

International exchange

Prevention and management of chronic obstructive pulmonary disease (COPD) in primary care: position paper of the European Forum for Primary Care

Tjard Schermer MSc PhD
Senior Researcher Chronic Respiratory Conditions

Chris van Weel MD PhD
Professor of General Practice

Department of General Practice, Nijmegen, The Netherlands

Francoise Barten MD PhD
Senior Research Public Health, Department of Public Health, Nijmegen, The Netherlands

Johan Buffels MD
General Practitioner, Department of General Practice, Catholic University, Leuven, Belgium

Niels Chavannes MD PhD
General Practitioner, Department of Public Health and Primary Care, Leiden University Medical Center, The Netherlands

Przemyslaw Kardas MD PhD
General Practitioner, First Department of Family Medicine, Medical University of Lotz, Poland

Anders Østrem GP
General Practitioner, Gransdalen Health Centre, Oslo, Norway

Antonius Schneider MD
General Practitioner, Department of General Practice and Health Services Research, University Hospital, University of Heidelberg, Germany

Hakan Yaman MD PhD
General Practitioner, University of Akdeniz, Faculty of Medicine, Department of Family Medicine, Antalya, Turkey

ABSTRACT

Chronic obstructive pulmonary disease (COPD) is a smoking-related, progressive lung disease that represents a substantial individual, societal and economic burden. Primary care professionals have an important role in healthcare provision for patients with COPD. In this position paper we summarise the current knowledge about, and management of patients with COPD. Next, we describe the role general practitioners and other primary care disciplines (should) have to prevent, diagnose and treat

COPD. Finally, we explore differences in the way particular aspects of primary care COPD disease management are available or organised in a number of European countries, in order to identify barriers and provide examples of 'best practices' for optimal primary care management of patients with COPD.

Keywords: chronic obstructive pulmonary disease, disease management, international diagnosis, prevention, primary care, review

Introduction

The aim of this position paper is to summarise the current knowledge and insights about the management of patients with chronic obstructive pulmonary disease (COPD) and, more specifically, to describe the role general practitioners (GPs) and other primary care disciplines (should) have to prevent, diagnose and treat COPD. Clearly, as in many other chronic conditions, optimal care for patients with COPD requires a range of preconditions. Whether or not these preconditions can be met in primary care largely depends on factors related to the healthcare system in a particular country. Therefore, an additional aim was to explore differences in the way particular aspects of COPD management in primary care are available or organised in a number of European countries, in order to explore barriers for, and to provide examples of 'best practices' for optimal primary care management of patients with COPD.

Definition and clinical profile of COPD

The Global Initiative on Obstructive Lung Disease (GOLD) defines COPD as a preventable and treatable respiratory disease with some significant effects outside of the lungs that may contribute to the severity in individual patients.¹ The pulmonary component of COPD is characterised by airflow limitation (or 'airways obstruction') that is not fully reversible. The pathological profile of COPD consists of a mixture of small airways disease and destruction of the lung parenchyma, the relative contributions of which vary from patient to patient.² The disease process is usually progressive and associated with an abnormal inflammatory response of the lung to tobacco smoke or other noxious gases or particles. Continued exposure to inhaled noxious agents causes a more-rapid progression of the disease through accelerated lung function decline.² This explains the importance of smoking cessation in patients with COPD, which has been shown to have a substantial effect on subsequent mortality, even when successful in only a minority of patients.³

Airways obstruction is defined in terms of decreased forced expiratory volume in one second (FEV_1) relative to the forced vital capacity (FVC), whereas severity of obstruction is expressed as the individual's FEV_1 relative to the FEV_1 observed in an appropriate reference population (' FEV_1 percentage predicted'). Following international secondary care guidelines,^{1,4} primary care guidelines for the diagnosis and management of COPD distinguish four severity stages: mild, moderate, severe and very severe disease, based on the degree of

airways obstruction.^{5,6} However, the severity of COPD cannot be captured by the degree of airways obstruction alone; other factors are important as well. In secondary care patient populations, the degree of dyspnoea, exercise capacity, and nutritional status also determine the severity of COPD – at least in terms of survival.⁷ Whether or not these (or other) factors also apply to primary care patients with COPD is yet undetermined, although it seems that dyspnoea as well as nutritional status may be relevant when staging severity in primary care COPD patients.⁸

An important factor in the clinical profile of patients with COPD is the occurrence of acute exacerbations: episodes with worsening of the signs and symptoms related to the disease. Exacerbations are mainly triggered by respiratory viruses and bacteria, which infect the lower airway and increase airway and systemic inflammation.⁹ Patients with frequent exacerbations show an even more progressive lung function decline,^{10,11} especially if they continue to smoke.^{10,12}

