life (SGRQ total score) were observed with tiotropium in younger patients. Mean Differences (tiotropium-control) were as follows:

	1 year	2 years	3 years	4 years
Pre-FEV_1 (ml)*	148	147	147	125
Post-FEV_1 (ml)*	86	126	153	105
Pre-FVC (ml)*	143	179	201	155
Post-FVC (ml)*	35	84	184	82
SGRQ (units)	-3.3	-3.0	-4.1	0.9**

*Pre/post 4 actuations salbutamol+ipratropium; *p<0.05 for all except for **

Mean decline pre-BD FEV_1=41 ml/yr (control) vs. 34 ml/yr (tiotropium) (p=ns). Mean decline post-BD FEV_1=58 ml/yr vs. 38 ml/yr, respectively (p<0.05). Exacerbations were less frequent in younger compared to older patients. Hazard ratio (95%CI) for an exacerbation (tiotropium/control)=0.87 (0.68,1.13). Rate ratio (95%CI) for number of exacerbations was reduced with tiotropium [0.73(0.56,0.95)].

Conclusion: Younger COPD patients have long-term improvements with tiotropium, which may include an effect on the rate of decline in lung function.

Conflict of interest and funding: All authors except SK and TL have received funding from various pharmaceutical companies (speaking and/or grants and/or consultancy). SK and TL are employees of Boehringer Ingelheim. Study funded by Boehringer Ingelheim and Pfizer.

47. Tiotropium prescribing for COPD in primary care: a marker of severity or predictor of admission?

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Aim: To examine the relationship between tiotropium prescribing in primary care and rate of admission due to COPD.

Method: Quarterly prescribing data between April 2006 and March 2009 were obtained from 114 general practices in south London, together with data on all practice admissions due to COPD. Practice demographic data, COPD prevalence data, and practice socio-economic status were obtained from routinely collected data. Tiotropium prescribing cost was expressed per patient on the practice list aged ≥45 years. Correlation was sought between rates of admission and tiotropium cost. Regression analysis was carried out to seek predictors of hospital admission.

Results: 5.6 COPD patients were admitted annually per 1000 patients ≥45 in participating practices. Mean practice prevalence of COPD was 0.89% (SD 0.52; range 0.06–2.3). Mean annual cost associated with tiotropium per patient aged ≥45 was £3.62 (£2.06; £0–£8.77). Tiotropium cost and COPD prevalence were strongly correlated (r=0.61; p<0.0001). Tiotropium cost per patient aged ≥45 was an independent predictor of COPD admissions when controlling for COPD prevalence and socio-economic status of practice area in multiple linear regression (Beta = 0.296; p=0.012). No correlation was found between COPD admissions and combination inhaled long-acting beta-agonist/corticosteroid prescribing.

Conclusion: The correlation between primary care tiotropium prescribing and admission due to COPD when controlling for disease prevalence and socio-economic deprivation raises important questions about prescribing of this drug. It seems unlikely that the rates of prescribing of tiotropium reflect disease severity alone since participating practices served a similar population.

Conflict of interest and funding: No conflict of interest. Funded by Guy's and St Thomas's Charity.

48. Effectiveness of combination therapies: real-world versus randomized controlled trials

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Aim: To compare real-world effectiveness of fixed-dose combination (FDC) inhaled corticosteroid/long-acting beta-agonist (ICS/LABA) therapy with that reported in asthma randomized controlled trails (RCTs).

Method: Retrospective study using the UK General Practice Research Database (GPRD) to assess asthma control measures in adolescent and adult patients (12–80 years) over a 1-year period initiating ICS, or receiving an increase in ICS dose, as FDC ICS/LABA therapy (n=6968). Additional exploratory cohorts were identified using proxy inclusion criteria for the Gaining Optimal Asthma controL (GOAL) RCT populations – Stratum II (n=207; 500mcg BDP-equivalent daily) and Stratum III (n=353; >500–1000mcg BDP-equivalent daily). Co-primary endpoints were the annualized exacerbation rate and GOAL 'Total Control' (defined as: peak expiratory flow ?80% predicted, absence of day-time or night-time symptoms, exacerbations, treatment-related adverse events and short-acting beta-agonist use).

Results: In our real-world GPRD population, only 17.4% of patients met the composite proxy measure for GOAL Total Control and the exacerbation rate was 0.31 exacerbations/patient/year. The number of Stratum II and III patients from the GPRD eligible for GOAL Total Control assessment was too low to draw meaningful results, but exacerbations rates were 0.62 (Stratum II) and 0.78 (Stratum III) exacerbations/patient/year. These real-world results compare with 44% (Stratum II) and 29% (Stratum III) of patients achieving Total Control in the GOAL RCT and annualized exacerbation rates of approximately 0.12 (Stratum II) and 0.27 (Stratum III).

Conclusion: FDC ICS/LABA therapies may not be as effective in real-world asthma management as RCT data might suggest.

Conflict of interest and funding: GPRD data access was funded by Merck & Co. Inc., and the analysis by Mundipharma International Limited.

49. Effectiveness of combination therapy with Tiotropium in COPD. A secondary analysis of the UPLIFT trial

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Aim: Clinicians who treat patients with COPD have an interest in the long-term impact of combinations of maintenance therapy.

Method: The 4-yr UPLIFT trial (tiotropium [TIO] vs. placebo [PBO]) permitted use of all respiratory drugs other than inhaled anticholinergics. Subgroups of COPD patients based on continued use of long-acting beta-agonists (LABA, n=2982), inhaled steroids (ICS, n=2902), or LABA+ICS (n=2260) were evaluated to assess the effect of double or triple therapy over 4 yrs on spirometry, health related quality of life (HRQoL)(SGRQ), and exacerbations (exac).

Results: Baseline post-bronchodilator (PB) FEV_1 was 46% predicted. Patients who continued to use LABAs, ICS or LABA+ICS improved FEV_1, FVC and SGRQ with TIO. The risk for exac. and associated hospitalizations were reduced with TIO. Range of differences (TIO–PBO) over 4 yrs by continued use of treatment:

	LABA	ICS	LABA+ICS
ΔTrough FEV_1 (ml)[1]	81 to 102	85 to 106	84 to 105
ΔTrough FVC (ml)[1]	151 to 209	163 to 221	151 to 227
ΔPB FEV_1 (ml)[1]	43 to 69	48 to 63	51 to 77
ΔSGRQ total (units)[1]	-2.8 to -1.5	-3.2 to -2.1	-3.1 to -1.7
Exac (HR (95%CI))[2]	0.87 (0.80-0.95)	0.85 (0.78-0.93)	0.85 (0.77-0.94)
Hosp exac (HR [95%CI])[2]	0.88 (0.77-1.01)	0.84 (0.73-0.96)	0.85 (0.73-0.99)

[1]All p-values <0.01, [2]Hazard ratio (95% confidence interval)

Conclusion: Tiotropium administered with other maintenance therapy improves short- and long-term lung function and HRQoL, and reduces the risk of an exacerbation and associated hospitalization.

Conflict of interest and funding: TT, BC, DT, MD have received funding from various pharmaceutical companies (speaking and/or grants and/or consultancy). SK, DL are employees of Boehringer Ingelheim. Study funded by Boehringer Ingelheim and Pfizer.

50. Efficacy of roflumilast in patients with symptomatic chronic obstructive pulmonary disease (COPD) receiving concomitant bronchodilator treatments

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Aim: To report the effects of roflumilast, an oral, selective phosphodiesterase 4 inhibitor, on lung function and exacerbations in patients with symptomatic COPD. Exacerbations were assessed in those treated with long-acting beta2-agonists (LABA), which themselves reduce exacerbations, or short-acting muscarinic antagonists (SAMA).

Method: M2-124 and M2-125 were identically designed studies in which patients with COPD, severe airflow limitation, symptoms of chronic cough and sputum and a history of exacerbations were randomised to roflumilast, 500 µg once daily (n=1537) or placebo (n=1554) for 52 weeks.[1] Concomitant LABA and SAMA use was allowed; however, inhaled corticosteroids were discontinued at randomisation.
Results: LABAs were used by 749 (49%) patients in the roflumilast group and 793 (51%) patients in the placebo group; SAMAs were regularly used by 537 (35%) and 569 (37%) patients, respectively. Lung function improved with a mean difference in pre-bronchodilator FEV_1 between roflumilast and placebo of 48 mL (95% CI: 35, 62) in the overall population. The change in exacerbation rate (moderate or severe) with roflumilast over placebo was –16.9% (95% CI: –25, –8) in the overall population and was not influenced by bronchodilator use, with changes of –20.7% (95% CI: –31, –9) for concomitant LABAs, –14.6% (95% CI: –26, –1) without LABAs and –13.1% (95% CI: –24, 0) for concomitant SAMAs and –19.8% (95% CI: –30, –8) without SAMAs.
Conclusion: Roflumilast reduced the frequency of moderate and severe exacerbations, which was independent of concomitant maintenance bronchodilator treatment.
[1]Calverley PMA, Rabe KF *et al*. *Lancet* 2009;**347**:685–94.
Conflict of interest and funding: Authors received compensation for consulting/research from multiple pharmaceutical companies. The trials were funded by Nycomed.

