

## Research paper

# Management of chronic obstructive pulmonary disease in Swiss primary care: room for improvement

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## ABSTRACT

**Background** Information on the quality of care for patients with chronic obstructive pulmonary disease (COPD) in Swiss primary care is limited.

**Aim** To identify gaps and quality improvement potential in COPD primary care in Switzerland.

**Methods** Pooled analysis of selected published data. Six international COPD guidelines (German, Swiss, United Kingdom, Canadian, Australian and New Zealand, and the global initiative on obstructive lung disease [GOLD] guidelines) were reviewed for care elements with a level of evidence rated II and higher in at least three of the six guidelines. We compared published data on COPD management in Swiss primary care with these recommendations and with published international benchmarks.

**Results** Nine elements fulfilled the criteria for evidence level II or higher in at least three of six COPD guidelines. These were summarised in six key domains: diagnosis, smoking cessation counselling, influenza vaccination, pharmacological treatment, patient education and pulmonary rehabilitation (long-term oxygen and palliative care are not the focus of COPD primary care in Switzerland and

outpatient exacerbation management was subordinated to pharmacological treatment and education). Swiss primary care data revealed spirometric confirmation of diagnosis in 55% of patients, smoking cessation counselling in 50% and influenza vaccination in 66%. Inadequate prescription of inhaled corticosteroids (ICS) was high at 38% in mild COPD and 43% in moderate COPD. Referral for pulmonary rehabilitation, even for patients with severe COPD, was low at 19% and data on patient education were rare. Diagnosis, patient education and referral for pulmonary rehabilitation revealed the highest, and influenza vaccination the lowest performance gap.

**Conclusion** Gaps between current care and recommended best practice exist in Swiss primary care COPD management. Promoting and implementing evidence-based frameworks for developing high quality care for patients with COPD are necessary.

**Keywords:** best practice, care quality, chronic care model, COPD, primary care

## How this fits in with quality in primary care

### What do we know?

There is limited information on the quality of care for patients with chronic obstructive pulmonary disease (COPD) in Swiss primary care.

### What does this paper add?

Gaps between current care and recommended best practice exist in Swiss primary care COPD management, particularly in relation to diagnosis, patient education and referral for pulmonary rehabilitation.

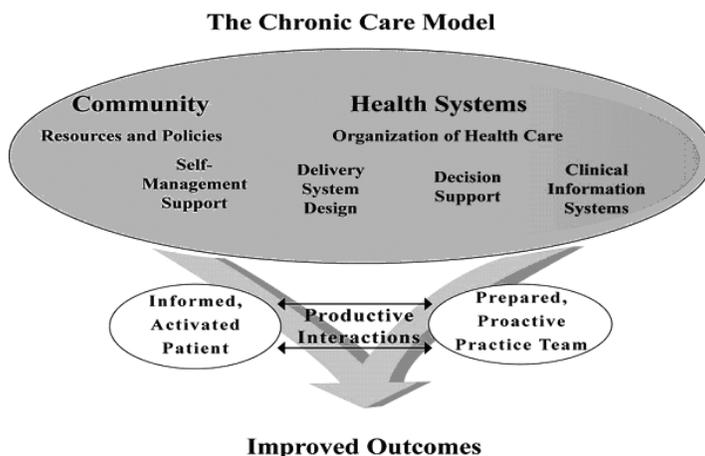
## Introduction

Chronic obstructive pulmonary disease (COPD) is a major worldwide health problem associated with high morbidity and mortality and enormous economic costs.<sup>1</sup> The prevalence of approximately 10% in Switzerland is similar to other European countries.<sup>2,3</sup> From the perspective of care quality, the variation that causes the greatest concern is that between actual practice and evidence-based 'best practice'. The lack of optimal care is associated with increased morbidity as well as excessive use of healthcare resources, leading to a significant economic burden. Assessment of care quality and efforts for closing gaps are of paramount importance for patients and the healthcare systems.<sup>4</sup>

Several international and Swiss national guidelines exist for COPD with the aim of supporting health professionals to deliver evidence-based and high-quality care.<sup>5-10</sup> In Switzerland, care for COPD is provided by generalists and specialists. Information on quality of care, particularly for patients with COPD treated in primary care, is limited. Quality indicators are not defined, and not measured or inadequately assessed. To identify gaps and the potential for im-

proving COPD care in Switzerland, we reviewed published data on COPD primary care in Switzerland for adherence with key management elements recommended by guidelines and compared performance in Swiss primary care with international examples for best practice for these elements.