Burden of COPD for patients, communities and primary healthcare systems

COPD is currently the fifth cause of morbidity and mortality in the developed world and represents a substantial economic and social burden.¹³ Recent population estimates for moderate and (very) severe COPD suggest a prevalence of 12% for men and 9% for women, but these rates vary between countries (see Figure 1). Primary care data show that prevalence rates of COPD seem to have peaked in men, but continue to rise in women,¹⁴ especially in the lower socio-economic classes.¹⁵

Throughout the course of their disease, COPD patients experience a progressive deterioration up to end-stage disease, which – apart from severe airways obstruction – is characterised by declining performance status, multiple co-morbidities, and severe systemic manifestations and complications.¹³ A population survey in Europe and North America has demonstrated the substantial individual morbidity associated with COPD:¹⁷ patients tend to underestimate their morbidity, despite limitations to their basic daily life activities, frequent work loss and frequent use of health services.^{17,18}

The severity distribution of diagnosed COPD in primary care has been estimated as 27% mild, 55% moderate, 15% severe and 3% very severe disease.¹⁹ GPs in the Netherlands diagnose 5–10 new cases of COPD annually.²⁰ However, the actual burden of the disease in the community is much higher, as a substantial number of patients with COPD remain undiagnosed and, consequently, untreated.²¹ Targeted screening of lung function in smokers in primary care reduces under

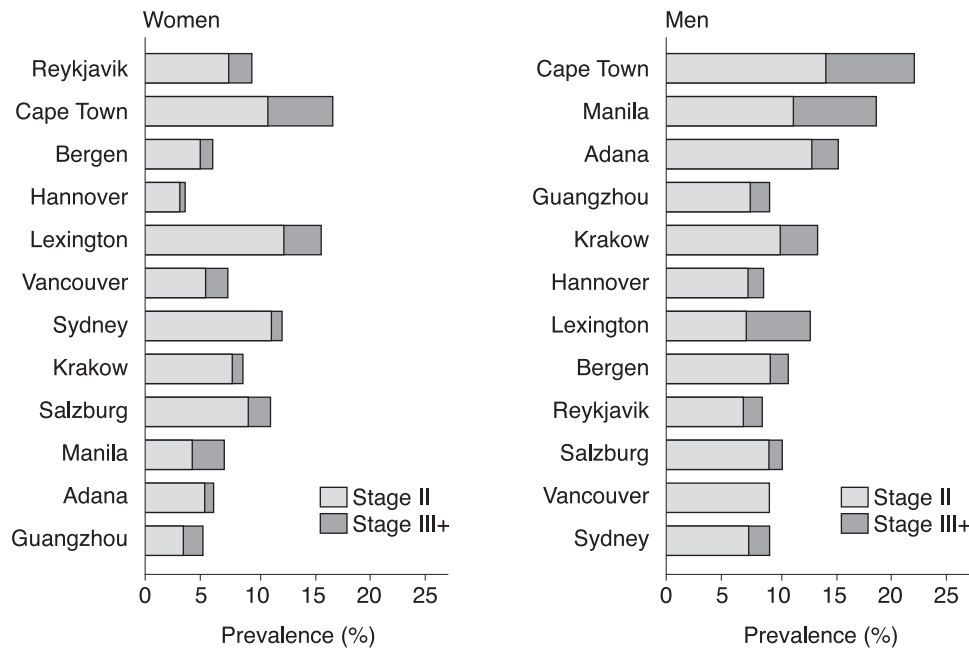


Figure 1 Prevalence rates of moderate and (very) severe COPD in 12 countries around the world – Guangzhou, China; Adana, Turkey; Salzburg, Austria; Cape Town, South Africa; Reykjavik, Iceland; Hannover, Germany; Krakow, Poland; Bergen, Norway; Vancouver, Canada; Lexington, USA; Manila, Philippines; Sydney, Australia.¹⁶

Reprinted from *The Lancet*, Vol. 370 No. 9589, Buist SA, McBurnie MA, Vollmer WM *et al*, International variation in the prevalence of COPD (The BOLD Study): a population-based prevalence study, pp. 741–50, 2007, with permission from Elsevier.¹⁶

diagnosis of airway obstruction (18–50% of screened smokers fit the definition of COPD),^{22–25} but there currently is no evidence that early detection and subsequent treatment actually leads to relevant health gains.

Exacerbations may cause serious morbidity, hospital admissions and mortality, and strongly influence health-related quality of life of patients with COPD. Patients with frequent exacerbations show faster deterioration of health status than those with infrequent exacerbations.²⁶ Despite the impact of exacerbations on patients' health,^{27,28} many exacerbations of COPD go unnoticed and patients often do not consult their physician until days or even weeks after the onset of an exacerbation.

