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ORIGINAL RESEARCH

## The feasibility of a primary care model for the management of COPD

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### Abstract

**Aims:** To investigate the feasibility of a primary care model to improve the management of COPD.

**Methods:** An intervention study on 1497 patients with documented COPD from 22 general practices, involving 11 practice nurses and a COPD Support Service (CSS). Outcome measures included the successful delegation of tasks from general practitioners (GPs) to the CSS and practice nurse, and performance in daily practice according to the model components – keeping a patient register with a recall system, periodical history taking and lung function measurements, asking diagnostic and therapeutic advice, and performing regular follow-up visits with education and counselling.

**Results:** In the 22 general practices, all components of the model were performed systematically, with the exception of 'asking for diagnostic and therapeutic advice' which occurred in 10 practices only. Of the 1497 patients, 374 (25%) were treated by chest physicians. Of the remaining patients 88% were included in the primary care model and 12% refused regular follow-up.

**Conclusion:** This primary care model for COPD management proved to be very feasible; GPs delegated the tasks, almost all patients were included in the control system, and a large majority of patients accepted follow-up according to the model.  
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### Introduction

Chronic obstructive pulmonary disease (COPD) is a chronic disease with a broad spectrum of

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severity and a large number of patients who have less severe disease. Care for this group of patients can best be provided in primary care, at least in terms of continuity, comprehensiveness and coordination [1]. To that end, internationally accepted guidelines have been developed and distributed [2,3]. It is recommended that clinicians use lung function measurements when diagnosing and monitoring COPD, checking health status and symptoms, and if necessary, adjusting medication. Furthermore, education should be used to help patients take over the daily management of their disease. Periodical contact appears to have a positive effect on long-term patient outcomes and quality of life [4].

In the Netherlands, the usual management of COPD patients is not optimal; in particular, regular follow-up visits and periodical lung function measurement are often not offered [5,6]. For general practice care to meet guideline recommendations, a number of factors are required which are often lacking [7–12]. These are: (1) decision support; (2) registries and reminder systems to ensure active follow-up; and (3) patient education and self-management support. Decision support means introducing specialist expertise for consultation in diagnosis and treatment [13]. A register is a list of all patients with a specific chronic disorder from which the care needed for each patient can be planned. An active recall system spots non-attendees, so steps can be taken to contact those patients [14]. Self-management education is provided to increase self-efficacy for improving clinical outcomes [15]. These three

factors all require a different type of expertise. Decision support has to be given by a medical expert, while registries for follow-up and patient self-management education include major roles for non-physicians [16–19].

We have developed a primary care model that integrates these different factors which require specific expertise (Figure 1). The implications of this model are twofold. On the one hand, it aims to help general practitioners (GPs) provide care according to guidelines. On the other hand, it needs to be accessible and attractive to patients so that they will participate. In this study the feasibility of the model in daily practice was tested.

## Methods

### Study population

This study evaluates the two-year implementation of a primary care disease management model in 22 practices (involving 29 GPs) in the South of the Netherlands. In the one-year run-in period, practice nurses were trained and the COPD Support Service (CSS) was organised. All 149 practices in the region were invited to participate by open invitation. General practices qualified for the care model if they met various inclusion criteria: co-operation with other practices to reach a total population of at least 4500 patients; a working space for the practice nurse; and the use of an electronic medical register. Of the 81 practices that showed interest, 44 met the inclusion criteria. Based on regional distribution criteria 22 practices were allocated to the intervention group.

After 18 months, the 22 practices had appointed 11 practice nurses with 2.1 nurses per 1000 COPD patients.

All patients with documented COPD after two years intervention (documentation is part of the intervention) in these 22 practices were included in the study.

### Model—see Box 1

#### Measures and data collection

Data collection took place 18 months after the general practices started to implement their own protocol. The following data were collected to answer the research question concerning implementation of the model: the percentage of practices (1) with a patient register and recall system; (2) performing periodical case history reporting and lung function measurements; (3) asking for diagnostic and therapeutic advice; (4) arranging periodical visits; and (5) providing

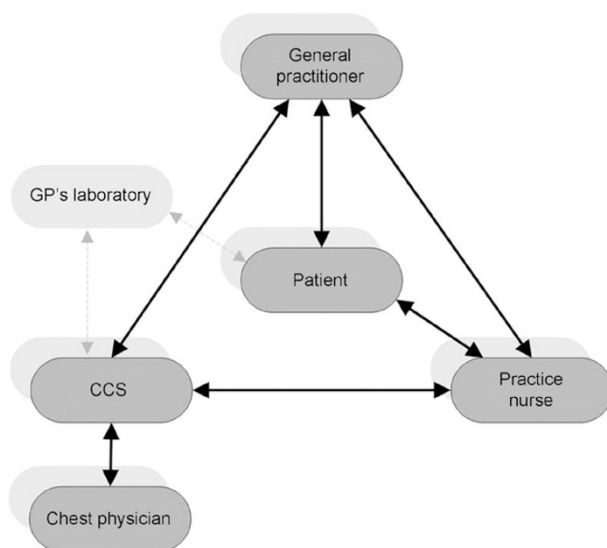


Figure 1 Actors primary care model for COPD.