With respect to the identified gaps, we refer to published international examples and relate this to the chronic care model (CCM) for improving quality of care for chronic illnesses (Figure 1). The CCM serves as an accepted and evidence-based framework for developing and implementing effective activities to improve care for chronically ill people.<sup>11</sup> The model integrates six aspects designed to facilitate interactions between practice teams and patients with the aim of improving processes and outcomes in chronic illnesses. These aspects are a health system with the availability of decision support and clinical information systems; delivery system design; support in self-management; and the use of community resources. A systematic review demonstrated that patients with COPD who received interventions with two or more CCM components had significant lower rates of hospitalisation and emergency visits compared with patients who did not.<sup>12</sup>



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**Figure 1** The chronic care model

## Methods

A pooled analysis of selected published data was conducted. Six COPD guidelines (German, Swiss, UK, Canadian, Australian and New Zealand and the USA National Heart, Lung, and Blood Institute, National Institutes of Health and the World Health Organisation GOLD COPD guideline) were reviewed.<sup>5–10</sup> COPD treatment elements with a level of evidence I or II or a recommendation level grade A or B according to the Report of the US Preventive Services Task Force<sup>13</sup> were considered as priority elements for good clinical practice if mentioned in at least three of the six guidelines. A category A recommendation is from endpoints of well-designed randomised controlled trials (RCTs) that provide a consistent pattern of findings in the population for which the recommendation is made. Category A requires substantial numbers of studies involving substantial numbers of participants. Category B evidence is from endpoints of intervention studies that include only a limited number of patients, post hoc or subgroup analysis of RCTs, or a meta-analysis of RCTs. In general, category B pertains when few randomised trials exist, they are small in size, they were undertaken in a population that differs from the target population of the recommendation or the results are somewhat inconsistent.

Evaluation of the adherence of Swiss general practitioners (GPs) to the selected treatment elements was based on results published in the literature. The literature search was performed in the electronic database MEDLINE (Ovid), and EMBASE (Elsevier). MEDLINE search terms are shown in Appendix 1.

In addition, we performed hand searches using reference lists of included studies and review articles. The same search was performed to identify publications on the adherence to the treatment elements in other countries. The search was restricted to European countries, USA, Canada and Australia.

To obtain insight into barriers, enablers, incentives and options we also interviewed national and international experts on adherence with and implementation of the recommended guideline elements. The interviews were outlined to assess experience and opinions about flaws, needs and possible solutions regarding better COPD care. We did interviews with pulmonologists from secondary and tertiary care, as well as with primary care physicians and GPs with a special interest in respiratory medicine, to get more insight into what is reality and problematic in COPD care in Switzerland. These national 'experts' operate as delegates of the Swiss Society of pulmonologist, the Swiss Societies of Internal and General Medicine and the Swiss College of Primary Care Medicine. The foreign experts from Canada, Netherlands and Spain have been leaders of quality improvement initiatives

in COPD in their countries and have published in this field.

We also asked them which elements they judge to be of particular importance for better quality in COPD primary care and which key areas they prioritise and emphasise in quality improvement initiatives.