The burden of COPD in terms of healthcare use and costs strongly depends on disease severity. For example, the costs of treating exacerbations in primary care patients with COPD increase along with the severity of the disease, which is mainly attributable to more physician consultations, diagnostic procedures, and prescriptions for reliever medication (e.g. bronchodilators, cough preparations).²⁹ Still, the majority of COPD-related healthcare costs are generated in secondary care, and are especially due to emergency room visits and hospital admissions.³⁰

Health inequities and access to care for patients with COPD

People are exposed to a variety of health hazards that are often interconnected and produce a synergy in terms of health effects.³¹ Ill health is multi-factorial, and COPD cannot always be traced back to a single risk factor: exposure as well as vulnerability differ according to social determinants of health. Addressing indoor air pollution from solid fuel use, a significant risk factor that is closely related to poverty, constitutes an upstream intervention to tackle COPD in later life. From a primary prevention point of view, tackling solid fuel related indoor air pollution should be a priority in opposing the population burden COPD in the long term.³²

In deprived countries, respiratory diseases have not received priority in relation to their impact on health.³³ As resources are scarce in these countries, adaptation of COPD guidelines using only essential drugs is required. To respond to the emerging public health problem of increasing respiratory disease prevalence rates in developing countries, the World Health Organization (WHO) has developed two initiatives, the Practical Approach to Lung Health (PAL) and the Global Alliance Against Chronic Respiratory Diseases

(GARD). These initiatives could facilitate the care of COPD patients living in these parts of the world, and primary care can play a pivotal role in achieving this.

Equal treatment for equal medical needs, irrespective of socio-economic position, is a major issue in many countries and obviously also applies to patients with COPD. Communities where people perceive poor access to medical care – typically low-income communities – have higher rates of hospitalisation for chronic diseases, including COPD. Hospital admission rates for COPD and other respiratory diseases may show marked geographic variation and are associated with indicators of socio-economic status, availability of medical resources (i.e. number of hospital beds and physicians per capita), occupational lung disease rates and cigarette consumption.³⁴ The type of health insurance scheme (private or public) or health insurance impediments may limit COPD patients' access to therapies or specialist services and thus negatively impact COPD care.^{18,35} Improving access to care is more likely to reduce hospitalisation rates for COPD than changing patients' propensity to seek healthcare or eliminating variation in physician practice style,³⁶ and public funding of primary care is likely to improve its access.³⁷

COPD and co-morbidity

Common acute illnesses may have a more-severe impact in patients with COPD. For example, upper respiratory tract infections are the most frequent health problem in all age groups, but may have a more severe impact or require different treatment in patients with COPD.^{1,38} Moreover, COPD patients frequently have or will develop multiple chronic health conditions. These co-morbidities can magnify the impact of COPD on a patient's health status and complicate the management of COPD, or vice versa.¹ Common co-morbidities in patients with COPD include other smoking-related diseases (e.g. ischaemic heart disease, lung cancer), conditions that arise as a complication of a specific pre-existing disease (e.g. heart failure due to pulmonary hypertension), and co-existing chronic conditions related to ageing with unrelated pathogenesis, such as (prostate) cancer, diabetes mellitus, and depression. Table 1 shows the prevalence of co-morbid conditions among primary care patients with COPD.

A condition that is specifically worth mentioning is chronic heart failure, because – like COPD – this is a common condition in elderly individuals. A diagnosis of heart failure may remain unsuspected in patients diagnosed with COPD, because the patient's shortness

Table 1 Prevalence of co-morbid conditions in COPD patients in Dutch primary care.³⁹

Diseases	Ranking	%
Locomotive diseases	1	36.1
High blood pressure	2	22.7
Insomnia	3	17.3
Heart disease	4	13.1
Sinusitis	5	12.4
Migraine	6	10.0
Depression	7	8.7
Dizziness	8	7.3
Ulcer (stomach/duodenum)	9	7.2
Cancer	10	6.2
Atherosclerosis	11	5.5
Thyroid diseases	12	4.9
Diabetes	13	4.5
Intestinal diseases	14	4.2
Skin diseases	15	4.2
Gall bladder diseases	16	3.8
Stroke	17	3.1
Chronic cystitis	18	3.1
Kidney stones	19	2.8
Thrombosis	20	2.4
Epilepsy	21	1.4
Liver diseases	22	0.3
Renal diseases	23	0.3

of breath is attributed to the COPD.⁴⁰ Conversely, in patients with chronic heart failure the prevalence of COPD ranges from 20% to 30%.⁴¹ Adequate differentiation between COPD and chronic heart failure – or the ascertainment that a patient suffers from both conditions – requires further diagnostic testing (electrocardiography (ECG), echocardiography, determination of plasma brain natriuretic peptide levels), which may require referral to or collaboration with a chest physician or cardiologist.