51. General practices show a wide diversity in their ability to correctly perform and interpret spirometry

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Aim: To identify the competency of general practices to provide spirometry services in primary care within Leicestershire
Method: As part of a wider COPD health improvement programme within Leicestershire County and Rutland a quality assurance system was developed to assess the abilities of practices to perform acceptable spirometric testing, benchmarked against national standards. Each practice participating in the quality assurance scheme submitted 10 spirometric tracings, which were assessed for technical competency and correct interpretation. Practices failing to achieve the acceptable level were provided with individual training subsequent to the assessment process. Practices were financially incentivised to participate in the scheme.
Results: 57 practices participated in the scheme. 18 practices (32%) attained an acceptable standard. 39 practices (68%) failed to attain an acceptable level. 20 practices (35%) received training and subsequently attained an acceptable level. 14 other practices have received training but are awaiting revalidation. 4 practices are in the process of receiving training. 1 practice failed and withdrew from the scheme.
Conclusion: COPD patients are significantly under diagnosed within the UK, with many patients only being diagnosed late in their disease. To correctly identify COPD patients requires mobilization of primary care within the UK to provide high quality spirometry testing. This study identifies a training need in a significant number of practices in their ability to demonstrate competency in spirometry. It also established a willingness of practices to engage in structured training to improve their ability to perform spirometry. The 20 practices (35%) that subsequently achieved an acceptable standard demonstrates that with training practices can perform successful spirometry.
Conflict of interest and funding: None.

52. Improving quality of Spirometry in Primary Care

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Brief outline of context: While spirometry is being performed within primary care there is a need for appropriate staff training, improvement in test quality and interpretation
Brief outline of problem: Research evidence of standards of spirometry performance and interpretation in primary care vary widely; best achieved levels of acceptable tracings range widely.
Assessment of problem and analysis of its causes: In 2009 we reviewed evidence establishing need for improvement, and published standards and recommendations for primary care spirometry. (http://dx.doi.org/10.4104/pcrj.2009.00054) An unacceptable level of poor quality spirometry, poor training provision for those performing tests and lack of routine quality control systems is evident. We also argued that use of LLN gives a more reliable interpretation of results, reducing the risk of over-diagnosing airflow obstruction in older subjects.
Strategy for change: Dissemination, discussion and implementation of the recommendations.
Measurement of improvement: Evidence of quality control systems and reduced percentage of poor quality spirometry tracings in primary care.
Effects of changes: So far, over 12000 copies downloaded, successful workshop discussion at GPIAG conference; the authors have attended meetings at invitation of Department of Health, lead currently producing implementation feasibility report.
Lessons learnt: Difficult to get cross-speciality agreement on standards. Need to overcome strong resistance to change amongst health professionals in order to improve the service.
Message for others: Spirometry standards in primary care need to improve. Need to ensure appropriate staff training and integrate systems of quality control within provision of primary care spirometry.
Conflict of interest and funding: Funding: Vitalograph Ltd

53. Lung function measures in the Canadian population

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Aim: To investigate lung function measures in relation to the prevalence of self-reported chronic respiratory disease in a sample representative of the Canadian population.
Method: Spirometry measures were obtained from the 2007-2009 Canadian Health Measures Survey. The survey, conducted by Statistics Canada, sampled approximately 5500 individuals aged 6 to 79 years, and consisted of a general health questionnaire, as well as a physical health measures component. Predicted equations were from 'Corey 1976' and from 'Hankinson (NHANES III)' for respondents aged ≤7 years and ≥8 years respectively.
Results: Lung function measures in those with self-reported asthma and COPD were significantly different from those of the total Canadian population. The prevalence of self-reported physician diagnosed asthma was 8.3% (95% CI: 6.9-9.6). In those with asthma, the mean percent of predicted FEV_1 was 89.8% (87.3-92.3), and the mean best FEV_1 to FVC ratio was 0.8 (0.7-0.8). The prevalence of self reported physician diagnosed COPD in those 35 years or older was 6.0% (4.7-7.2), while estimates are significantly higher based on lung function measures, with 11.7% (10.0-13.3) having a best FEV_1 to FVC ratio of <0.70. Only 37.5% (28.3-46.7) of those ≥35 years with self-reported COPD had a best FEV_1 to FVC ratio of <0.70.
Conclusion: Estimating the prevalence and severity of chronic lung disease using self-reported physician diagnosis or symptom reporting has inherent limitations. Population lung function measures can enhance understanding of these limitations and be used to better characterize lung disease in the population. Further work will be undertaken to assess predictors of lowered lung function measures in those not reporting physician diagnosed chronic respiratory disease.
Conflict of interest and funding: Funding: Public Health Agency of Canada.

54. Can Your Mobile phone help your asthma: preliminary results

Ryan D, Pinnock H, Lee AJ, Tarassenko L, Ayansina D, Musgrave S, Malhotra S, Price D
University of Aberdeen

Aim: To examine the use of mobile phone technology compared to paper diaries in achieving asthma control.
Method: Patients (n=288) with uncontrolled asthma were asked to record peak flow, symptoms and medication usage. They were randomised to paper diary, or mobile phone recording with instantaneous feedback. The primary outcome measure was a change in ACQ6 between baseline and 6 months.
Results: 205 patients completed the trial. Analysis, before breaking the randomisation code, showed that Group 1 (n=107) had a mean (95% CI) improvement in ACQ6 of 0.85 (0.67, 1.03) compared to Group 2 (n=98) 0.94 (0.77, 1.11). The percentage with a minimal clinically important difference (≥0.5) was approx 70% in each arm.
Conclusion: Both groups demonstrated significant improvement in asthma control from baseline. Use of mobile phone technology provided no additional benefit over paper diaries.
Conflict of interest and funding: COI: None.
Funding: AsthmaUK.

55. Understanding asthma action plan promotion and use: what the qualitative evidence tells us

Ring N, Hoskins G, Jepson R, Wilson C, Wyke S, Pinnock H, Sheikh A
University of Stirling, Stirling, Scotland, UK

Aim: To understand what helps or hinders asthma action plan promotion by health professionals and use by patients/parents.
Method: Systematic review and synthesis of qualitative studies. Relevant studies were identified through database searches with potentially relevant papers assessed against study criteria. Included studies were qualitative and provided insight into what facilitates or prevents the promotion and use of asthma action plans. Included studies were synthesized using meta-ethnography, a process which brings individual studies together into a new 'line of argument'.
Results: Nine databases were searched (April 2009) and 20 papers met our inclusion criteria.
Participants did not see asthma action plans as universally helpful or relevant. Action plan implementation involves complex decision-making influenced by many factors. Findings suggest action plan implementation is hindered because patients/parents and professionals operate within different asthma models which inform their understandings of the condition, its management and their roles. Barriers to action plan implementation are symptomatic of these different asthma models.
Findings reinforce the need to involve those with long-term conditions in their care. If professionals provide medically focused action plans that do not 'fit' with the patients'/parents' views of asthma and its management, action plans will continue to be perceived as irrelevant and under-used. Facilitators, including communication, are required so action plans can be jointly developed by patients/parents and professionals.
Conclusion: Meta-ethnography allowed novel insights into the synthesised studies. Findings strengthen the importance of professionals adopting a patient-centred, partnership approach to the development and review of action plans, recognising the place of asthma in patients' everyday lives.
Conflict of interest and funding: No conflict of interest. Funding: Chief Scientist's Office for Scotland.

56. A General Practitioner respiratory clinic in a local hospital

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Graduate School of Medicine, University of Wollongong, NSW, Australia

Brief outline of context: A GP Respiratory clinic was held in the outpatients department of 2 local hospitals. Patients were referred by their GP and were only seen once.
Brief outline of problem: Under-diagnosis and sub-optimal management of some respiratory problems with difficulties in accessing timely Consultant opinion.
Assessment of problem and analysis of its causes: There is evidence of under-diagnosis and sub-optimal management of some respiratory problems (particularly COPD) in Primary care. Much of this is due to the structure, payment system and workforce issues in Australian General Practice.
Strategy for change: A working party was convened of all stakeholders. Patients are seen at a single session by a respiratory scientist (for spirometry), A GP with a special interest in respiratory disease and an experienced Community Nurse who has done further training in smoking cessation. The local Division of General Practice provided project management support.
Measurement of improvement: Data was collected including Spirometry, MRC dyspnoea score, Anxiety/depression score, nutritional status.
Effects of changes: Approximately 50% of patients received a new diagnosis. The greatest problem was under utilization of the clinic.
Lessons learnt: It takes time to become established. The problem of remembering that the clinic exists in the chaos of daily practice is a challenge for referring doctors.
Message for others: It makes a difference to patient care to have the structure of a focussed clinic with expertise.
Conflict of interest and funding: nil conflicts of interest. Funding was received from the Federal government for a 12 month pilot program.

57. Singapore National Asthma Programme

Tan NC, Wong WM, Lim TK, SNAP team
Singhealth polyclinics, Singapore

Brief outline of context: Asthma afflicts approximately 20% of children and 5% of adults in Singapore.
Brief outline of problem: Local asthmatic patients suffer a high disease burden in terms of healthcare needs, personal disability, premature mortality risks and economic costs.
Assessment of problem and analysis of its causes: Multidisciplinary members of the Singapore National Asthma Programme (SNAP) gathered to determine the major causes of the problem. The causes include: patients' and doctors' underestimation of asthma severity, inadequate asthma counseling for patients, cost of effective but expensive asthma medications, walk-in primary care system and lack of defaulter tracking system
Strategy for change: SNAP includes : coordinated media efforts, improved patient educational material to promote preventive treatment, quality improvement plan in polyclinics, enrolment of high-risk patients into a structured educational drug optimizing programme, organization of public forums, exhibitions on asthma to promote community awareness, road-shows and asthma training module for primary care physicians in collaboration with College of Family Physicians.
Measurement of improvement: Asthma mortality rate decreased from 2.9/100 000 patients/year in 1994 to 0.17/100 000 in 2008. Hospitalisation rate for severe asthma exacerbations declined from 197/1000 000 in 1994 to 112/100 00 in 2008. 59% of asthmatics were classified as good asthma control based on Asthma Control Test in 2008. Overall defaulter rate was 20%.
Effects of changes: The programme results in reduction of asthma-related morbidity and mortality.
Lessons learnt: Multi-pronged approach is key in the success of the programme.
Message for others: Coordination and team efforts are required to spearhead a national programme.
Conflict of interest and funding: Nil