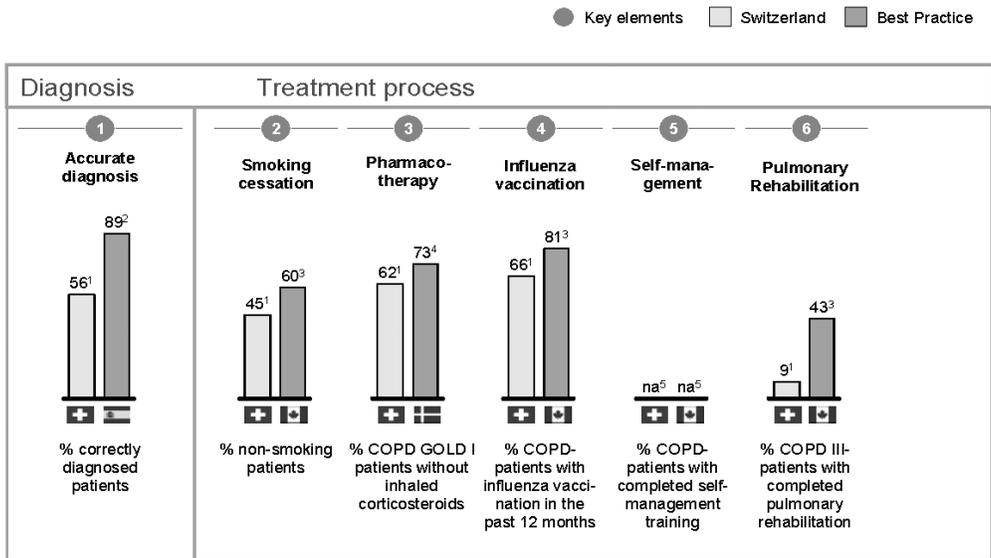
## Results

Thirty-one elements for COPD management were identified from the guideline review. Of the 31 identified COPD treatment elements, the following six key elements for primary care were selected, based on a level of evidence II and higher or a recommendation grade B or higher: correct diagnosis, smoking cessation counselling, influenza vaccination, drug treatment of stable COPD and exacerbation management, patient education and pulmonary rehabilitation. Long-term oxygen assessment and prescription is not primary care based in Switzerland therefore we did not consider it as a key element for COPD primary care. Outpatient exacerbation management and exacerbation treatment was subordinated to pharmacological treatment and education.

We identified four papers, one published in 2004 and three in 2010, containing data on quality of care in Swiss primary care,<sup>14–16</sup> and 23 international papers. The most comprehensive assessment of quality of COPD primary care in Switzerland was performed by Jochmann *et al.*<sup>15</sup> In this study, 139 GPs caring for 615 patients with COPD completed questionnaire details about treatment/management for each patient.

We identified gaps in Swiss primary care COPD management for all of the recommended best practice elements, which can be summarised in six domains with impact on the process and quality of care (Figure 2).

- Underdiagnosis and/or inadequate quality of diagnosis; patients classified by their physician as COPD patients fulfilled the GOLD criteria for COPD in 56% of cases;<sup>15</sup> confirmation of COPD by spirometry was reported in 55% of patients.<sup>14</sup> Of the tests performed to establish the diagnosis of COPD, 60% were of acceptable quality according to existing criteria.<sup>16</sup>
- Inadequate smoking cessation counselling; only 50% of smokers who mentioned their smoking habits to their physician were actually counselled to quit smoking.<sup>17</sup>
- Non-adherence of physicians with pharmacological treatment recommendations; 69% of patients with mild COPD (GOLD I), 82% of patients with moderate COPD (GOLD II), 35% of patients with severe COPD (GOLD III) and 34% with very severe COPD (GOLD IV) were not treated according to



1 Jochmann *et al.*, *SMW* 2010    2 Soler *et al.*, *Respir Med.*, 2010    3 Bourbeau *et al.*, *Can J Resp Med*, 2008    4 Ulrik *et al.*, *Int J COPD*, 2010  
 5 In Switzerland only as part of pilot projects; no data available (na) for Canada  
 6 Bundesamt für Statistik; inpatient cases with main diagnosis (ICD-10) J41, J42, J43, J44, J47 or secondary diagnosis J44 and main diagnosis J10.0, J11.0, J12-16, J18, J20, J21, J22, J96; no reliable and comparable data from other countries available

**Figure 2** Differences in six COPD key elements between Swiss primary care and published international data

GOLD recommendations. Notably, 38% of GOLD stage I patients and 57% of GOLD stage II patients were prescribed inhaled corticosteroids (ICS) indicating over-treatment.<sup>15</sup>

- Vaccination; influenza vaccination was reported in 66% of Swiss COPD patients.<sup>15</sup>
- Under-use of pulmonary rehabilitation.
- Self-management education.

Referral for pulmonary rehabilitation was very uncommon in patients with mild COPD (5%), and only slightly higher (9%) in patients with moderate and severe COPD (19%).<sup>15</sup> Referral for pulmonary rehabilitation showed the greatest potential for improvement compared with data reported from other countries.<sup>15,18</sup> We could not find reliable data on the implementation of COPD self-management programmes in Switzerland.