Clinical COPD guidelines

The goals for COPD patient management are to delay the process of disease progression and alleviate its manifestations. A substantial number of clinical guidelines to support (evidence-based) health care for patients with COPD have been published in the past few years.⁴² Some of these guidelines have specifically been developed for use in primary care,^{5,6,43} others do or do not address the role of primary care in diagnosing and managing COPD. In some – but not all – cases, GPs have been involved in the development of the guideline. Current COPD guidelines generally cover diagnosis and severity classification, non-pharmacologic treatment options (including smoking cessation), avoidance of risk factors, patient education, pharmacological therapy and use of oxygen supplementation, management of acute exacerbations, the role of pulmonary rehabilitation, and monitoring and ongoing care.⁴² Despite the popularity of the guidelines, deficits with respect to diagnosis and treatment of COPD and practical implementation of educational measures are quite common in primary care.^{44,45} Observations that many GPs are not aware of the existence or the contents of COPD guidelines may explain this.^{18,46}

Range of services that should be available from primary care for COPD

Prevention

The ultimate measure to reduce the risk of developing COPD in the long term would be to prevent young people from taking up cigarette smoking or being exposed to other harmful inhaled matters. In many healthcare systems, GPs can be actively involved in public health campaigns and may play an important part in bringing messages to patients and the public about reducing exposure to risk factors.¹ However, from the primary care point of view, smoking cessation in (young) adults is the most effective intervention to reduce COPD risk, and at the same time the risk of other smoking-related diseases as well. GPs and nurses often have repeated contacts with patients over time, which provides the opportunity to discuss smoking cessation, enhance motivation for quitting, and identify the need for supportive pharmacological treatment in smokers – with or without COPD. However, it is important to realise that GPs often do not know who the smokers in their practice population are, as no systematic records are kept of subjects' current smoking behaviour, and standard screening procedures

on smoking are rarely applied. As individuals from lower socio-economic classes are especially at risk to develop COPD,¹⁵ focusing smoking prevention and cessation efforts on this subpopulation could be a priority for the contribution of primary care to the prevention of COPD.

Diagnostic services

Lung function testing is indispensable to demonstrate the largely irreversible loss of lung function that is typical for COPD. Primary care spirometry not only increases rates of COPD diagnosis, but also leads to improvements in COPD management.^{4,48} All clinical COPD guidelines consider spirometry to be the standard to establish the presence (or absence) of airways obstruction.⁴² When available in primary care, spirometry is a valuable tool in the evaluation of patients with respiratory symptoms, allowing the GP to exclude or diagnose COPD, and to correctly stage its severity. Additional diagnostic tests like advanced lung function testing generally require referral to a chest physician or a (hospital-based) pulmonary function laboratory. Hand-held spirometers have been developed in recent years, with a global quality and user-friendliness that makes them acceptable for use in primary care practices.⁴⁹ However, low quality of spirometric tests has been reported in primary care practices,^{50,51} which may hamper the validity of results and affect clinical decision making. Co-ordinated efforts by health policy makers and the medical profession are needed to provide the right equipment, training for staff who use it, and continuing quality assurance and support for test interpretation in primary care.⁵² Table 2 provides an overview of possibilities to organise primary care spirometry.

Management of stable COPD

Smoking cessation

Apart from being the main cause of COPD, cigarette smoking is also by far the most important factor responsible for progression of the disease.⁵⁴ In primary care an estimated 25–50% of patients with COPD are current smokers.^{55,56} Simple smoking-cessation advice from (primary) healthcare professionals makes smokers more likely to quit, and supportive interventions (e.g. counselling, pharmacological support) enhance the success of smoking cessation attempts.⁵⁷ For some smoking cessation interventions, quit rates have specifically been studied in COPD patients,^{54,58–60} some interventions have been evaluated in smokers in primary care,^{61–63} but only a few in COPD patients in primary care.^{55,64} The latter studies show that although every COPD patient that quits smoking

Table 2 Advantages and disadvantages of different ways to organise spirometry in primary care.⁵³

Where spirometry is performed	Advantages	Disadvantages
General practice surgery	Least barriers to access No extra healthcare costs Least travelling distance for patients Minimises number of patient visits ('one-stop shop') Results of spirometry integrated into first consultation Enables GPs to acquire expertise	Reliability of measurements less certain Extra workload for family practice Family practice has to build up expertise
Nurse-run asthma/COPD clinic	Good reliability of measurements Few access limitations No extra workload for family practices No high demands on spirometry expertise in family practice	Extra healthcare costs Considerable travelling distance for patients Timely feedback of spirometry results to family practice crucial
Primary care group-commissioned spirometry service	Good reliability of measurements No extra workload for family practices No high demands on spirometry expertise in family practice Centralisation of interpretation of spirometry	Extra healthcare costs Considerable travelling distance for patients Timely feedback of spirometry results to family practice crucial
Hospital-based pulmonary function laboratory	Optimum reliability of measurements No extra workload for family practices No high demands on expertise in family practice Facilitates consultation of specialist respiratory services	Possible access limitations ^a Limited capacity next to regular tasks Extra healthcare costs Considerable travelling distance for the patients Timely feedback of test results to family practice crucial