58. Description of an incentivised initiative to improve community COPD care

Ryan D, Rashid A, O'Kelly N, Smith J, Pulman N, Price D
Leicester County and Rutland Primary Care Trust

Brief outline of context: COPD is underdiagnosed and poorly managed globally.
Brief outline of problem: Leicestershire has the second lowest recorded prevalence of COPD in England and Wales (1.2%), coupled with high emergency admissions for COPD.
Assessment of problem and analysis of its causes: A baseline evaluation of COPD in one of the localities within Leicestershire demonstrated large variations in diagnosis, assessment and management of COPD.
Strategy for change: The PCT PEC designed and commissioned a program to deliver improved outcomes and consistent delivery. The scheme has four strands: 1. Analysis of baseline care and Practice Training Needs 2. Planned prevalence work 3. Strengthening Primary Care Services 4. Targeted referral to community pulmonary rehabilitation. Baseline assessment year of routinely collected practice data, utilising OPC clinical service tools, with follow up at one year will facilitate data stratification of patients by risk, facilitate identification of simple management changes and assess infrastructural needs, and measure improvement in care delivery by practices.
Measurement of improvement: 1. Increase in competency of GP delivery of spirometric asessments. 2. Increased recorded prevalence (incentivising practices to screen 1% of practice population with highest risk factors) 3. Decreased exacerbations of COPD. 4. Increased referral of suitable patients to community pulmonary rehabilitation services.
Effects of changes: To improve quality of life outcomes for patients and reduction in hospital admissions
Lessons learnt: Work across the health community; identify clinical leaders; ensure managerial support. Incentivise and support clinicians.
Message for others: To improve any one item of COPD care a whole systems approach needs to be undertaken.
Conflict of interest and funding: COI: None Funding LRCPCT

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59. STAR clinics for COPD in primary care: a new community-based multidisciplinary service

Thornton H, Baxter N, Davidson C, Booth H, Georgopoulou S, White P
King's College London, Department of Primary Care and Public Health Sciences

Brief outline of context: STAR (Specialist Treatment, Assessment & Referral) clinics provide community-based intermediate COPD care, staffed by specialist primary care clinicians, hosted by general practices across two London boroughs.
Brief outline of problem: COPD management in London is inconsistent: variation in respiratory drug prescribing; high admission rates; under-use of pulmonary rehabilitation (PR).
Assessment of problem and analysis of its causes: Low uptake of COPD initiatives suggested general practices placed low priority on COPD. The innovation reported was designed by a multidisciplinary team after consultation with local policymakers, patients and practices.
Strategy for change: Within a system-wide initiative, community clinics were established by specialist general practitioners, respiratory nurses and pharmacists. Patients who could benefit from review were identified using practice electronic records and invited to attend. Optimisation of treatment and appropriate onward referral were recommended and patients were returned to routine care.
Measurement of improvement: Quality of life, lung information needs, PR uptake, intervention rate and patient satisfaction were measured.
Effects of changes: 86 patients attended in the first six weeks. Spirometry confirmed COPD in 48%. Of these, 81% received medication change (48%) or referral to PR, smoking cessation or acute phone helpline (67%). Evaluation continues; full results will be presented.
Lessons learnt: Initial slow uptake required sustained communication with local practices. Large numbers of non-COPD patients prompted tightening of referral criteria
Message for others: 67% of primary care COPD patients received onward referral. 48% were receiving treatment not considered optimal by specialists. This approach brings high quality COPD care to patients who are otherwise likely to remain neglected.
Conflict of interest and funding: N/A

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60. Respiratory Disease Management in Primary Care: Impact of Independent Prescribing Pharmacist-Run Asthma and COPD Clinic on Outcomes

Siabi N, Dhillon S, Kostrzewski A, Saini G, Ali M
School of Pharmacy, University of Hertfordshire/Lynwood Medical Centre

Aim: To evaluate patients' satisfaction with the Prescribing pharmacist-run respiratory service; To compare patients' satisfaction with Prescribing pharmacist, doctors and nurses consultations; To evaluate the patients' hospital admission rates and well being.
Method: A total of 499 respiratory patients with Asthma, COPD or both were sent a postal satisfaction survey following attendance at the pharmacist run respiratory clinic between January 2007 and July 2008. The questionnaire explored patients' experiences, healthcare outcomes and hospital admission pre-and post clinic.
Results: Response rate was 41%, with age range 6-98 years and mean age of 65 (±19.8). Patients rated the pharmacist consultation as effective as doctor's consultation in terms of 'good or very good rating' and significantly lower number of 'poor rating' than doctors' consultation (p=0.001). The Cranbach's alpha score for effectiveness of services provided by pharmacist, nurses and doctors was 0.97. One-way ANOVA showed significant difference between mean scores of three services ($F(2,334)=7.58, p=0.001$). Effectiveness of service provided by the doctor was significantly lower than the mean score for effectiveness of service provided by pharmacist (p=0.002) or nurse (p=0.023). Attending pharmacist clinic demonstrated to reduce the number of hospitals admissions significantly $\chi^2 = 2.069E2$, $p<0.001$ Attending pharmacist clinic also had significant impact on improving or preventing worsening of patients' breathing ($\chi^2=26.41$, $p<0.001$). Of 133 patients, 33% said breathing was improved, 13% said breathing was worsened and 40% said their breathing stayed about the same as before after attending pharmacist clinic.
Conclusion: Independent Prescribing Pharmacists can deliver an effective respiratory clinic leading to: Decreased hospital admission rates; Increase patients' satisfaction; Improve clinical outcomes
Conflict of interest and funding: None

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61. Learning from a Distance: A cluster randomized trial of a program to improve asthma care through interactive, online spirometry training and feedback

Stout JW, Smith K, Zhou C, Solomon C, Dozor A, Mangione-Smith R
University of Washington, Seattle Washington, United States

Aim: To evaluate the effectiveness of a virtually delivered quality improvement (QI) program designed to improve primary care management for children with asthma.
Method: Cluster randomized trial with seven matched pairs of pediatric practices from New York State, USA from October '07 to September '08. All practices received a spirometer and standard vendor training. The 7-month QI program included: 1) Spirometry Fundamentals CD-ROM; 2) case-based, interactive webinars; and 3) monthly feedback reports to the practice from an internet-based spirometry quality feedback reporting system. Practice pairs were compared directly to each other, and between-group differences were

analyzed using mixed-effects regressions models.
Results: Participating practices uploaded a total of 1,028 spirometry testing sessions, of which 340 (33.1%) were at acceptable quality. The mean difference between matched intervention and control practice pairs for the number of tests performed did not differ significantly during the post-intervention period (mean difference = -4.2, 95% CI -52.9- 44.5, p=0.82). In the post-intervention period, the intervention group had a 19.4% higher percentage of tests with acceptable quality than the control group, adjusting for quality in the pre-intervention interval (95% CI:3.5- 35.3, p=0.03). Intervention providers also had a higher likelihood of documenting asthma severity (OR=2.9, 95% CI 1.8, 4.5, p<0.001)
Conclusion: An interactive, multi-faceted distance QI program resulted in improved spirometry quality and increased documentation of of asthma severity levels. Successful participation in QI programs can occur over distance.
Conflict of interest and funding: There are no conflicts of interest. Funded by the Agency for Healthcare Research and Quality, and administered by the Health Research and Educational Trust, Chicago, IL.

62. Up-skilling general practice nurses to improve asthma management in primary care

Wicking J, Gordon M, Brophy S, Cleveland R, Bell M, Whorlow K
National Asthma Council, Australia

Brief outline of context: The National Asthma Council (NAC) successful A-Team program provides best-practice asthma management education for primary care health professionals. NAC has run the program nationally since 2001 with Australian Government funding. Expert presenters deliver standardised content through local general practice networks throughout Australia.
Brief outline of problem: Formal evaluation of recent A-Team workshops indicated many practice nurses requesting more detailed, role-specific information.
Assessment of problem and analysis of its causes: Feedback reflected practice nurses increasing profile and scope of practice since the A-Team program was first established.
Strategy for change: NAC developed a new role-specific asthma management seminar for practice nurses using content adapted from existing programs as a basis. Pilot seminars were held in GP networks across Australia in 2009.
Measurement of improvement: Participants completed a written evaluation after each seminar.
Effects of changes: Seven pilot seminars were attended by 167 practice nurses with a 91% evaluation response rate. Almost all respondents (99%) reported the workshop 'met their learning needs' and all (100%) reported it was 'relevant to their practice'. Seminar components rated as 'good' or 'excellent' included: lecture presentations (100%), inhaler device (99%), and resource material (99%). The Australian Government will fund NAC's full implementation of the seminar.
Lessons learnt: NAC's consideration of unanticipated issues raised in an established program's evaluation led to new opportunities. Positive responses from structured evaluation provided compelling evidence of the pilot's effectiveness.
Message for others: Practice nurses benefit from role specific education. Formal evaluation can help identify new opportunities or areas of need as well as demonstrate program effectiveness to stakeholders and funding bodies.
Conflict of interest and funding: None

63. NP Led Community COPD Activation Program

Young S
St Mary's General Hospital, Kitchener, Canada

Brief outline of context: COPD exacerbation causes a reduction in lung function and quality of life.
Brief outline of problem: COPD is the most common reason for hospital admission in the aging (The Human and Economic Burden of COPD, 2010). Assessment of problem and analysis of its causes: Few government dollars are allocated for prevention, early detection and treatment of COPD. This program allows primary care practitioners an option for their patients with suspected (screening process) or confirmed COPD, regardless of severity or prior knowledge.
Strategy for change: The Community COPD Activation Program consists of 5 sessions spread over 3 weeks. The sessions are 1 to 2 hours in length and include education and activation. Nurse Practitioner and Registered Respiratory Therapist coordinators provide a pre-assessment and screening. Activation includes exercise with supervision from the coordinators and an exercise therapist. Post program, participants are linked with community exercise programs. Allied health can be accessed if necessary (i.e. social work). Action plans are arranged with scripts for on-hand antibiotics by the NP coordinator.
Measurement of improvement: Participants return at 6weeks post program for repeat assessment of exercise tolerance, exacerbations and quality of life. Further assessments occur at 6 and 12 months. Repeat prn scripts can be arranged.
Effects of changes: Self management is improved and there is a reduction in utilization of acute care services.
Lessons learnt: Class size, availability of transportation, caregiver/significant other supports, extent of mental health issues and community awareness are important factors with the program.
Message for others: Even brief education and exercise (Activation) programs can influence outcomes in all stages of COPD.
Conflict of interest and funding: No conflict of interest. Program is funded through the operational budget of the hospital.