In the interviews, correct diagnosis, counselling for smoking cessation, patient self-management inclusive of exacerbation management, as well as a higher awareness of ambulatory pulmonary rehabilitation programmes in doctors and patients were emphasised as important areas where effort and support for closing the evidence-performance gaps is most needed to improve the quality of COPD care.

## Discussion

Our comparison between recommended and current care for patients with COPD in Swiss primary care reveals discrepancies between best practice and the treatment patients receive in daily practice. According to the published data, only about half of COPD patients are diagnosed correctly with spirometry or receive smoking cessation counselling. Over-treatment with ICS in patients with mild and moderate COPD, and under-use of proven and recommended non-pharmacological interventions, in particular patient education for better self-management and referral to pulmonary rehabilitation, were identified. The smallest gap was seen for influenza immunisation.

Underdiagnosis of COPD is a problem also frequently reported from other countries.<sup>19</sup> Known reasons for the under-use of spirometry in primary care are insufficient skills and knowledge, time and resource constraints, as well as inadequate reimbursement.<sup>14,20</sup> To raise awareness of the importance and use of spirometry in primary care and to boost the rate of detection of COPD, several options have been discussed.<sup>21</sup> For example, data from Denmark, Australia and Spain showed that training programmes for GPs and practice assistants, discussion of the results with specialists, and spirometry workshops or new spirometry delivery models with specially trained health professionals, improve the diagnosis rate and the quality of spirometry testing.<sup>22–25</sup> Soler *et al*<sup>25</sup> showed

**Table 1** COPD care based on the Chronic Care Model (CCM): the six CCM elements and recommendations for implementation activities

Community resources	Health system organisation of care	Self-management support	Delivery system design	Decision support	Clinical information systems
Identify key partners to start collaboration process	Obtain executive management support for the model	Develop and implement:	In collaboration with key partners develop and implement:	In collaboration with key partners develop, implement and integrate:	In collaboration with key partners develop and implement electronic system
Form COPD work groups with key partners	Embed in strategic plans of health policy	COPD evidence-based self-management programme that includes behavioural change, and proactive follow-up	COPD-registry and proactive care plan	local evidence-based guidelines for health professionals with timely reminders, feedback	for access to key data on COPD registry
Develop a COPD community resource list	Identify key political leaders	Adequate human and system resources to implement COPD self-management programme	Electronic tracking and data assessment form	Share evidence-based guidelines and information with patients to encourage their participation	to share information between providers and patients
Develop strategies to use existing COPD education and coaching	Develop methods to measure success of interventions	Incentives that rewards members for COPD programme participation	Trained and prepared care teams and case management to assure continuity and regular follow-up	Provider education with proven methods	to plan, track and coordinate care
Develop resources for group education	Definition of relevant outcomes	Tools for members to document goals and track progress	Integrated services and active care coordination between primary, secondary and tertiary care	Ongoing training of providers and patients	for timely reminders of providers and patients
Increase awareness for COPD in population	Evidence-based tools and action plan to assist practitioners in implementing and counselling			Specialist expertise	to facilitate performance monitoring of practice team and care system

that training GPs in spirometry can improve the rate of correct diagnosis from 56 to 89%.

Smoking cessation is the single most effective intervention to reduce the risk of developing COPD and the only intervention that has been shown to slow the rate of decline in lung function.<sup>26</sup> It improves symptoms and survival in COPD patients.<sup>27</sup> Minimal interventions lasting 3–5 minutes are effective and should systematically be offered to every smoker.<sup>28</sup> For smokers motivated to quit, a more intensive counselling with pharmacotherapy should be offered whenever possible and has been shown to result in higher quit rates.<sup>29</sup> The reported smoking cessation counselling rate of <50% in Swiss primary care is very low. Studies and experience from other countries demonstrate that reimbursement of nicotine replacement therapy (NRT), incentives for the GPs or counselling by trained nurses or practice assistants improve implementation and cessation rates.<sup>30–32</sup>

Influenza vaccination prevents acute exacerbations of COPD, which are the most frequent complications seen in patients.<sup>33</sup> Individuals with COPD and influenza are at significant risk of requiring hospitalisation. Annual influenza vaccination reduces mortality by as much as 50% in elderly patients, and reduces the incidence of hospitalisation by about 40% in all patients.<sup>34</sup> Patient reminder systems have been shown to improve influenza vaccination rates in different countries<sup>35</sup> and could be applied in Swiss primary care as well.

