

Integrated respiratory care: what forms may it take and what are the benefits to patients?

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Provenance

Commissioned article,
peer reviewed.

Competing interests

None declared.

Educational aims

- › To outline the rationale behind and key components of integrated respiratory care.
- › To give an overview of different models of delivery of integrated respiratory care.
- › To explore the benefits to patients with chronic respiratory disease.

Summary

Providing for the long-term needs of patients with chronic respiratory diseases, such as chronic obstructive pulmonary disease (COPD), sets new challenges for healthcare organisations in terms of structure and funding. Integrated respiratory care is a holistic patient-centred approach to long-term conditions encompassing: disease prevention and promotion of lung health; early diagnosis; monitoring and education; coordination of hospital and community care; and implementation of evidence-based guidelines. Models of integrated respiratory care may vary depending on local resources and needs. Key aspects include nurse-led care nearer to or in the patients' home, self-management support, flexible healthcare design that suits patient needs, effective information sharing, and access to specialist care. These interventions have the potential to improve self-care and understanding of disease, reduce the need for scheduled and unscheduled consultations and length of stay, and enhance patients' health-related quality of life.

HERMES syllabus link: modules
E.1.12, I.8, I.9

Table 1 Common chronic respiratory diseases

Asthma
Bronchiectasis
COPD
Hypersensitivity pneumonitis
Interstitial lung disease
Pneumoconiosis
Post-tuberculous lung disease
Pulmonary circulatory disease: pulmonary embolism, pulmonary hypertension, cor pulmonale
Pulmonary eosinophilia
Rhinitis
Sarcoidosis
Sleep apnoea syndrome

▶ An epidemic of chronic disease now accounts for the majority of global morbidity and premature mortality in the Western world. In 2005, chronic diseases accounted for 35 million deaths out of a total of 58 million deaths from all causes. This is twice the number of deaths from all infectious diseases, maternal and perinatal conditions and nutritional deficiencies combined [1].

Respiratory diseases account for a significant part of this global chronic disease health burden (table 1). The World Health Organization estimated that 4.6 million people died prematurely because of chronic respiratory disease in 2005 [2]. Despite the fact that many of these diseases are preventable, their global prevalence is increasing in both the developed and developing world, particularly in children and the elderly.

Managing the needs of a population with increasing longevity, who live for many years with several comorbid long-term conditions, one or more of which may ultimately cause their death, sets new challenges for structuring and funding

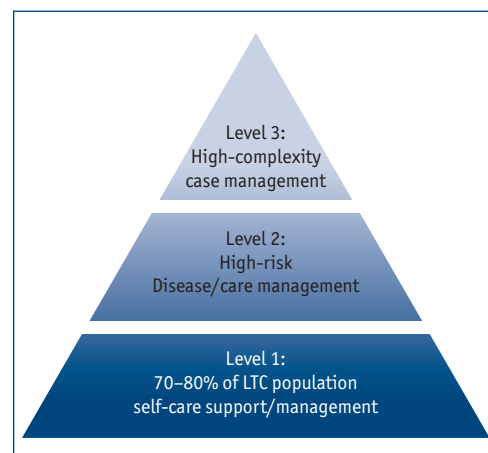


Figure 1
The chronic disease triangle. LTC: long-term conditions. Modified from [4].

healthcare. Since the 1990s, significant advances have been made in the design of new models of care for chronic illnesses. One of the best known is the chronic care model, proposed by WAGNER *et al.* [3]. This model centres on:

- the holistic appraisal of the patient,
- the promotion of self-management,
- healthcare design that is responsive to patient need,
- efficient information sharing.

The triangle shown in figure 1 represents the whole population broken into groups ranging from those without chronic disease but with risk factors at the base, to the small number of individuals at the top who have highly complex conditions and who use health services intensively. Integrated care seeks to address the need to evolve from the current disease-oriented approach to a more patient-focused perspective of healthcare delivery. In caring for long-term conditions, prevention, timely diagnosis, and treatment need to sit within a larger framework of enhanced communication, patient/carer education and support, partnerships of care, specialist review, convenient follow-up, and palliative care, as appropriate.

Integrated respiratory care

Integrated respiratory care refers to the holistic, coordinated, patient focused and multidisciplinary delivery of high-quality care (both pharmacological and non-pharmacological) at all stages during the natural history of disease. It encompasses disease prevention and promotion of lung health, enhanced case finding, monitoring and education, coordination of hospital and community care, and its standardisation using evidence-based guidelines.