64. A pilot study of tele-monitoring for COPD: the views of patients and clinicians

McKinstry B, Pinnock H, Ure J, Sheikh A, Kidd G, Tarling A, McCall Smith E, Pagliari C, MacNee W, Hanley J
University of Edinburgh, UK

Aim: To explore the experiences of patients and their clinicians participating in a pilot study of tele-monitoring for people with COPD
Method: The Lothian tele-monitoring equipment comprised a touch-screen computer linked by broadband to a central server. Patients completed a validated daily symptom questionnaire and provided physiological measurements (pulse oximetry, spirometry) at least weekly but more often as they wished or at the request of a clinician. A call-centre reviewed the results on a daily basis and contacted clinicians if the symptom score was high. Participating patients and professionals provided in-depth interviews about their attitudes to the technology and its impact on them. Most were interviewed twice; at the beginning and near the end of the project. Interviews were recorded, transcribed and thematically analysed by two researchers. Use of healthcare resources were obtained from primary care records.
Results: Eighteen patients and 23 clinicians participated. Although the system proved feasible, the pilot raised a number of practical issues with implications for future implementation. Patients were generally very positive about the technology which they perceived enabled early recognition of exacerbations and facilitated access to clinical advice. In contrast, clinicians had concerns about increased medicalisation, increased workload (one reporting a doubling of antibiotic and steroid prescribing), difficulties in interpreting physiological results and false positive symptoms scores.
Conclusion: While popular with patients, tele-monitoring in COPD may increase workload in primary care. Important questions remain about the utility of physiological measurements, and the reliability of symptom scores.
Conflict of interest and funding: Funding: Intel/Tunstall.

65. A COPD disease management decision support electronic program using an integrated care electronic health record (EHR)

Román M, Buades J, Taltavull JM, Doncel I, Jiménez C, Rodriguez T, Gómez A, Suarez M. Pérez N

Functional working group for Historia de Salud de las Islas Baleares. OTIC (Ib-Salut)

Aim: The development of an electronic tool to improve COPD diagnosis and management among all the implicated health professionals –nurses, primary care doctors, pneumologists and physiotherapists- working in different clinical settings in a national health area.

Method: The information coming from the seven different existing electronic health records of the Health Area -6 hospitals plus primary care- is sent using standards for electronic exchange of medical information -HL7- and identified by a unified personal code unique for every individual and recovered in a central database warehouse (CDW). A specific tool using advanced informatics technology select and structure esential informationrelated to COPD from the CDW and it's presented back to every health professional electronic terminal in a specific interface combining all the important information related to COPD in a useful way.

Results: The informatics tool is ready to start working. It accurately presents information coming from 7 different electronic health records in real time and adequate speed in a format that allows all implicated health professionals to improve their COPD approach and workflow with a short time consuming on a friendly and useful way.

Conclusion: The informatics tools could help towards better diagnosis and management of COPD, making health professionals' work easier and optimizing available resources

Conflict of interest and funding: The project is funded by specific grants from the Balearic Health Goverment.

66. Mentoring by community nurses in Chronic Obstructive Pulmonary Disease (COPD)

Walters JAE, Courtney-Pratt H, Wills K, Robinson A, Turner P, Walters EH, Wood-Baker R

Menzies Research Institute, University of Tasmania

Aim: COPD causes an escalating reduction in patients' quality of life and is a major contributor to healthcare costs, especially through hospitalisation. We investigated the potential benefits of health-mentoring by community health nurses to support patients' self-management after hospitalisation for an acute exacerbation (AE).

Method: We conducted a controlled trial in Tasmania, with concealed allocation by matched area of domicile. Mentors assisted participants to achieve goals related to their specific relevant "life problems" using strategies to enhance their motivation and self-management skills during regular telephone contacts over 12 months (after two initial home visits). Outcomes included healthcare utilisation, quality of life (SF-36), and psychological morbidity.

Results: During 2005-6, 106 participants, mean age 69.1 years, duration of COPD 9.5 years, FEV_1 34.3% predicted, SF-36: Physical Function (PF) 26, General Health (GH) 30, were recruited from 319 consecutive AE admissions to a regional general hospital (33% excluded by specified criteria, 20% refused participation). Mentored (MG) and control (CG) groups had similar baseline characteristics (except female gender, MG 67%, CG 45%) and completion rates (MG 36/55, 10 died, 9 withdrew. CG 33/51, 13 died, 5 withdrew). Hospital Emergency Department attendances and admissions increased by a similar amount on the previous year in both groups. PF and GH components of SF-36 showed a significant benefit for the mentored group over 12 months, mean differences 5.6 p =0.005 and 4.2 p=0.046 respectively.

Conclusion: Mentoring by community health nurses for patients with severe COPD improves their quality of life after admission for an acute exacerbation, but does not affect use of hospital resources.

Conflict of interest and funding: Department of Health & Human Services, Tasmania.

67. Nurse-led multidisciplinary programme for patients with Chronic Obstructive Pulmonary Disease (COPD) in Primary Health Care

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Family Medicine Research Centre, School of Health and Medical Sciences, Örebro University, Örebro, Sweden

Aim: To investigate the long-term effects of a nurse-led multidisciplinary programme (NMP) on functional capacity, quality of life (QoL) and exacerbation frequency among patients with COPD in primary health care (PHC).

Method: A one-year longitudinal study with a quasi-experimental design. Patients with COPD in GOLD stage 2 and 3 were included, 49 in the intervention group and 54 in the control group. The intervention consisted of a NMP over six weeks with one hour theory about the disease and its consequences and one hour physical activity each week. Individual home training programme were given to each patient. At base-line and after one year the functional capacity was assessed with 6-minutes-walking-test (6MWT) and QoL was assessed with Clinical COPD Questionnaire (CCQ). Exacerbation frequency was calculated one year before the NMP and one year after.

Results: No significant differences between the groups were shown in 6MWT and CCQ after one year. However, participants within both groups increased their 6MWT corresponding to statistical significance (p=0.004) and (p=0.002) from baseline to the one-year follow-up. Furthermore, the patients within the intervention group increased their QoL significantly after one year (p=0.022) but no change was found within the control group (p=0.086). When changes in exacerbation frequency were compared between the groups it was found that the exacerbation frequency decreased with significance in the intervention group that have had a NMP (p=0.009).

Conclusion: A NMP in PHC seems to decrease the exacerbation frequency. Further studies are needed to access the cost-effectiveness of this kind of intervention.

Conflict of interest and funding: None.

68. Effect of Respiratory Educators in Family physicians' Offices on COPD

Cave AJ, Makarows C, Ahmadi E

Department of Family Medicine, University of Alberta, Canada

Aim: To determine the effect of respiratory educators in primary care on COPD symptoms, lung function and health care utilisation.

Method: A randomised control clustered trial in five health regions in the province of Alberta. Patients with physician diagnosed COPD were randomised by practice to intervention or control. Study subjects received three education sessions over 6 months and were followed fo a year, They completed evaluations at entry, 6 months and 12 months . control subjects were evaluated at entry, and six months and then received the education over the next 6 months before final evauation at one year. 181 subjects were enrolled fro 29 practices across the province.

Results: FEV_1 remained constant on average over the year . Symptoms of cough, shortness of breath and wheeze improved at 6 months and this was maintained at one year. Urgent visits to the family physician and to the emergency room fell at 6 months and remained reduced at one year. Hospitalisations were also reduced but numbers were small.

Conclusion: Respiratory Educators in family physicians' offices can be effective in improving outcomes for patients with COPD.

Conflict of interest and funding: Funding for the study was provided bty AHFMR, ASTHMA, and also from industry sponsors, AstraZeneca, Glaxo SmithKline, Nycomed and Boerhinger Ingelheim.

69. Pilot study: Usability of the Ontario Asthma Flow Sheet

Kaplan A, Klein S, Scott MB
Chairperson Family Physician Airways Group of Canada

Aim: Asthma control in Canada is suboptimal. Incentive measures to promote chronic disease management was felt to be one solution. An Asthma Flow Sheet for primary care physicians in Ontario was created potentially as a tool for incentive bonuses to help improve in Asthma management in Ontario and subsequently in Canada

Method: A pilot usability study was performed with a flow sheet (created with input from multiple stakeholders) being assessed by Ontario Family Physicians.

Results: Of 33 respondents, all but one of the responding doctors listed themselves as currently seeing asthma patients. Most of the doctors (53%) averaging between 50 to 200 asthma patients per year. Despite the significant percentage of respondents (93%) expressing interest in an asthma flow sheet, only 9% of the doctors reported past use of one. Family doctors expected they would use it with ~76% of their patients. Every respondent also believed that successful implementation of the flow sheet would result in greater asthma control and improvement in patient quality of life. The average expected value of incentive bonus for use of the flow sheet was $62. The flow sheet was met with some concern with the anticipated difficulty being time-related or an issue with paperwork.