Over-treatment with ICS in mild-to-moderate COPD is frequent in Switzerland, similar to other countries.<sup>18,23</sup> Contrary to asthma, ICS and combination treatment with ICS and long-acting beta-agonists (LABA), are not first line therapy in COPD patients. Benefits from ICS (fewer symptoms, fewer exacerbations and less healthcare use) have been shown for advanced COPD (FEV1 <50% predicted) and for patients with frequent exacerbations.<sup>36</sup> The increased risks of bone density loss, muscle dystrophy and pneumonia in patients with long-term inhaled corticosteroid therapy outweigh the benefits in patients with mild COPD.

Underuse of non-pharmacological interventions is also a problem. Pulmonary rehabilitation and self-management support are highly recommended as an integral part of COPD management. They have been shown to reduce exacerbation rates and health resource utilisation and to improve quality of life.<sup>37–39</sup>

Whereas rehabilitation and education is offered to the majority of patients with heart disease, it is widely underused in the management of COPD. Awareness of rehabilitation and self-management education as ways to lessen the impact of the disease on both patients and the healthcare system by preventing exacerbations, and unnecessary hospital admissions resulting from exacerbations, seems to be much lower in COPD

than in patients with heart disease. In a recent editorial, Mark Fitzgerald stated that ‘the term lung attack like heart attack may resonate more with patients, communities and providers than exacerbations and could optimise current management strategies with emphasis on rehabilitation and self-management education, integrating a written action plan for exacerbation management’.<sup>40</sup>

## What will it take to do better?

Many of our findings reflect the current approach to primary care in Switzerland with a lack of planned care, insufficient care coordination and patients who are inadequately trained in managing their chronic illness.

With respect to the identified gaps in COPD, primary care practices could elaborate CCM-based relevant actions (Table 1) addressing delivery of care by trained and prepared proactive teams who offer spirometric diagnosis of good quality, guideline-based treatment and self-management support.<sup>12,37,39,41</sup> However, such quality improvement strategies require a policy environment supportive of incentives for care coordination, self-management support and adoption of information technology.<sup>42,43</sup>

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## REFERENCES

- 1 Chapman KR, Mannino DM, Soriano JB *et al*. Epidemiology and costs of chronic obstructive pulmonary disease. *European Respiratory Journal* 2006;27(1):188–207.
- 2 Bridevaux PO, Probst-Hensch NM, Schindler C *et al*. Prevalence of airflow obstruction in smokers and never-smokers in Switzerland. *European Respiratory Journal* 2010;36(6):1259–69.