In recent years, a number of innovative shifts in the organisation of healthcare have particularly focused on the needs of patients with COPD. COPD is a progressive systemic disease which results in loss of function and debility over time. With deteriorating lung function come increasingly frequent acute exacerbations, high-cost polypharmacy, increased need for scheduled and unscheduled care, and an increased risk of death [5]. Exacerbations are repeated events [6] that are feared by patients [7], and are associated with high levels of anxiety and depression [8] and a steep decline in quality of life [9]. The economic burden of COPD is vast; in 2002, direct costs for COPD were US\$18 billion and €38.6 billion in

the USA and European Union, respectively. Of these, about 60% related to exacerbations [10]. The costs associated with COPD rise dramatically with worsening disease severity. As a background to this, COPD is also significantly underdiagnosed and undertreated for a variety of reasons [11, 12].

Many agree that inadequate coordination and a lack of cohesion between primary care and specialist care may be one of the reasons for the poor outcomes seen in patients with long-term conditions such as COPD [13]. Implementing integrated respiratory care often requires a rethinking of traditional organisational boundaries. Its aims are to improve processes and outcomes of care whilst making the most efficient use possible of scant healthcare resources [14, 15].

In a systematic review, ADAMS *et al.* [16] evaluated the impact of applying the chronic care model to the management of COPD. They concluded that care models that resulted in reduced numbers of emergency department visits, hospital admissions and length of stay, were those that included at least two elements of the model, namely:

- advanced access to knowledgeable healthcare providers,
- selfmanagement education and support including individualised action plans,
- guideline-based therapy,
- a clinical registry system.

In a recent review, STEUTEN *et al.* [17] suggested that three or more of these elements were necessary to demonstrate reduced hospitalisation. This analysis also reviewed evidence of the cost-effectiveness of these studies and stated that more well-designed health-economic studies were needed.

Integrated respiratory care, as applied to chronic respiratory diseases such as COPD, has a number of different facets, and takes many forms. These include:

- an enhanced role for specialist respiratory nurses, physiotherapists and ancillary healthcare workers,
- case management,
- disease-specific self management,
- implementation of clinical practice guidelines and decision-making tools,
- hospital-at-home schemes and admission avoidance schemes,
- community-based pulmonary rehabilitation,
- application of health technologies for remote disease monitoring and proactive management in the community,
- respiratory consultants working in the community.

Common themes in the delivery of integrated care include the role of the specialist nurse and intervention in the patient's home. A number of studies have examined nurse-led outreach and patient support for stable patients with COPD; however, a systematic review of these in 2005 failed to show a consistent effect on rates of hospitalisation [18]. This is probably because these studies lacked strategies specifically targeting exacerbations. A more recent randomised controlled study from the Netherlands has suggested that transfer of care for outpatients with stable COPD from respiratory physicians to respiratory nurses working under protocol was safe, with higher rates of overall satisfaction and equivalent outcomes in terms of disease progression and unscheduled healthcare [19].

Selfmanagement support facilitates patient recognition of an exacerbation and prompts use of antibiotics and steroids as appropriate [20]. In a number of studies, this has translated into reduced hospital admissions, length of stay, emergency room visits and primary-care consultations [21, 22]. To date, systematic reviews have concluded, "it is likely that selfmanagement education [in COPD] is associated with a reduction in hospital admissions" [23], but that larger randomised controlled trials with long-term follow-up are still required for a definitive assessment of its impact [24]. An intensive, disease-specific selfmanagement programme in Canada combined this and other interventions to good effect [25]. BOURBEAU *et al.* [25] offered patient education, support and an individualised pulmonary rehabilitation programme to patients who had a prior admission for a COPD exacerbation. This was implemented through a weekly home visit by a health professional over 2 months and resulted in a 39% reduction in admissions and a 41% reduction in emergency department visits in the intervention group. These benefits persisted in the medium term [26], and appeared to be cost-effective [27].

Enhanced access to specialist healthcare is clearly very important regarding acute exacerbations. Hospital-at-home schemes provide a safe alternative to admission for patients with COPD, and can take the form of either supported discharge after hospital admission or admission avoidance [28]. The concept of a day hospital as a safe and useful alternative to an emergency department and in-patient care for patients with chronic respiratory disease has also been explored [29]. These schemes are now widely used in the management of COPD exacerbations, although their availability and hours of operation are still

variable. They are safe [30], cost-effective [31, 32], save hospital bed days [33] and are preferred by patients [34]. As a result, they are an important feature of integrated care pathways for patients with chronic respiratory disease.