^a Depending on local co-operation with secondary care chest physician.

definitely is worthwhile, primary care professionals' expectations should not be too high, as smoking-cessation counselling in primary care results in a 9% rate of successful quitters among COPD patients (compared with 4% without intervention) after one year.⁶⁵ Primary care doctors mainly apply smoking-cessation interventions that are easy to administer and are not very time consuming.⁶⁶ Recent research suggests that using spirometry for identification of airways obstruction may improve the success rate of subsequent smoking-cessation interventions.^{67,68} More-intensive smoking cessation counselling of COPD patients may be more feasible for non-physicians, such as practice nurses. Clearly, a good infrastructure is a prerequisite for effective smoking-cessation sup-

port in primary care, but recent data from Sweden illustrate that not all primary care practices have arranged structured programmes for smoking-cessation guidance for their COPD patients yet.⁶⁹

Physical exercise training and pulmonary rehabilitation

Improving physical performance is an important treatment objective in COPD.¹ Although there is currently no conclusive evidence that exercise programmes in primary care are effective to improve patient outcomes,⁷⁰ enhancing patients' physical fitness is recommended in primary care COPD guidelines.^{5,6,43} Most patients with COPD managed in primary care have mild or moderately severe disease,¹⁹ and will therefore

not have access to secondary care pulmonary rehabilitation programmes. Because it may not always be feasible to arrange for physical exercise programmes in primary care (availability of well-trained physiotherapists is crucial, see 'Learning lessons: primary health care for COPD across Europe'), a multidisciplinary co-operation with a local hospital may be an option. Once an increased level of physical activity in patients with COPD is achieved, regular attention and motivational support from a primary care professional may contribute to maintaining this.^{71,72}

Pharmacotherapy and vaccinations

Pharmacotherapy for COPD patients is used to prevent and control symptoms, reduce frequency and severity of exacerbations, and improve health status and exercise tolerance. Inhaled bronchodilators (β_2 -agonists, anticholinergics) are central to the symptomatic management of COPD in primary care.^{5,6,43} Regular treatment with inhaled corticosteroids does not modify lung function decline, but may reduce the frequency of exacerbations and improve health status in symptomatic patients with severe disease and repeated exacerbations – which is only a minority of all patients with COPD treated in primary care.⁷³ A single-inhaler combined inhaled steroid and long-acting β_2 -agonist – if available – is more effective than the individual components in reducing exacerbations and improving lung function and health status.¹ Although theophylline in a low dose reduces exacerbations, it does not improve lung function, and higher doses bear the potential for toxicity.

Influenza vaccines containing killed or live, inactivated, viruses can reduce serious illness and death in COPD patients by about 50%, and are recommended for primary care.⁷⁴ Pneumococcal vaccination is effective in COPD patients aged 65 years and older,^{75,76} or with severe airways obstruction.⁷⁷

Regular monitoring

Follow-up of COPD patients' physical and mental condition is part of best (primary care) practice when this monitoring results in information that contributes to the achievement of the treatment goals.⁴² Frequently recommended monitoring routines are the follow-up of lung function, symptoms, exercise tolerance, (fat-free) body mass, frequency of exacerbations, co-morbidity and smoking habit. Recommendations on monitoring procedures in patients with COPD are currently not based on scientific evidence. It would make sense to recommend some monitoring procedures – especially monitoring of symptoms and smoking status – as a routine for every COPD patient, and apply additional surveillance on the basis of disease-severity stage.⁷⁸ An initial severity staging at the time of diagnosis followed by re-assessment once every few years in patients with

mild to moderate disease may be sufficient for the majority of COPD patients managed in primary care.

End-of-life care

Patients with end-stage COPD experience intolerable dyspnoea, substantial disability, and higher levels of anxiety and depression, which affect their quality of life and can be a source of concern for family and carers. These patients have different healthcare needs than those in earlier stages of the disease. They often lack surveillance and receive limited end-of-life care, in part because their disease course is difficult to predict.⁷⁹ Although palliative care is a team effort in which other medical professionals (palliative care physicians, nurses) non-medical professionals (counsellors, clergymen) and laymen (relatives, volunteers) are involved, the GP is in an excellent position to organise and provide comprehensive end-of-life care for COPD patients.⁸⁰ Potential barriers may include unwillingness of patients to discuss end-of-life care, and GPs' lack of time, increased workload, fear of uncertainty of the information to provide about the prognosis, and lack of appropriate tools to guide referral for palliative care.⁸¹