- 3 Buist AS, McBurnie MA, Vollmer WM *et al.* International variation in the prevalence of COPD (the BOLD study): a population-based prevalence study. *Lancet* 2007 Sep 1;370(9589):741–50.
- 4 Sharma G, Kuo YF, Freeman JL, Zhang DD, Goodwin JS. Outpatient follow-up visit and 30-day emergency department visit and readmission in patients hospitalized for chronic obstructive pulmonary disease. *Archives of Internal Medicine* 2010 Oct 11;170(18):1664–70.
- 5 National Clinical Guideline Centre. *Chronic Obstructive Pulmonary Disease: management of chronic obstructive pulmonary disease in adults in primary and secondary care*. National Clinical Guideline Centre (UK): London, 2010.
- 6 McKenzie D, Abramson M, Crockett A *et al.* *The COPD\_X Plan: Australian and New Zealand guidelines for the management of chronic obstructive pulmonary disease*. The Australian Lung Foundation: Bowen Hills, Qld, 2010.
- 7 O'Donnell DE, Aaron S, Bourbeau J *et al.* Canadian Thoracic Society recommendations for the management of chronic obstructive pulmonary disease – 2007 update. *Canadian Respiratory Journal* 2007;14 (Suppl B):5–32.
- 8 Vestbo J, Agusti A, Anzueto A *et al.* Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (updated 2010). Global Initiative for Chronic Obstructive Lung Disease, 2010. [www.goldcopd.org](http://www.goldcopd.org)
- 9 Vogelmeier C, Buhl R, Criege CP *et al.* [Guidelines for the diagnosis and therapy of COPD issued by Deutsche Atemwegsliga and Deutsche Gesellschaft für Pneumologie und Beatmungsmedizin]. *Pneumologie* 2007;61(5):e1–40.
- 10 Russi EW, Leuenberger P, Brandli O *et al.* Management of chronic obstructive pulmonary disease: the Swiss guidelines. Official guidelines of the Swiss Respiratory Society. *Swiss Medical Weekly* 2002 Feb 9;132(5–6):67–78.
- 11 Wagner EH. Chronic disease management: what will it take to improve care for chronic illness? *Effective Clinical Practice* 1998;1(1):2–4.
- 12 Adams SG, Smith PK, Allan PF, Anzueto A, Pugh JA, Cornell JE. Systematic review of the chronic care model in chronic obstructive pulmonary disease prevention and management. *Archives of Internal Medicine* 2007 Mar 26;167(6):551–61.
- 13 Lawrence RS, Mickalide AD, Kamerow DB, Woolf SH. Report of the US Preventive Services Task Force. *Journal of the American Medical Association* 1990 Jan 19;263(3):436–7.
- 14 Rutschmann OT, Janssens JP, Vermeulen B, Sarasin FP. Knowledge of guidelines for the management of COPD: a survey of primary care physicians. *Respiratory Medicine* 2004 Oct;98(10):932–7.
- 15 Jochmann A, Neubauer F, Miedinger D, Schafroth S, Tamm M, Leuppi JD. General practitioner's adherence to the COPD GOLD guidelines: baseline data of the Swiss COPD Cohort Study. *Swiss Medical Weekly* 2010 Apr 21.
- 16 Leuppi JD, Miedinger D, Chhajed PN *et al.* Quality of spirometry in primary care for case finding of airway obstruction in smokers. *Respiration* 2010;79(6):469–74.
- 17 Krebs H. Raucherberatung in der ärztlichen und zahnmedizinischen Praxis aus Sicht der Rauchenden und ehemals Rauchenden. Befragung, 2010.
- 18 Bourbeau J, Sebaldt RJ, Day A *et al.* Practice patterns in the management of chronic obstructive pulmonary disease in primary practice: the CAGE study. *Canadian Respiratory Journal* 2008 Jan–Feb;15(1):13–19.
- 19 Bednarek M, Maciejewski J, Wozniak M, Kuca P, Zielinski J. Prevalence, severity and underdiagnosis of COPD in the primary care setting. *Thorax* 2008 May;63(5):402–7.
- 20 Salinas GD, Williamson JC, Kalhan R *et al.* Barriers to adherence to chronic obstructive pulmonary disease guidelines by primary care physicians. *International Journal of Chronic Obstructive Pulmonary Disease* 2011;6:171–9.
- 21 Price D, Crockett A, Arne M *et al.* Spirometry in primary care case-identification, diagnosis and management of COPD. *Primary Care Respiratory Journal* 2009 Sep;18(3):216–23.
- 22 Lange P, Rasmussen FV, Borgeskov H *et al.* The quality of COPD care in general practice in Denmark: the KVASIMODO study. *Primary Care Respiratory Journal* 2007 Jun;16(3):174–81.
- 23 Ulrik CS, Hansen EF, Jensen MS *et al.* Management of COPD in general practice in Denmark – participating in an educational program substantially improves adherence to guidelines. *International Journal of Chronic Obstructive Pulmonary Disease* 2010;5:73–9.
- 24 Walters JA, Hansen EC, Johns DP, Blizzard EL, Walters EH, Wood-Baker R. A mixed methods study to compare models of spirometry delivery in primary care for patients at risk of COPD. *Thorax* 2008 May;63(5):408–14.
- 25 Soler N, Ballester E, Martin A, Gobartt E, Miravittles M, Torres A. Changes in management of chronic obstructive pulmonary disease (COPD) in primary care: EMMEPOC study. *Respiratory Medicine* 2010 Jan;104(1):67–75.
- 26 Anthonisen NR, Connett JE, Kiley JP *et al.* Effects of smoking intervention and the use of an inhaled anticholinergic bronchodilator on the rate of decline of FEV1. The Lung Health Study. *Journal of the American Medical Association* 1994 Nov 16;272(19):1497–505.
- 27 Wu J, Sin DD. Improved patient outcome with smoking cessation: when is it too late? *International Journal of Chronic Obstructive Pulmonary Disease* 2011;6:259–67.
- 28 Stead LF, Bergson G, Lancaster T. Physician advice for smoking cessation (Cochrane Review). *The Cochrane Library, Issue 2, 2008*. CD000165. Update Software: Oxford.
- 29 Fiore MC. US public health service clinical practice guideline: treating tobacco use and dependence. *Respiratory Care* 2000 Oct;45(10):1200–62.
- 30 Salize HJ, Merkel S, Reinhard I, Twardella D, Mann K, Brenner H. Cost-effective primary care-based strategies to improve smoking cessation: more value for money. *Archives of Internal Medicine* 2009 Feb 9;169(3):235–6.
- 31 Toljamo T, Kaukonen M, Nieminen P, Kinnula VL. Early detection of COPD combined with individualized counselling for smoking cessation: a two-year prospective study. *Scandinavian Journal of Primary Health Care* 2010 Mar;28(1):41–6.