Models of integrated respiratory care

A number of recent studies have examined the implementation of coordinated chronic disease management strategies in patients with chronic respiratory disease, and demonstrated positive clinical outcomes.

In a metropolitan, community-based geographical control study in Australia, SMITH *et al.* [35] examined the effects of a programme of coordinated shared care between hospital based specialists, general practitioners and other community-based healthcare workers for patients with COPD, asthma and other chronic respiratory diseases. Nurses provided liaison between patients and the healthcare system with general practitioners co-ordinating care. Multidisciplinary action plans incorporating national evidence-based management guidelines were provided for use in primary care. Patients reported improvements in a number of quality of life measures, although there was no impact on healthcare utilisation.

Similar outcomes occurred in another randomised control study of patients with severe COPD or chronic heart failure, who received intensive home-based, nurse-led case-management focusing on disease and symptom control, self-care, illness related resources, and preparation for end of life [36]. Those in the intervention arm were more likely to self-manage when unwell, were more aware of resources available to support them, and made better legal preparation for the end of life. They reported lower symptom distress and better health-related quality of life than controls, although emergency department attendances were equivalent. However, only patients perceived (correctly or not) to be in the last 2 yrs of life took part in this study. How applicable these findings are to the wider range of patients with chronic respiratory disease is open to question.

In Maastricht (the Netherlands), a disease-management programme used primary-care databases to identify everyone currently diagnosed or likely to be diagnosed in the future with asthma or COPD, and followed them for 12 months. A specialist respiratory nurse reviewed 975 patients in primary care and performed spirometry. The diagnosis of asthma or COPD was confirmed or

reconsidered after joint discussion with a respiratory consultant and general practitioner. Patients were then classified by disease severity and required frequency of review, according to evidence-based management guidelines, and were allocated for follow-up to a member of the team: mild asthma/COPD to the general practitioner; moderate asthma/COPD to nurse-led review in the community; and severe asthma/COPD to the secondary-care clinician. The nurse and general practitioner regularly discussed patients seen in primary care and the nurse reported to the medical specialist once a week [37]. In this study, quality of care as assessed by self-management support, accessibility and co-ordination of care improved, as did patient satisfaction. Follow-up consultations and medication costs increased due to better adherence to guidelines. Non-routine consultations and hospitalisations fell, and total healthcare costs reduced in patients with asthma but not COPD. However, this study was not a randomised controlled trial, the duration of follow-up was short, and it was not powered to show health economic outcomes. It is not clear whether this would be a sustainable model in the long term, or in larger numbers of patients, particularly as it did not necessarily build respiratory competence and capacity in primary care.

Technological support, both for the collection and sharing of information, is an important feature of the chronic care model. CASAS *et al.* [38] randomised 155 patients after hospital admission for a COPD exacerbation to integrated or usual care and followed them for 12 months. The integrated care intervention consisted of: a comprehensive assessment; self-management support; an individual care plan; and enhanced accessibility to healthcare professionals through a web-based call centre and video conferencing. The intervention group had fewer hospital admissions and readmissions compared with usual care. In a similar, but smaller, US study of 40 patients with severe COPD, KOFF *et al.* [39] added a remote monitoring system to integrated care and found significant benefits in terms of health-related quality of life. The authors suggested this might have been due to increased recognition and early treatment of exacerbations; however, the patient numbers were too small and the follow-up period too short to assess this.

Hospital-at-home schemes and pulmonary rehabilitation have both been included in studies of the impact of integrated respiratory care on health outcomes. LAWLOR *et al.* [40] found reduced numbers of readmissions in a retrospective review of 246 COPD patients admitted with exacerbations

and enrolled on to the early supported discharge programme of a metropolitan teaching hospital in Ireland. On discharge, patients had follow-up visits at home from a respiratory nurse or physiotherapist and received selfmanagement support, including written plans, telephone support, individual home pulmonary rehabilitation and rapid access to respiratory outpatient clinics as necessary. However, these 246 patients represented only 20% of all COPD admissions, as the remainder did not fulfil criteria for early supported discharge. Both this study and the Canadian study described previously [25], are likely to have preferentially selected patients with frequent exacerbations and, therefore, the relevance of their findings to the wider population of COPD patients, or those with infrequent exacerbations, is unclear.