Multidisciplinary co-operation with secondary care and within primary care

When the structure of the healthcare system and the willingness of the professionals allows, GPs, chest physicians and allied disciplines involved in the management of patients with COPD can collaborate and provide multidisciplinary or 'shared' care. A chronic disease-management programme for COPD patients that incorporates a variety of interventions, including pulmonary rehabilitation and implemented by primary care, has been shown to reduce admissions and hospital-bed days.⁸² Implementation of such a programme requires a (guideline-based) working agreement in which the responsibilities of, and communication between, all involved healthcare professionals and patient participation are clearly defined.^{83,84} When such a working agreement is in place, the GP can also refer a COPD patient to a chest physician for once-only diagnostic consultation, or to 'map' relevant baseline characteristics.⁸⁵ Instead of actual referral of the patient, a chest physician can also support primary care by offering diagnosis and diagnostic advice assessed from written spirometry and history data.⁸⁶ As a part of a multidisciplinary collaboration, primary care professionals can continue tasks that are typically initiated in secondary care. For instance, recovery of a severe exacerbation for which a COPD patient has previously

been admitted to hospital can be monitored at home by the GP or nurse, and a primary care physiotherapist can sustain or further improve favourable effects that have been achieved in an inpatient pulmonary rehabilitation programme.⁷² Within primary care, physicians can refer COPD patients to a physiotherapist for physical exercise training, to a (respiratory) nurse for patient education, self-management instructions, and supervision of inhalation technique, or to a dietician for counselling in case of either overweight or malnutrition.⁸⁷

Learning lessons: primary health care for COPD across Europe

As a part of the process of writing this position paper, GPs with a special interest in COPD from several European countries (Germany, Norway, Poland, the Netherlands, Belgium and Turkey) were interviewed regarding four aspects of COPD patient care in their country: use of COPD guidelines, primary care spirometry, influenza vaccination, and physical exercise programmes for COPD. The interviews provided examples of what could be considered 'best practice', but also identified some marked similarities and discrepancies between the ways that primary care for COPD is organised in the respective countries.

Evidence-based clinical COPD guidelines for GPs are available in all involved countries. In some countries an international guideline has been adopted and translated;^{1,5} other countries have produced their own national guidelines.^{83,84} In the latter case, existing COPD guidelines have been taken into account.^{1,88} In some guidelines, the role of the GP is made explicit for several aspects of COPD patient care, like diagnosing, referral, periodic monitoring and severity assessment, stimulating smoking cessation and participation in exercise programmes, and involvement in aftercare after hospital discharge for an exacerbation.^{83,84}

Appendix 1 describes the organisation and accessibility of primary care spirometry in the respective countries. Distinct points are the high availability of spirometers in primary care practices in Norway, the range of spirometry services for primary care in the Netherlands, the imposed quota of spirometry tests for primary care practices in Germany, the mandatory spirometry training for GPs and the inability to delegate spirometry test execution to practice nurses or assistants in Belgium, and the dependency on pharmaceutical companies and occasional or local *ad hoc* initiatives for spirometry in Poland and Turkey, respectively. Appendix 2 describes the organisation of (influenza) vaccination for patients with COPD in these same countries.

From the interviews it also became quite clear that exercise programmes for COPD patients in primary care are not well established in any of the countries involved. Some countries have regional (the Netherlands, see www.kroonluchter.org) or even nationwide (Germany, see www.die-gesundheitsreform.de/glossar/disease_management_programme.html) disease-management programmes for COPD that include physical exercise programmes. In some countries, COPD patients from primary care have access to hospital-based pulmonary rehabilitation programmes, but the mandatory involvement of a chest physician is considered a barrier for effective implementation. Other barriers for the uptake of exercise programmes are a lack of primary care physiotherapists with specific expertise in supervising physical exercise training in patients with COPD, lack of supervised community sporting groups for respiratory patients, GPs' failure to recognise the importance of exercise for patients with COPD, and, consequently, low priority for setting up such programmes in their practices. Insufficient reimbursement for COPD exercise programmes was mentioned as a barrier for implementation in all countries except one: in Norway, GPs have the possibility to prescribe 40 sessions with a physiotherapist for individual or group training for a COPD patient, which can be extended with an additional 40 sessions when these are prescribed by a medical specialist. Because of GPs' unfamiliarity with this possibility and a lack of physiotherapists to offer these services, implementation of exercise programmes for COPD in Norwegian primary care lags behind – despite adequate reimbursement.

Appendix 3 provides examples of 'European best practices' for the management of patients with COPD in primary care.