- 32 Hernandez C. Institut d'Estudis de la Salut, Departament de Salut, Barcelona, 2011 (personal communication).
- 33 Nichol KL, Baken L, Nelson A. Relation between influenza vaccination and outpatient visits, hospitalization, and mortality in elderly persons with chronic lung disease. *Annals of Internal Medicine* 1999 Mar 2; 130(5):397–403.
- 34 Poole PJ, Chacko E, Wood-Baker RW, Cates CJ. Influenza vaccine for patients with chronic obstructive pulmonary disease (Cochrane Review). *The Cochrane Library, Issue 1*, 2006. CD002733. Update Software: Oxford.
- 35 Szilagyi PG, Bordley C, Vann JC *et al*. Effect of patient reminder/recall interventions on immunization rates: a review. *Journal of the American Medical Association* 2000 Oct 11;284(14):1820–7.
- 36 Alsaedi A, Sin DD, McAlister FA. The effects of inhaled corticosteroids in chronic obstructive pulmonary disease: a systematic review of randomized placebo-controlled trials. *American Journal of Medicine* 2002 Jul; 113(1):59–65.
- 37 Bourbeau J, van der Palen J. Promoting effective self-management programmes to improve COPD. *European Respiratory Journal* 2009 Mar;33(3):461–3.
- 38 Bourbeau J. Making pulmonary rehabilitation a success in COPD. *Swiss Medical Weekly* 2010;140:w13067.
- 39 Bourbeau J, Julien M, Maltais F *et al*. Reduction of hospital utilization in patients with chronic obstructive pulmonary disease: a disease-specific self-management intervention. *Archives of Internal Medicine*. 2003 Mar 10;163(5):585–91.
- 40 FitzGerald JM. Targeting lung attacks. *Thorax* 2011 May;66(5):365–6.
- 41 Bodenheimer T, Lorig K, Holman H, Grumbach K. Patient self-management of chronic disease in primary care. *Journal of the American Medical Association* 2002 Nov 20;288(19):2469–75.
- 42 Leatherman S, Berwick D, Iles D *et al*. The business case for quality: case studies and an analysis. *Health Affairs (Millwood)* 2003 Mar–Apr;22(2):17–30.
- 43 Rittenhouse DR, Shortell SM. The patient-centered medical home: will it stand the test of health reform?

*Journal of the American Medical Association* 2009 May 20;301(19):2038–40.

#### AUTHORS' CONTRIBUTION

TR and CSS were the initiators and devised the conceptual framework of the paper. CSS and KDL drafted the report on which the paper is based. All authors contributed in writing and revising the manuscript. All authors read and approved the final manuscript.

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None.

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## Appendix 1 Search terms used for MEDLINE search

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### Search terms

COPD  
Emphysema  
Chronic bronchitis  
Chronic airflow obstruction  
Obstructive lung disease  
Management  
Guideline  
Recommendation  
Quality improvement  
Primary care  
Implementation  
Adherence  
Best practice  
Quality of care  
General practitioner  
GP  
Spirometry  
living well with COPD  
Smoking cessation  
Counselling  
Pulmonary rehabilitation  
Self-management  
Education