In a randomised controlled study in West London (UK), 122 patients with moderate-to-severe COPD admitted to hospital with an acute exacerbation received a nurse-led care package incorporating initial pulmonary rehabilitation and selfmanagement education, a written COPD action plan, monthly telephone calls and three monthly home visits over 24 months of follow-up [41]. Patients in the intervention arm were more likely to start treatment with antibiotics or steroids during exacerbations and required fewer unscheduled primary-care consultations than those receiving usual care. There were also significantly fewer COPD related deaths in the intervention group, although rates of hospitalisation were equivalent. This is the first study to date that has demonstrated a mortality benefit resulting from an integrated care intervention in COPD. As with other studies, it is unclear which intervention(s) were the most important, although it is likely that prompt use of selfmanagement medication mitigated the severity of exacerbations and accounted for the fewer COPD related deaths in the intervention group. A recent Spanish study of 113 COPD patients supports this hypothesis [42]. COPD patients were randomised post-exacerbation to usual or integrated care, which consisted of an individually tailored care plan and access to a specialised case manager nurse through a web-based call centre. Patients receiving integrated care showed improved disease knowledge and treatment adherence after 1 yr of intervention, and the authors suggested that these factors might play a role in the prevention of severe COPD exacerbations triggering hospital admissions.

Substitution of the location of integrated care can also include secondary-care clinicians moving into the community to work as consultants in

Table 2 Potential roles of a consultant in integrated respiratory care

Medical input into hospital-at-home schemes
Medical input into community oxygen assessment services
Medical support for community pulmonary rehabilitation programmes
Medical support for domiciliary ventilation services
Clinical liaison with palliative medicine services
Delivery and evaluation of "outreach" and "virtual" clinics for assessment of patients with complex breathlessness/chronic respiratory disease in the community
Support for high-quality competent spirometry in primary care
Provision of a learning resource for primary-care physicians and community nurses
Act as a local champion for lung health and disease prevention

integrated respiratory care. Hospital consultants in a number of specialties have reviewed patients in primary care "outreach" clinics for many years. Although patients appreciate these for their convenience, surveys have found that they are generally expensive in terms of specialist time and costs [43]. A study by GRUEN *et al.* [44] showed that simply exchanging the hospital outpatients department for a community venue improved access, but had no effect on health outcomes. However, programmes that include collaboration with primary care or educational interventions facilitated implementation of guidelines and improved health outcomes [44]. "Virtual clinics", where case histories and test results are reviewed in collaboration by the specialist and primary-care team without the patient being present, are another model that might improve the processing of information and provide an educational resource. Consultants in integrated care have the potential to support processes of care for patients by filtering or triaging referrals to hospital, and facilitating coordination with other strands of an integrated respiratory service. Table 2 outlines some of the roles that an integrated care consultant might fulfil.

Conclusion

There is a growing body of evidence showing the potential for community-based integrated care interventions to enhance clinical outcomes for patients with chronic respiratory disease, including disease knowledge and selfmanagement, rates of scheduled and emergency consultations, hospital admissions and health-related quality of life. However, many studies reported to date have had limited scope, focusing on individual interventions or aspects of disease rather than encompassing prevention, as well as care of stable and exacerbating patients. One of the reasons for the disparate results seen in these studies is that there is likely to be synergism between different

interventions when applied to multiple cases. The combination of interventions that define the optimal model of integrated respiratory care and yield the best and most cost-effective outcomes is not clear, and may alter depending on local prevalence, resources and need [45].

A common problem in pilot studies to date is that many patients were excluded from taking part, generally due to severe comorbidity, complex disease or lack of appropriate social care resources. Similarly, patients with mild disease or infrequent exacerbations were poorly represented. Comorbidity impacts significantly on mortality and it is logical that integrated care

programmes for patients with chronic respiratory ill health should dovetail with services for other chronic conditions which cluster with it and share common risk factors, such as cardiovascular disease. There is also a need for bridging integrated healthcare with community services that provide social support. The current focus on advanced chronic respiratory conditions also needs to include preventive strategies focusing on lung health for those at risk of ill health in the future, as well as patients with mild/early disease. Fundamental shifts in the international organisation of healthcare are already taking place in order to meet these challenges [46].