Recommendations

- Availability of an (evidence-based) clinical guideline is essential for optimal care provision for patients with COPD in primary care. In the guideline, the role of the GP and – ideally – of other involved (primary) healthcare professionals should be made explicit for several aspects of COPD patient care, from diagnosis up to palliative care for end-stage COPD. Global guidelines like those developed by GOLD and the International Primary Care Airways Group (IPAG) can serve as the foundation for developing national COPD guidelines. Once a national guideline is available, raising awareness of its existence among (primary) care professionals, and activities to implement the guideline are essential.

- Further development of high-quality primary care spirometry is indispensable for any COPD guideline to have a solid bedrock in primary care. Coordinated efforts by the medical profession and health policy makers are needed to provide the right equipment, training for staff who use it, and continuing quality assurance and support for test interpretation in primary care.
- Multidisciplinary collaboration can improve diagnosis and management of COPD in primary care. Structuring collaboration and communication between primary care professionals involved in the management of COPD (i.e. GPs, nurses, physiotherapists, pharmacists, dieticians) is elementary to achieve this. Within the possibilities a country's healthcare system offers, bridges should be built between primary and secondary care in order to accomplish optimal multidisciplinary care for COPD patients.
- Smoking cessation is the key to the prevention as well as to the treatment of COPD. Therefore, primary care practices should arrange a solid infrastructure and adequate training of staff in order to arrange effective smoking-cessation support for patients diagnosed with COPD, as well as for non-COPD smokers who want to quit. Disciplines other than GPs (especially nurses) can be involved in this. Smoking cessation support should be a central issue in multidisciplinary working agreements for the management of COPD.
- Programmes for physical exercise training for COPD patients should be developed within the context of a national healthcare system, and structurally embedded in this healthcare system. Access to exercise programmes for primary care patients with COPD should not be restrained. Clearing barriers that prevent the development and implementation of exercise programmes (especially lack of reimbursement and availability of well-trained physiotherapists for supervision) should be a priority for those involved in the management of COPD in primary care.

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ADDRESS FOR CORRESPONDENCE

Tjard RJ Schermer, Radboud University Nijmegen Medical Centre, Department of General Practice, PO Box 9101 (117-HAG), 6500 HB Nijmegen, The Netherlands. Tel: +31 24 3614611; fax: +31 24 3541862; email: T.Schermer@hag.umcn.nl

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Appendix 1: Services for spirometry in primary care, as described by GPs from different European countries

Country	Description
Germany	Spirometry is available for GPs either in the own practice or through referral to a pulmonary specialist. There are no reimbursements or financial incentive for GPs to arrange spirometry. Collaboration between practices regarding spirometry is hampered by 'competition' between practices because patients can switch between practices. A small financial incentive is available for performing a spirometry test in the diagnostic work-up of patients, but the number of tests performed in a practice should not exceed average values of other practices.
Norway	Ninety percent or more of practices have a spirometer in the practice; about 40% of them are well trained in spirometry and perform the tests themselves. Ideally, spirometry is performed in the practice by a well-trained health secretary, a professional trained to work in primary care. Current governmental policy requires a spirometry test for the diagnosis of COPD in order for respiratory drugs to be reimbursed. This requirement is not accompanied by criteria for spirometry quality assurance. One effect of this policy is that the use of spirometry in primary care is facilitated.
Poland	Primary care spirometry is mainly done in the practices by nurses who are (or should be) trained sufficiently for this task. GPs can refer patients for spirometry to specialised centres, but there are only a few of those in the country, they have waiting lists, and reimbursement has not been arranged. Pharmaceutical companies have put a lot of money and effort in offering equipment and the services of a lung function technician to perform the tests in the practice.
The Netherlands	Primary care spirometry is available in many (60–70%) practices, in primary care diagnostic centres, and through referral to a hospital-based pulmonary function laboratory. Some practices use services of a specialised respiratory nurse who regularly visits the practice. Within practices, spirometry is performed by practice nurses or assistants, rarely by GPs. Recent changes in primary care reimbursement (including attractive tariffs for spirometry tests) have caused a sharp increase of spirometry utilisation, which is not necessarily good for the quality of the tests.
Belgium	There are two ways primary care spirometry is organised: in the patient's own practice, or through open access to ambulatory or hospital-based pulmonary function laboratory services. Spirometry tests in the practice are performed by GPs; this task cannot (yet) be delegated to practice nurses or practice assistants. A minimum (i.e. 10 hours) of spirometry training for GPs has been legally anchored and is a prerequisite for reimbursement of spirometry tests. This policy 'merges' spirometry with other elements of COPD care provision.
Turkey	Apart from occasional regional projects or initiatives, GPs have no access to spirometry facilities. The only way is to refer a patient to a medical specialist, after which spirometry can be performed in a hospital-based laboratory.