Conclusion: Primary Care practitioners in Ontario would welcome an incentive based flow sheet to help them manage asthma and expect it would assist them in attaining a firm diagnosis of asthma and improving asthma control. The barriers of time and paperwork could be offset by incentive payments. A larger usability study is now occurring.

Conflict of interest and funding: Funding for this study was provided as an unrestricted research grant by Astra Zeneca Canada.

70. Assessing a population-based approach to the management of chronic respiratory disease

Hampson C, Latycheva O, Elliott SJ , Vine MM, Haynes M
The Asthma Society of Canada, Toronto, Canada

Aim: The prevalence of chronic respiratory disease has increased in the last 25 years, with a heavy economic and social burden. Enhanced patient knowledge can result in overall improved disease management and quality of life. The Partnership in Lung Age Testing and Education (PLATE) Programme investigated the effectiveness of a population-based approach to the management of respiratory disease. The PLATE objectives were: improve patient education; increase public awareness about chronic respiratory disease; and promote a healthy lifestyle.

Method: In Phase one, 13 Airways Clinics were delivered in various community settings (e.g. pharmacies, shopping malls,etc.), providing participants with respiratory health education and peak flow testing. In Phase two, a follow-up survey was conducted to examine changes in levels of knowledge gained from phase one.

Results: 316 participants attended the Airways Clinics, with 87 participating in the intervention. Three groups of participants were identified: physician-diagnosed asthma; physician-diagnosed COPD; and symptomatic without diagnosis and/or long-time smokers.

Conclusion: The Airways Clinics were positively received by participants: 90% utilized the take home educational materials; and 97% recommended that the Clinics be implemented nationally. Following the Clinics, 77% were more aware of the role a healthy lifestyle plays in disease management. Findings indicate that the highest level of interest came from high-needs communities, with pharmacies being the most appropriate clinic setting, and shopping malls best for information displays.

Conflict of interest and funding: No conflict of interest has been reported.

71. Changes in management of COPD after training intervention in Primary Care

Soler N, Martin A, Ballester E, Anton E, Ribera X, Miravitlles M, Torres A
Hospital Clinic Barcelona

Aim: Changes in management of COPD in Primary Care (PC) were studied following a training intervention consisted in dissemination and training of the Spanish Society for Pulmonology and Thoracic Surgery (SEPAR) COPD guidelines. The use of a portable device to assess lung function (FEV_1, FEV_1/FEV_6) was evaluated to adequately stratify COPD according to severity and reduce other diagnostic interventions.

Method: GPs from PC Centers in Spain were recruited. In phase I (baseline), GPs performed an initial evaluation of 5 patients with COPD. In phase II, GPs were randomly allocated to the following groups: 1) control group-G1 (GPs managing COPD according to usual clinical practice); 2) training group-G2 (dissemination and training of SEPAR guidelines); and 3) training group-G3 (dissemination and training of SEPAR guidelines and distribution of the Koko Peak Pro (Ferraris®) to measure FEV_1FEV_6, and FEV_1/FEV_6).

Results: Phase-I included 3254 physicians, who selected 16,024 patients. In phase-II, 301 physicians in G1, 1182 in G2, and 1141 in G3 selected 1481, 5798, and 5556 patients, respectively. Evaluation of the changes in COPD stratification according to the Guidelines showed that physicians in G1 adequately classified 60% of patients, compared to 69% in G2 and 88.5% in G3 ($p<0.0001$). On comparing groups G1 and G3, a significant reduction was seen in chest X-rays (from 42% to 32%, $p=0.0002$) and arterial blood gas studies performed (from 34% to 22%, $p<0.0001$).

Conclusion: The dissemination and training on COPD Guidelines and the utilization of a portable device for monitoring lung function (FEV_1, FEV_1/FEV_6) may improve COPD management in PC.

Conflict of interest and funding: Martin and Anton are Pfizer employees. Ribera is a Boehringer employee. Supported by Boehringer and Pfizer.

72. An asthma education program for Canadian schools

Ciavarella A
no affliation

Aim: To create asthma education in Canadian school curriculae.

Method: School principals and teachers were approached in Ontario and British Columbia. They were asked to allow the teaching and screening of asthma as part of a special PE class. In 2003 and 2004 a total of 2,406 students from 4 schools in British Columbia and 4 in Ontario participated in the program. Each student was given a Parental Consent Form with information explaining the details of this event. At the beginning of the class included the use of a Peek Flow Meter and learning about airflow physiology. This was followed by a voluntary 7 minute run. During the post-run session, each student measured their PEF at 0, 5, 10 and 15 minutes and calculated any post exercise drop in PEF. They also learned the basics of asthma triggers, asthma pathophysiology and filled out an asthma screening questionnaire5. All results were graded and returned to the students. Positive responders were asked to see their family doctor.

Results: The school principle is contacted in primary grades, for secondary grades, the head PE teacher is contacted. The program was successfully conducted in grades 4 to 12. There is a social stigma associated with asthma.

Conclusion: The Physical Education class in the existing Canadian public school curriculum is an ideal setting for teaching the basic principles of asthma. For students, the self-discovery of exercise-induced airflow reduction is a measurable event within these parameters

Conflict of interest and funding: The Family Practice Airway Group of Canada gave a UN restricted grant for the purchase of basic materials. All other expenses including equipment, travel, food, and lodging were at my own expense. All helpers were volunteers and not paid for their time.

73. Web-based education on Pediatric Asthma: does it work?

Kaplan A
Family Physician, Canada

Brief outline of context: A web-based medical educational program on pediatric asthma was created in 2009 to attempt to improve knowledge.
Brief outline of problem: Asthma control in Canada is suboptimal and there seems to be confusion about optimizing care in the younger child.
Assessment of problem and analysis of its causes: A needs assessment was carried out that showed that the basics of pediatric asthma knowledge from diagnosis through treatment needed review. This was shared with our faculty including two specialists and five family physicians.
Strategy for change: The CME was created and advertised through emails and as of this writing, 1047 physicians participated in the program.
Measurement of improvement: Pre and post questionnaires were reviewed to assess knowledge change.
Effects of changes: Physicians learned a number of important issues. 79% post vs 40% pre recognized that many children with wheeze will outgrow their asthma. Exclusive breast feeding will not necessarily prevent asthma. ICS are safe at normal doses, but be cautious of higher dosages (eg growth and adrenal suppression). Other important take-aways included verifying inhaler technique, consideration of allergy testing and appropriate use of medications.
Lessons learnt: Action Plan, Educational tools and access to asthma clinics/educators was the most common additional resources stated. Web based educational programs have the ability to improve knowledge on pediatric asthma.
Message for others: Web based medical education is practical and effective in these times of dwindling resources and limited physician time.
Conflict of interest and funding: An unrestricted grant from Nycomed was used to fund this program.

74. Canadian pilot of the emPower program designed to optimize the early diagnosis and treatment of COPD

Kaplan A
University of Toronto, Canada

Brief outline of context: Four Canadian pilots were performed of the emPower program, an educational program created by a global action group of international primary care physicians (PCPs) in collaboration with Boehringer Ingelheim and Pfizer.
Brief outline of problem: COPD identification and diagnosis in primary care is challenging due to perceived lack of tools, protocols and incentives. Despite recent evidence that earlier COPD identification and treatment may improve patients' long-term outcomes, this is not widely recognized by PCPs.
Assessment of problem and analysis of its causes: Previous programs have improved PCP confidence in diagnosing/managing COPD, screening and diagnosis rates (Frith, IPCRG 2008;Abst16). The effect of the emPower program was assessed in Canada.
Strategy for change: Piloting this program was necessary to see its efficacy in Canada to facilitate the diagnosing and subsequent treatment behaviour of PCPs in Canada.
Measurement of improvement: Pre- and post-knowledge measurements of COPD criteria were evaluated to assess knowledge translation.
Effects of changes: These educational programs were universally found to be useful and the programs' content was thought to be relevant to practice and would change PCP future behaviors.
Lessons learnt: This program performed in Canada increased COPD knowledge and changed perceptions of COPD with respect to diagnosis (made by spirometry vs clinical grounds), rates of screening, confidence of the physician in diagnosis and management of patients with COPD and the differentiation between asthma and COPD.
Message for others: The emPower program was effectively piloted in Canada to facilitate PCPs delivery of better care to COPD patients through earlier identification and treatment.
Conflict of interest and funding: Funding from various pharmaceutical companies (speaking, travel, research). emPower is sponsored by Boehringer Ingelheim/Pfizer.

75. FRESH-AIR Study: Free Respiratory Evaluation and Smoke-exposure reduction by primary Health cAre Integrated gRoups (pilot study)

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Aim: To develop a comprehensive and effective approach for COPD case-finding in the resource-limited setting, combining questionnaire and spirometry, and to apply effective strategies to limit COPD risk by both smoking cessation and indoor biomass smoke reduction.
Method: Cross-sectional diagnostic assessment by case-finding approach and subsequent prospective therapeutic intervention in two outpatient clinics in both rural and urban areas in the South of Vietnam.
Results: 70 patients (34% female, 66% male) were recruited. In 32.9%, 32.9% and 34.3% of cases, patients were exposed to biomass smoke (BM), cigarette smoke (CS) and both (B+C), respectively. The rate of spirometry confirmed COPD was 60% (58.5% rural and 62.1% urban, 16.7% female and 82.6% male), while the rate of COPD was 13% (BM), 87% (CS) and 79.2% (B+C), respectively. The mean PM2.5 was 23.9ppb (0.13 – 413), with all but one of cases below the threshold of 35ppb for harmful indoor pollution. However, in this pilot, the average time of PM2.5 measurement was 2 hours which may not be sufficient to detect all indoor air pollution. Up to 67% patients were past or current smokers with an average of 30.5 pack years (2-110). The risk of COPD for ever smokers was strongly elevated (OR 32.5; 95% CI 7.7-136). The risk of COPD for patients with >10 pack years was considerably higher (OR 20; 95%CI: 3.1-127.6) than in those who smoked less than 10 pack years.
Conclusion: COPD seems to be well detected (60%) by our case-finding approach in both urban and rural areas in Vietnam. At both sites, indoor biomass air pollution was lower than expected, and contributes much less to COPD than cigarette smoke in our population. There is a strong association between smoking status (ever smoking and number of pack years) and COPD in resource-limited setting
Conflict of interest and funding: This study has been enabled by IPCRG eFaculty and Vitalograph, and this is a WHO-GARD endorsed project.