References

- Strong K, Mathers C, Leeder S, *et al.* Preventing chronic diseases: how many lives can we save? *Lancet* 2005; 366: 1578–1582.
- Bousquet J, Dahl R, Khaltaev N. Global alliance against chronic respiratory diseases. *Eur Respir J* 2007; 29: 233–239.
- Wagner EH, Austin BT, Davis C, *et al.* Improving chronic illness care; translating evidence into action. *Health Affairs* 2001; 20: 64–78.
- Singh D, Ham C. Improving care for people with long term conditions: a review of UK and International Frameworks. Birmingham, University of Birmingham & NHS Institute for Innovation and Improvement, Health Services Management Centre, 2006. Available from: www.improvingchroniccare.org/downloads/review_of_international_frameworks_chris_hamm.pdf
- McGhan R, Radcliff T, Fish R, *et al.* Predictors of rehospitalisation and death after a severe exacerbation of COPD. *Chest* 2007; 132: 1748–1755.
- Garcia-Aymerich J, Farrero E, Felez MA, *et al.* Risk factors of readmission to hospital for a COPD exacerbation: a prospective study. *Thorax* 2003; 58: 100–105.
- Haughney J, Gruffydd-Jones K. Patient-centred outcomes in primary care management of COPD – what do recent trials tell us? *Prim Care Respir J* 2004; 13: 185–197.
- van Manen JG, Bindels PJ, Dekker FW *et al.* Risk of depression in patients with COPD and its determinants. *Thorax* 2002; 57: 412–416.
- Seemungal TAR, Donaldson GC, Paul EA, *et al.* Effect of exacerbation on quality of life in patients with chronic obstructive pulmonary disease. *Am J Respir Crit Care Med* 1998; 157: 1418–1422.
- Chapman KR, Mannino DM, Soriano JB, *et al.* Epidemiology and costs of COPD. *Eur Respir J* 2006; 27: 188–207.
- Takahashi T, Ichinose M, Inoue H, *et al.* Under diagnosis and undertreatment of COPD in primary care settings. *Respirology*. 2003; 8: 504–508.
- Pena VS, Miravittles M, Gabriel R, *et al.* Geographic variations in prevalence and underdiagnosis of COPD: results of the IBERPOC multicentre epidemiological study. *Chest* 2000; 118: 981–989.
- Bodenheimer T. Coordinating care – a perilous journey through the healthcare system. *N Engl J Med* 2008; 358: 1064–1071.
- Morgan M. Integrated respiratory care: what exactly do we mean? *Chron Resp Dis* 2008; 5: 131–132.
- Seemungal TAR, Wedzicha JA. Integrated care: a new model for COPD management? *Eur Respir J* 2006; 28: 4–6.
- Adams SG, Smith PK, Allan PF, *et al.* Systematic review of the chronic care model in COPD prevention and management. *Arch Intern Med* 2007; 167: 551–561.
- Steuten LMG, Lemmens KMM, Nieboer AP, *et al.* Identifying potentially cost effective chronic care programs for people with COPD. *Int J COPD* 2009; 4: 87–100.
- Taylor SJ, Candy B, Bryar RM *et al.* Effectiveness of nursing and nurse led chronic disease management innovations for patients with COPD: a systematic review of the evidence. *BMJ* 2005; 331: 485.
- Vrijhoef HJM, Van Den Bergh JHAM, Diederiks JPM, *et al.* Transfer of care for outpatients with stable COPD from respiratory care physician to respiratory nurse – a randomised controlled study. *Chronic Illness* 2007; 3: 130–144.
- Watson PB, Town GI, Holbrook N, Dwan C, Toop LJ, Drennan CJ. Evaluation of a self management plan for COPD. *Eur Respir J* 1997; 10:1267–1271.
- Gallefoss F, Bakke PS. Impact of patient education and self management on morbidity in asthmatics and patients with COPD. *Respir Med* 2000; 94: 279–287.
- Rea H, McAuley S, Stewart A, *et al.* A chronic disease management programme can reduce days in hospital for patients with chronic obstructive pulmonary disease. *Intern Med J* 2004; 34: 608–614.
- Effing T, Monnikhof EM, van der Valk PD, *et al.* Self-management education for patients with COPD. *Cochrane Database Syst Rev* 2007; 4: CD00290.
- Blackstock F, Webster K. Disease specific health education for COPD: a systematic review of changes in health outcomes. *Health Educ Res* 2007; 22: 703–717.
- Bourbeau J, Julien M, Maltais F, *et al.* Reduction of hospital utilization in patients with COPD: a disease specific self-management intervention. *Arch Int Med* 2003; 163: 585–591.
- Gadoury MA, Schwartzman K, Rouleau M, *et al.* Self management reduces both short and long term hospitalisation in COPD. *Eur Respir J* 2005; 26: 853–857.
- Bourbeau J, Collet JP, Schwartzman K, *et al.* Economic benefits of self management education in COPD. *Chest* 2006; 130: 1704–1711.
- Ram FS, Wedzicha JA, Wright *et al.* Hospital at home for patients with acute exacerbations of COPD: systematic review of the evidence. *BMJ* 2004; 329: 315.