Appendix 2: Influenza vaccination for COPD patients in primary care, as described by GPs from different European countries

Country	Description
Germany	COPD is an indication for influenza vaccination in the national guidelines. Implementation is hampered by the fact that GPs are not allowed (by law) to contact patients to invite them to come to the practice for a flu shot. In 2007 a nationwide disease-management programme for COPD has been launched, of which influenza vaccination, self-management education and smoking-cessation advice are integral parts. ^a
Norway	There is a national programme for influenza vaccination for the elderly and patients with pulmonary or cardiovascular conditions. Media campaigns remind patients to get the flu shot, but patients do not receive reminders. The government has published a national strategy for COPD for the period 2006–2011 as advised by a national multidisciplinary board. Primary care has a pivotal role in this strategy, especially with regard to early detection of COPD, smoking cessation, and treatment – including influenza vaccination.
Poland	Influenza vaccination is not reimbursed for patients; people need to pay for it themselves (including people in high-risk groups). The rate of vaccination in the general population is low, and the same is true for patients with COPD. Some local governments arrange free-of-charge influenza vaccination campaigns.
The Netherlands	Influenza vaccination takes place on a national scale, is well organised, and is mainly coordinated by GPs for their practice populations. Compliance of patients in the influenza vaccination campaigns is high. Influenza vaccination is reimbursed for the elderly and chronically ill (including COPD).
Belgium	Influenza and pneumococcal vaccination programmes in primary care are supported through media campaigns. Best practice is that the GP provides a regional governmental body (LOGO) with a list of high-risk patients (including COPD patients) in the practice that have an indication for vaccination. LOGO takes care of the mailing to these patients.
Turkey	For about five years now the Ministry of Health has recognised the importance of vaccination in subjects aged >65 years and in patients with chronic conditions. Patients with COPD have (free) access to influenza and pneumococcal vaccination. GPs have a focus on prevention, and therefore play an important role in the vaccination.

^a www.aok.de/bawue/rd/127166.htm; www.die-gesundheitsreform.de/glossar/strukturierte_behandlungsprogramme.html; www.die-gesundheitsreform.de/glossar/disease_management_programme.htm

Appendix 3: Examples of 'European best practices' for COPD in primary care

General practitioners with special interest (GPwSIs) for respiratory medicine (United Kingdom)

GPwSIs are GPs with additional training and experience in a specific clinical area who take referrals for the assessment/treatment of patients that may otherwise have been referred directly to a secondary care consultant, or who provide an enhanced service for particular conditions or patient groups. The core activities of a GPwSI service for respiratory medicine will vary, dependent upon local needs and resources. However, they are likely to focus on COPD, asthma, allergy and respiratory tract infection. The pivotal role of a GPwSI in respiratory medicine is as clinical lead within primary care organisations, providing clinical expertise along with the necessary leadership, negotiating and co-ordinating skills to develop an integrated respiratory service according to local needs.

- www.dh.gov.uk/assetRoot/04/02/03/86/04020386.pdf (in English)

Development and implementation of COPD guidelines (Germany)

A national COPD guideline has been published in Germany in 2006. A number of medical professional organisations were involved in the development of this guideline, among which the German association for general and family medicine (DEGAM). Representatives of patient organisations were involved in order to include the patient perspective. The international GOLD guideline and the British National Institute for Health and Clinical Excellence (NICE) guideline were taken into account when developing the German guideline. In the guideline, the role of the GP is made explicit for several aspects of COPD patient care: diagnosing COPD, referral by a pulmonary specialist back to the GP, periodic monitoring and assessment of disease severity. This has stimulated smoking cessation and participation in exercise programmes and involvement of the GP in aftercare after hospital discharge for an exacerbation. The guideline is accessible through the internet free of charge, as are accompanying materials (i.e. summary card, aids/checklists for physicians, educational materials for physicians, information leaflets for COPD patients).

- www.versorgungsleitlinien.de/themen/copd/index.html (in German)

Integrated primary care for patients with COPD (the Netherlands)

The so-called 'Chandelier programme' is a multidisciplinary programme in a multi-ethnic area in Rotterdam for patients with moderate and severe COPD, which was initiated by the GPs and physiotherapists from a primary healthcare centre. All patients with respiratory conditions have been invited to the healthcare centre for a lung function test. Next, the GP and practice nurse compose an individualised care programme for the patient, that may comprise a tailored exercise programme under supervision of a physiotherapist; nutritional interventions supervised by a dietician; patient education, self-management and smoking cessation by the practice nurse or a respiratory nurse; medication compliance and inhalation technique check by a pharmacy assistant; and involvement of a nurse specialised in mental health in case of depression or anxiety problems. Implementation of the Chandelier programme is now taking place in a much larger area in Rotterdam and surroundings, by a regional foundation, with financial support of non-commercial and commercial sponsors (including pharmaceutical companies).

- www.kroonluchter.org and www.zorgdraad.nl (both in Dutch)