76. The prevalence of post-infectious cough and its management in Primary Health Care

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Aim: The aim of the study was to estimate the prevalence of post-infectious cough and the therapeutical strategies followed by family physicians.
Method: The survey included a total of 768 patients with acute respiratory infections. 110 (14.3%) of them complained for persistent cough for over 3 weeks, and not more than 8 weeks. The diagnosis was post-infectious cough. We noted down the treatment which was followed and the progress of the presented cases.
Results: 21% of the patients were treated with tiotropium as the guidelines recommend, 35% took ipratropion, 7% were treated with codeine, 10% with b-bronchodilators, 2% with antihistaminic, 18% with inhaled corticosteroids and 7% with combined b-bronchodilators and corticosteroids. 82% were improved with the use of the above medicines.7% of the above cases needed second or third choice treatment. From the total of 110 post-infectious cough cases, 2 were proved to be asthma, 9 bronchitis, 3 pneumonia, 4

gastroesophageal disease. In total 16% of the patients had a subjacent disease that potentially could be the cause of this persistent cough. From the total of patients a 5% were needed evaluation from an expert and more specialized further investigation with appropriate diagnostics tests.
Conclusion: As the post-infectious cough can indicate a subjacent disease, family physicians must be aware of possible subjacent diseases, differential diagnosis and also of recommended available tests. A significant percentage of physicians seem to use tiotropium as a first choice treatment. Inhaled anticholinergic bronchodilators has been proved as an effective therapeutical approach in order to relieve post-infectious cough in a significant proportion of patients.
Conflict of interest and funding: None to declare

77. Wright Humidification Mask in Chronic Tracheostomy Patients

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Aim: Tracheotomy patients require humidification several times a day in order to maintain the health of airway mucosal and tissue. A major problem is the amount of time required. This study was to evaluate the efficacy of a new face and tracheotomy mask (Wright Mask), developed to increase the ease and shorten the time required for humidification.
Method: This randomized controlled trial enrolled 30 tracheostomy patients. With normal saline and compressed air, blood O2% saturation was measured: 1)Baseline; 2)Conventional facemask; 3)Trach-collar; 4)Wright Mask. Order was randomized. Patients were given a survey to evaluate the mask in terms of ease of use, comfort and breathing quality.
Results: Mean age was 60±7y. Baseline saturation was 99.03%±1.05. Mean saturation facemask was 99.06%±0.98; trach-collar 99.01%±1.06 and Wright Mask 99.11%±0.98 (p>0.05). Comfort ratings (1-10, most comfortable) were: facemask 7.2±1.6; trach-collar 8.2±1.5 and Wright Mask 6.9±1.7 (p<0.001, trach-collar vs. 2 other masks and p=0.146, facemask vs. Wright mask). Difficulty of breathing (1-10, easiest) was 8.4±1.4; 8.8±1.3; 8.3±1.4 for facemask, trach-collar and Wright mask (p=0.043, trach-collar vs. facemask; p=0.019, trach-collar vs. Wright mask; p=0.154, facemask vs. Wright mask). Ease of device use (1-10, easiest) was 8.7±1.3 for facemask, 8.9±1.1 for trach-collar and 8.6±1.4 for Wright mask (p=0.040, Wright mask vs. facemask; p=0.044, Wright mask vs. trach-collar; p=0.128, facemask vs. trach-collar).
Conclusion: No differences were noted in the blood O2% with the Wright Mask compared to other masks. The Wright Mask may be a good alternative for humidifying the airway of patients with a chronic tracheotomy and could improve their quality of life, by reducing the amount of time required for humidification by half.
Conflict of interest and funding: Study supported by Wright Solutions.

78. A breath-actuated jet nebulizer (BAN) has dosimetric capability for a solution formulation based on differing volume fill of medication as well as run time

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Aim: The ability to deliver a suspension formulation dosimetrically by nebulizer is important when titrating a patient to the minimum effective dose. Ideally such a device should provide a medication delivery rate independent of fill volume to simplify the treatment process, especially if diluted respirator solution is being used.
Method: We report a study in which we evaluated delivery of a widely prescribed solution formulation (Ventolin*, GSK Canada Inc., 833 Ìg/mL albuterol (salbutamol)) by BAN (AeroEclipse-II*, Trudell Medical International, London, Canada, n = 3) operated at 50 psig. Emitted droplets were collected onto a filter at the nebulizer mouthpiece. Tidal breathing was simulated (Vt = 600cc; rate = 10 cycles/min; I/E ratio = 1:2), varying the volume fill in the nebulizer reservoir from 1.0 to 3.0 mL in 0.5 mL increments. The total droplet mass of albuterol collected at minute intervals (TDM) until sputtering was assayed by a validated HPLC-UV spectrophotometric technique. Fine droplet fraction ($FDF_{<4.7\mu m}$) was determined by laser diffractometry in parallel experiments.
Results: $FDF_{<4.7\mu m}$ was 87.1 0.5% (mean SD). Fine droplet mass ($FDM_{<4.7\mu m}$) was linear with elapsed time, and almost independent of volume fill within the range studied at 102.9 ± 7.5 µg/min.
Conclusion: The BAN provides predictable $FDM_{<4.7\mu m}$ based on volume fill and time, thereby assisting the clinician with dose titration.
Conflict of interest and funding: The study was funded by Trudell Medical International, manufacturer of the BAN and the authors are all full time employees of this organization.

79. Feasibility of a diagnostic program for Sleep Apnea / Hypopnea Syndrome (SAHS) in a primary care practice

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Aim: To evaluate the feasibility of a primary care program to diagnose Sleep Apnea / Hypopnea Syndrome by respiratory polygraphy.
Method: Patients of 20 to 70 years old attending the practice for any reason were selected if they had two on these four conditions: snoring, sleep apneas related by the patient or partner, daytime sleepiness or obesity (BMI 30–40). Patients with very severe diseases, currently taking hypnotic drugs or alcohol, pregnant or previously diagnosed with SAHS were excluded. A questionnaire was answered before respiratory polygraph was offered and explained to use it at home. All the tests were interpreted by three different primary care doctors. To evaluate the accuracy of the interpretation we compared our results with the ones made by a respiratory specialist.
Results: 39 subjects, 69,2% men, mean age 50,5 were preliminary selected for this pilot study. All of them snored, 64% obese, 28% relating sleep apneas, 28,2% had daytime sleepiness. In 13 patients the poligraphy had to be repeated due to missed variables measurements. 27 poligraphies (72,9%) were valid, 20 of them (74,1%) interpretable. We diagnosed SAHS in 8 patients (40% from all valid interpretable ones and 21% from the total studied sample. Kappa index for accuracy of the interpretation was high, 0,89, 0,89 and 0,80 respectively between the three primary care doctors and the pneumologist
Conclusion: Respiratory poligraphy for SAHS diagnosis is feasible in primary care
Conflict of interest and funding: None.

80. The influence of hypothyroidism on the course of brittle asthma (BA)

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Aim: to determine the role of comorbid thyroid pathology on the course of brittle asthma (BA)
Method: 174 (of 30-60 year old) patients with not-controlled BA were included in the study. The complex examination, including verification of comorbid conditions, immunological and ventilation parameters, questionnaire of quality of life was carried out. Then the patients with hypothyroidism and not controlled BA were separated. This was the main group of the study. After 6 months to correct thyroid function a new complex examination was held.
Results: 100% of the patients with brittle asthma had comorbid uncontrolled conditions: gastro-intestinal (78.2%), upper respiratory tract pathology (75.4%), cardiac uncontrolled diseases (74%), endocrine pathology (72.4%) ets. In the structure of the endocrine pathology the leading place was obtained by thyroid gland diseases (57.9%), 90% of the patients with thyroid

pathology had hypothyroidism. All patients with hypothyroidism had recurrent viral, bacterial or fungi infections, not stable BA, despite of the adequate treatment and deviations in the immunological parameters. The correction of hypothyroidism in complex with adequate antiasthmatic therapy made possible to reach the control over the symptoms of BA in 86.3% of the patients. After the correction of hypothyroidism the decreasing of recurrent infections and BA exacerbations was observed, it became possible to decrease the basis BA therapy (corticosteroid) in 60.6% of patients, in 19.6% the therapy was not changed and only in 6.1% we had to increase the BA treatment.

Conclusion: the correction of uncontrolled comorbid conditions in patients with BA may help in obtaining better control over symptoms of BA

Conflict of interest and funding: educational grant.

81. Sequencing Analysis on rpoB Gene Mutation of Rifampin-resistance in Mycobacterium Tuberculosis Isolates Collected in Zunyi, Guizhou, China

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Aim: Zunyi is the key area for tuberculosis (TB) control in Guizhou, China, with an incidence of TB at 699 cases per 100,000 population in 2005. The objective of this study was to determine the molecular characteristics of rifampin rpoB gene mutation and rifampin-resistance in M.Tuberculosis strains from Zunyi (2007-2009), in order to find out genetic markers for rapid detection of drug resistance strains in the area.

Method: The study was carried out on 106 clinical isolates with drug susceptibility testing and genotypic analysis by PCR amplification and sequencing of rpoB gene.