29. Schwartzman K, Duquette G, Zaoude M, *et al.* Respiratory day hospital: a novel approach to acute respiratory care. *CMAJ* 2001; 165: 1067–1071.
30. Sala E, Alegre L, Carrera M, *et al.* Supported discharge shortens hospital stay in patients hospitalized because of an exacerbation of COPD. *Eur Respir J* 2001; 17: 113–1142.
31. Hernandez C, Casas A, Escarabill J, *et al.* Home hospitalisation of exacerbated COPD patients. *Eur Respir J* 2003; 21: 58–67.
32. Skwarska E, Cohen G, Skwarski KM, *et al.* Randomized controlled trail of supported discharge in patients with exacerbations of COPD. *Thorax* 2000; 55: 907–912.
33. Cotton MM, Bucknall CE, Dagg KD, *et al.* Early discharge for patients with exacerbations of COPD: a randomized controlled study. *Thorax* 2000; 55: 902–906.
34. Ojoo JC, Moon T, McGlone S, *et al.* Patient's and carers' preferences in two models of care for acute exacerbations of COPD: results of a randomized controlled trial. *Thorax* 2002; 57: 167–169.
35. Smith BJ, McElroy HJ, Ruffin RE, *et al.* The effectiveness of a coordinated care for people with chronic respiratory disease. *Med J Aust* 2002; 177: 481–485.
36. Aiken LS, Butner J, Lockhart CA, *et al.* Outcome evaluation of a randomized trial of the PhoenixCare Intervention Program of case management and coordinated care for the seriously chronically ill. *J Pall Med* 2006; 9: 111–126.
37. Steuten L, Vrijhoef B, Van Merode F, *et al.* Evaluation of a regional disease management program for patients with asthma or COPD. *Int J Qual Health* 2006; 18: 429–436.
38. Casas A, Troosters T, Garcia-Ayemrich, *et al.* Integrated care prevents hospitalisations for exacerbations in COPD patients. *Eur Respir J* 2006; 28: 123–130.
39. Koff PB, Jones RH, Cashman JM, *et al.* Proactive integrated care improves quality of life in patients with COPD. *Eur Respir J* 2009; 33: 1031–1038.
40. Lawlor M, Kealy S, Agnew M, *et al.* Early discharge care with ongoing follow-up support may reduce hospital re-admissions in COPD. *Int J COPD* 2009; 4: 55–60.
41. Sridhar M, Taylor R, Dawson S, *et al.* A nurse led intermediate care package in patients who have been hospitalised with an acute exacerbation of COPD. *Thorax* 2008; 63: 194–200.
42. Garcia-Aymerich J, Hernandez C, Alonso A, *et al.* effects of an integrated care intervention on risk factors for COPD readmission. *Respir Med* 2007; 101: 1462–1469.
43. Powell J. Systematic review of outreach clinics in primary care in the UK. *J Health Ser Res Pol* 2002; 7: 177–183.
44. Gruen RL, Weeramanthri TS, Knight SE, *et al.* Specialist outreach clinics in primary care and rural hospital settings. *Cochrane Database Syst Rev* 2004; 4: CD003798.
45. Stuart M, Weinrich M. Integrated health system for chronic disease management; lessons learned from France. *Chest* 2004; 125: 695–703.
46. Bolibar I, Plaza V, Llauger M, *et al.* Assessment of a primary and tertiary care integrated management model for COPD. The COPD PROCESS Study Group. *BMC Public Health* 2009; 9: 68.