Results: Among these isolates, there were 39 rifampin-resistant and 67 susceptible strains. Of the 39 drug-resistant isolates, 31 (79.5%) carried mutations on the amplified fragment of the rpoB gene with 12 mutation types at nine codons including 531, 526 and 550, and three new mutation patterns that have not been reported previously were recognized, in which one mutation (Ile572Phe) and three mutations (Ser509Arg, Leu511Pro, Asp516Val) in rpoB gene have been accepted as new mutation types by US GenBank (GQ250580 and GQ250581, respectively). On the other hand, one mutation (1.5%) appeared in drug-susceptible strains.

Conclusion: The study showed geographical variation in the mutation types of rpoB gene in M. tuberculosis isolates from Guizhou of China, and this finding is valuable for the development of rapid molecular diagnostic methods of multi-drug resistant suitable for specific regions.

Conflict of interest and funding: No conflict of interest. This work was supported by the Guizhou Science and Technology Fund (J-2007-2223) and (USA) CDCSBIR Award#200-2007-M-22792

82. Barriers and Facilitators for Parents in Creating Smoke-Free Homes: Implications for Patients as Partners in Care

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University of Prince Edward Island

Aim: To describe parents' perceptions of the barriers and facilitators to creating smoke-free homes.

Method: As part of a RCT to test an intervention to empower parents to make their homes/vehicles smoke-free, 36 parents with children 5 years or younger were interviewed in their homes to determine the barriers and facilitators to making their homes smoke-free. Open-ended questions were used to explore barriers and facilitators to smoke-free homes. Qualitative methods were used to code, validate, and assign themes to perceived barriers and facilitators.

Results: Participants were primarily mothers (n=33). Sixteen participants (44%) had a household income of < $15,000, and 11 (31%) had not completed high school. The most commonly reported barriers to smoke-free homes were factors within the individual. Of these, nicotine addiction was the most frequently reported barrier to smoke-free homes. Other barriers included interpersonal and environmental factors such as supervision of young children, partners'/relatives' preference for indoor smoking, bad weather, and lack of outdoor access. The most commonly reported facilitators included changes within individuals such as quitting smoking and committing to smoke-free homes. In contrast, facilitators which worked best were those involving others such as talking with partners, relatives, and friends about the change to a smoke-free status.

Conclusion: The diversity of barriers identified in this research highlights the complexity of adopting smoke-free homes. Parents reported that facilitators involving others were most effective in overcoming barriers, yet they most often relied on themselves to make this difficult transition. Parents did not seek advice from health care providers. These data suggest that the transition process is complex; health care providers need to assume a more visible and effective presence in helping parents devise individualized strategies. Health care providers are in an excellent position to work with parents through ongoing assessment of child exposure and development of individualized, multi-dimensional interventions for families. This needs to be an integral part of health care for families, and is a critical aspect of promoting the health of children. Most parents want to provide the best care possible for their children, and health care providers are well positioned to help them achieve this goal.

Conflict of interest and funding: Canadian Tobacco Control Research Initiative; Canadian Nurses Respiratory Society; CNF Nursing Care Partnership; PEI Cancer Research Council

83. Efficacy of a rehabilitation program on moderate COPD conducted in primary care and the maintenance of benefits during two years

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Aim: To establish the efficacy of a 24-month pulmonary rehabilitation program conducted in primary care in GOLD II COPD patients

Method: A randomized controlled trial with 2 different intervention groups, one running a 12 weeks rehabilitation program and the other following the program to complete two years. A third control group following usual care was established. We selected 35 to 74 years old moderate COPD patients coming from 7 practices. Patients in the two intervention groups received a full four component pulmonary rehabilitation program three times a week during the intervention time. The main variable was quality of life improvement measured by the Chronic Respiratory Questionnaire. We also measured other variables including pulmonary function and 6 minutes walking test.

Results: From the 97 randomized patients, 71 attended first assessment and 51 were followed up till the end of the study. We observed small improvements in the dyspnea dimension of CRQ questionnaire after 3 months in both intervention groups comparing with the usual care group. A significant improvement in quality of life was observed in the two intervention groups after a year of follow-up comparing with basal situation while no changes occurred in the usual care group.

Conclusion: Assuming the difficulties in getting significant results in poor symptomatic patients and the high percentage of patients lost, we found significant changes in some quality of life items that could justify the development of primary care rehabilitation programs in moderate COPD patients.

Conflict of interest and funding: None. Funded by a grant from Fundacio La Caixa

84. Lung function and health status in metropolitan fire-fighters compared to general population controls

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Aim: To assess health status of South Australian (SA) metropolitan fire-fighters in terms of lung function and health-related quality of life, and to compare these with general population controls.
Method: The study was a cross-sectional comparison of (respiratory) health indices between 501 fire-fighters and 1324 general population controls taken from the North West Adelaide Health Study (NWAHS). All were males aged 21 to 61 years. Measurements included spirometry (i.e., forced expiratory volume in 1 second (FEV_1), forced vital capacity (FVC), mid-expiratory flow (FEF25-75)) and the Short Form 36 (SF-36) health-related quality of life questionnaire.
Results: Health status in the fire-fighters was generally better than in NWAHS controls. Mean % predicted FEV_1 and FVC were 103.4% [SD 12.1] versus 89.5% [13.7] and 110.0% [11.6] versus 88.5% [12.5] (both $p<0.001$ in linear regression analysis, adjusted for age, smoking, BMI and FEV_1 % predicted). FEV_1/FVC and FEF25-75 were significantly lower in the fire-fighters ($p<0.003$). 93 (18.6%) fire-fighters and 82 (6.2%) controls had an FEV_1/FVC < 70% ($p<0.001$). The SF-36 Mental Health scale was the only scale on which fire-fighters had a lower mean score ($p=0.009$), but none of the SF-36 scales showed clinically meaningful differences between the cohorts.
Conclusion: Male metropolitan fire-fighters showed better general health and better lung health than general population controls. The high rate of fire-fighters with FEV_1/FVC values below the recommended cut-point for airflow obstruction illustrates the inappropriateness of this clinical cutpoint for use in populations preselected on their physical fitness.
Conflict of interest and funding: No conflicts of interest; funded by the South Australian Metropolitan Fire Service

85. Intractable breathlessness in COPD - a suitable case for palliation

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Aim: To define the prevalence of intractable breathlessness in COPD in primary care and the potential for its palliation.
Method: Cross-sectional interview study in patients' homes using structured questionnaires, and combining findings of earlier study (in press) in 44 practices with those of the current study in 60 practices. Participants had a diagnosis of COPD and at least two of: FEV_1 <40% predicted, hospital admissions or acute severe exacerbations with COPD, long term oxygen therapy, cor pulmonale, and use of oral steroids. Patients with advanced cancer, severe alcohol or mental health problems, or learning difficulties, were excluded. In the current study participants on suboptimal treatment were offered optimisation of treatment before reassessment of breathlessness.
Results: Practice participation rate was 80% in the first study, participant response 61%. Participation rates are similar in the current study. 88% participants reported shortness of breath most days/everyday, 45% were housebound, 75% had a carer. Participants were at least as severe as non-participants from medical records. 57% had severe breathlessness. 92% said breathlessness was their most important problem. > 20% were on sub-optimal treatment. The prevalence of intractable breathlessness due to COPD before optimisation of treatment was 0.05%. Optimisation is currently being carried out. Its impact on the prevalence of intractable breathlessness will be reported.
Conclusion: The prevalence of intractable breathlessness in advanced COPD is substantial. Palliation of breathlessness is a priority for these patients. Their general practitioners may not know that the problem exists and specialist respiratory or palliative care services for breathlessness are rare.
Conflict of interest and funding: No conflict of interest. Funded by Dunhill Medical Trust.

86. A qualitative multi-centre study exploring the burden of COPD on patients aged 45–68 yrs and their families

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Aim: A large proportion of patients with COPD are still working or otherwise active. The perspective of these younger COPD patients and their families is important to understand in order to explore their needs.
Method: Patients aged 45–68 yrs, their partners and children (12–18 yrs), were recruited via physician referral, patient registries and patient associations. Patients were required to be on ≥1 long-acting maintenance COPD therapy, walk without assistance, not oxygen dependent, and either employed or with home/family responsibility. Emotional and social challenges were explored during focus groups using semi-structured interviews and projective exercises e.g. picture-sort stimuli and sentence completion.
Results: 85 COPD patients, 41 partners and 10 children from 5 countries participated. 40% of patients were employed, and an additional 40% modified their work due to COPD. COPD symptoms, which were often unpredictable in occurrence, had a negative impact on work, hobbies and social life. An inability to conduct activities previously taken for granted, and symptoms associated with older people e.g. breathlessness, caused patients to feel 'old beyond their years'. Family members reported feelings of resentment and loss, and compromised activities.
Conclusion: The impact of COPD on activity and productivity of younger patients is wide ranging and negatively impacted work; the effects extending to family. A downward spiral of unpredictability of symptoms and symptom burden led to patient feelings of increased age. Further research to drive understanding of disease burden in this group is urgently needed to help health and policy professionals design better support strategies.
Conflict of interest and funding: This study was funded by Novartis Pharma AG

87. There is a need for standardization of spirometry interpretation algorithms

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Aim: To date there are no studies reporting on the variation among spirometry interpretation algorithms (SIA), including how closely the decision logic of various SIA conform to guideline defined spirometric diagnosis of asthma (www.nhlbi.nih.gov/guidelines/asthma/) and chronic obstructive pulmonary disease (COPD) (www.goldcopd.com/)) .
Method: Medline/Embase were used (search words, spirometry, interpretation, algorithms, asthma and COPD diagnosis, guidelines) to identify SIA related material since 1990, including the following commonly cited resources; 1) www.goldcopd.org, and 2) ATS/ERS Task Force: Standardization of Spirometry, www.thoracic.org/section/publication/statements. Many other international resources were identified
Results: We observed considerable variability among SIA as outlined below: 1) many could not be used as stand alone documents. 2) some SIA lacked a logic string leading to a post-bronchodilator (PD) forced expiratory volume in one second (FEV_1)/forced vital capacity (FVC) ratio; an omission which hinders COPD diagnosis. 3) some SIA used PD changes in FEV_1 to distinguish between asthma and COPD; a strategy which could lead to disease misclassification. 4) some SIA did not suggest bronchodilator challenge if the FEV_1/FVC was > 0.70; a strategy which could result in under-diagnosis of asthma. 5) some SIA recommend tests which cannot be obtained in a timely manner; a strategy which could result in unnecessary delay in treatment.
Conclusion: There is considerable variability among SIA reported in the literature. Differences among SIA could result in disease misclassification. There is a need for standardization of SIA which are in keeping with current management guidelines for asthma and COPD.
Conflict of interest and funding: Conflict of interest and funding: None

88. Use of Spirometry in Diagnosing COPD: A Survey of Canadian Physicians

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[1]*Chair, Family Physician Airways Group of Canada*

Aim: To assess use of spirometry in diagnosing chronic obstructive pulmonary disease (COPD).
Method: A questionnaire developed by an expert steering committee measured COPD practice patterns and use of spirometry in Canada. Patient office visits for any reason were screened. Those ≥40 years, smoker or ex-smoker and answered yes to any of the Canadian Lung Association questions1 were eligible to have their visit included in the practice assessment.
Results: 166 family physicians participated and 3,275 visits were assessed. 69% of visits were not respiratory-related. Prior to this program, 73% of participating physicians reported rarely or never using the Medical Research Council Dyspnea Scale (MRC). Spirometry was not ordered in 52.7% of cases. Ordering spirometry did not correlate to disease severity.

MRC Dyspnea Grade	Spirometry ordered (%)	Spirometry not ordered (%)
MRC 1	513 (15.7)	759 (23.2)
MRC 2	620 (18.9)	597 (18.2)
MRC 3	297 (9.1)	216 (6.6)
MRC 4	108 (3.3)	137 (4.2)
MRC 5	13 (0.4)	15 (0.5)

Reasons for not ordering spirometry (includes multiple responses).
Results won't change treatment 31%
Waiting until patient stabilizes 6%
Other medical priorities 27%
Can manage based on peak flow results 4%
No access 9%
Referring to specialist 3%
Believe results will be normal 9%
Results difficult to interpret 1%
Wait for spirometry too long 7%
Other 13%
Conclusion: While mass COPD screening of asymptomatic individuals is not currently recommended, greater use of opportunistic spirometry in symptomatic at-risk patients is merited. Making a firm diagnosis will change treatment; spirometry barriers need to be overcome.
Conflict of interest and funding: Research funded by Boehringer-Ingelheim (Canada), Ltd./Ltée and Pfizer Canada.

89. CASPIR. Practical spirometry for primary care, a nation wide programme

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Brief outline of context: The CASPIR (Copd, Asthma,SPIRometry) project was initiated by the professional groups (Dutch association of Lungfunction Technician NVLA, Pulmonary Physicians NVALT, GP's CAHAG, practice nurses V&VN in cooperation with research department UMC St Radboud University Nijmegen) with the goal of enhancing development of an interactive course for spirometry for GP's and their staff to perform high quality spirometry in primary care. The project is compliant with ATS/ERS guidelines.
Brief outline of problem: There are concerns about the quality of spirometry performance in primary care today. Due to changes in the reimbursement and practice accreditation, formal training is necessary, in cooperation with lung function technicians and pulmonary physicians.
Assessment of problem and analysis of its causes: Current short courses focus on interpretation/education only. Organizational, quality control/assurance and maintenance aspects are unaddressed, as is cooperation with others.
Strategy for change: Developing and implementing a program. Cooperation with allied health professionals and experts at all stages. Program elements are: a CME package (with credits) blended learning, organizational aspects and quality control/maintenance.
Measurement of improvement: Knowledge, before and after, on Flow-Volume loops, Quality Control, calibration check, hygiene protocol, spirometry-procedures.
Effects of changes: After 1 year over 60 groups participated, approximately 1200 participants. Portfolios were reviewed, knowledge and quality of performance improved.
Lessons learnt: Developing and implementing is possible. Cooperation with allied heath professionals is necessary and rewarding.
Message for others: Cooperate with others, organize well and work regional.
Conflict of interest and funding: Development funded by an unrestricted grant. (Boeringher-Ingelheim, GlaxoSmithKline, AstraZeneca)

90. Professional societies work to improve the quality of spirometry tests done in primary care settings

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Brief outline of context: Primary care providers who desire to perform spirometry tests in their office to confirm and classify the severity of COPD and asthma
Brief outline of problem: The cost and size of office spirometers have decreased; most spirometers are accurate; but manufacturers often fail to provide features to minimize interpretation misclassification.
Assessment of problem and analysis of its causes: Substandard staff skills and suboptimal instrument features contribute to inaccurate spirometry results and interpretation errors.
Strategy for change: The NLHEP surveyed spirometry experts and GPs to determine optimal features for office spirometers; posted these features; and asked manufacturers to submit office spirometers for independent evaluations. The AARC surveyed stakeholders about the necessary skills and developed an Internet-based examination program to test those skills.
Measurement of improvement: The percentage of spirometry tests done by an individual which meet quality goals. More than 90% is achievable; 80% is average for skilled technologists; below 70% suggests the need for more training.
Effects of changes: Four spirometers have passed the review in 4 years. The $50, performance-based, AARC spirometry competency exam starts soon.
Lessons learnt: It may be necessary for NLHEP to purchase office spirometers. Incentives may be needed to prompt many medical professionals to take the new spirometry competency exam.
Message for others: Other countries should consider similar programs to improve the quality of spirometry testing.
Conflict of interest and funding: No conflict of interest. Funding: AARC NLHEP

91. Interpreting lung function data using percent of predicted and fixed thresholds misclassifies over 20% of patients

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Aim: To determine interpretation misclassification rates when using FEV_1/FVC <0.70 and FEV_1 <80% predicted (as recommended by the GOLD guidelines for COPD) when compared to using the fifth percentile lower limit of the normal range (LLN).
Method: PFT (pulmonary function test) results were obtained from 11,413 patients over age 20 consecutively seen at large PFT laboratories in the UK, New Zealand, and USA. Misclassification rates were determined using the ATS/ERS 2005 PFT interpretation guidelines.
Results: Using the GOLD guidelines, 24% of all patients were misclassified. For example, airway obstruction was seen in 35.7% using GOLD versus 27.9% using LLN.
Conclusion: Using percent predicted and fixed cut-points to define PFT abnormality introduces clinically important biases in assessing disease status that could affect allocation to treatment.
Conflict of interest and funding: Conflicts of interest: none. Funding: none

92. Spirometry 360: interactive online training and feedback

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Brief outline of context: Following a successful randomized trial, a spirometry distance training project was delivered to 52 primary care practices across the US.
Brief outline of problem: Spirometry is recommended for asthma and COPD care. U.S. Primary care providers (PCPs) manage most people with these conditions, though spirometry is not routinely performed.
Assessment of problem and analysis of its causes: Most PCP offices do not have access to affordable, high quality spirometry training and feedback.
Strategy for change: The four-month on-line training consisted of Spirometry Fundamentals, a multi-media tutorial CD-ROM; interactive, case-based webinars led by clinical experts; and an internet-based quality feedback reporting system.
Measurement of improvement: Spirometry quantity and quality were summarized and reported monthly to practices, including example images, trends over time, written feedback, and phone calls.
Effects of changes: Average monthly frequency of spirometry sessions increased from 7 to 15; "passing" (clinically useful) curves increased from 49% to 62%; "passing" curves among children < 8 years increased from 33% to 60%, and "perfect" curves (meeting all ATS criteria) increased from 14% to 30%.
Lessons learnt: While spirometry quantity and quality improved overall, uptake was highly variable. A study to understand predictors of success is underway.
Message for others: Spirometry lends itself well to distance training and feedback and can be a potent leverage tool for improving respiratory care. Dissemination into other countries and languages should be possible.
Conflict of interest and funding: No conflicts of interest. Participating practice networks paid a license fee to University of Washington.

93. Impact of Spirometry Interpretation Workshops in Primary Care

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Aim: Barriers to utilization of spirometry in primary care have included challenges related to interpretation of spirometic data. The objectives of the workshops were to improve understanding about a) the role of spirometry for objective testing of lung function, b) spirometry terminology, quality control, and technique of measurement and c) to increase confidence in the interpretation of spirometry data.
Method: During 2007-2009 a total of 20 workshops were completed by 409 participants (162 physicians and 247 allied health workers) in the province of Ontario, Canada. A pre-assessment questionnaire was completed by 275 (67.2%) of participants (68.5%, physicians) and (66.4%, allied health workers)
Results: Approximately 82% and 88% of physicians and allied health workers, respectively had access to spirometry testing however only 37.5% of participants indicated that they performed spirometry. Participants identified training/education, time and cost as barriers to utilization. A post-assessment questionnaire was completed by 39 physicians and 34 allied health workers; of these 83.4% were very satisfied or extremely satisfied with the workshop. Most respondents indicated that the workshop influenced their clinical practice in some way, including a heightened confidence in interpreting spirometry data. Ninety percent of participants indicated that they would recommend the workshop to a colleague.
Conclusion: Our results suggest that a spirometry interpretation workshop has a favourable impact on attitudes toward the use of spirometry in primary care. Further research is needed to evaluate the influence of this workshop on spirometric diagnosis of common respiratory conditions.
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