**Box 1: Primary Care Model**

The GP can delegate tasks to the practice nurse and the CSS but remains responsible in the end. To that purpose, every general practice will make a practice protocol in which the division of roles is described.

The CSS is a logistic support service, connected to the regional primary care laboratory with a specialised lung nurse and some administrative employees. It offers logistic support to the general practice by means of managing the patient register and a recall system for annual history taking and lung function measurement (performed by the primary care laboratory if not performed in the practice itself). The CSS also forms the link with the chest physician.

A number of chest physicians from the regional hospitals provide diagnostic and therapeutic advice by evaluating the lung function measurements and case history reports (without actually seeing the patient).

The GP discusses the results of the check-up with the patients and determines whether the medication is still adequate.

The practice nurse's most important tasks are education and counselling. Patients who meet the referral criteria will be referred to a chest physician for further diagnosis or treatment.

advice and counselling according to the protocol. The following data were collected to determine the degree of inclusion in the care model: the percentage of COPD patients treated by the GP who were included in the care model.

Data were collected through documents (protocols), interviews, the CSS and general practice registration (inclusion patients). The following targets were set as criteria for success:

- in all the participating practices (100%) the five elements of the care model are part of their own protocol;
- at least 65% of the patients treated by the GP are included in the model; this level was chosen because a drop-out of 40 to 60% is described in the literature in patients attending comparable programs for asthma care [20,21].

**Analysis**

The data about the usage of the model and the inclusion of patients were processed in frequencies, percentages and averages.

**Table 1** Characteristics of practices at baseline (sd)

Number of practices	22
Number of general practitioners	29
% urban practice (> 80.000 inhabitants)	38
% single handed practices	27
Mean population/FTE	2519 (346)
% practices with active recall system	0

**Results****Population**

The study was performed amongst 22 practices with a total number of 29 GPs, of whom 76% were male (Table 1). At the start of the study, the average age of the GPs was 46 years; 38% of the study practices were located in an urban area (>80,000 inhabitants) and 32% were single-handed. None of the practices had a patient follow-up register at baseline.

**Implementation of the model**

In all participating practices all components of the model were performed systematically, with the exception of 'asking for diagnostic and therapeutic advice' which occurred in only 10 practices - see Table 2.

After the study a double patient register existed for each practice. The practice nurse kept a list of all the patients with documented COPD and the CSS had their own register of patients who had to be called for a check-up. In seven practices the laboratory performed the periodical history taking and lung function measurement, and 15 practices performed these tests on their own.

In all the practices the practice nurse set up a COPD clinic. In those sessions she integrated discussing test results and medication counselling with education and counselling. She discussed the test results with the GPs before discussing them with the patient. The patient was only seen by the GP if there were special circumstances or symptoms which required assessment.

**Degree of inclusion in the care model**

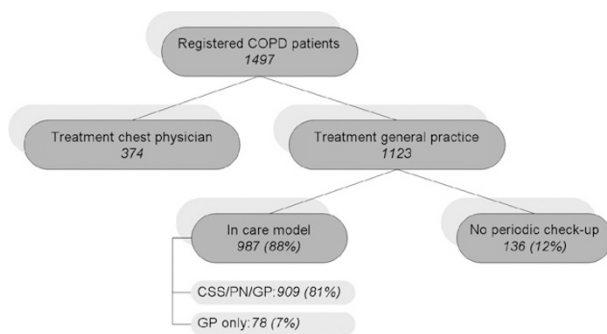
Altogether, the 22 general practices saw a total of 1497 patients with documented COPD in the first 18 months of the study (prevalence 2.4%). Of these patients 374 were referred to the chest physician, leaving 1123 patients under the control of the general practices (Figure 2).

Prior to the intervention none of the practices had an active monitoring system. Eighteen months later 81% of the 1123 patients were included

**Table 2** Model components implemented

Model components	Care taker (in n practices):			
	PN	CSS/CP	LAB	Total
Patient register with all the diagnosed patients	22			22
Patient register for recall system	13	9		22
Periodical anamnesis and spirometric test	15		7	22
Diagnostic and therapeutic advice		10		10
Periodical check-up	22			22
Self-management education	22			22

PN = Practice Nurse.  
 CP = Chest Physician.  
 LAB = Laboratory.

**Figure 2** Division of patients in and outside care model.

in the care model with periodic lung function measurement followed by a visit to the practice nurse. Of the patients seen by the GP only 40 did not need periodic monitoring; 23 had co-morbidity, and in 15 patients the diagnosis had not been confirmed.

Altogether, 136 patients eligible for admission to the care model refused periodic monitoring.

## Discussion

This primary care model for COPD appears to be very applicable to other general practice settings. The GP delegated tasks to the CSS and the practice nurse according to the model, and almost all patients were included in the control system. A large majority of patients accepted the frequent check-ups as per the model. The prevalence of COPD in the study group was 23.6 per 1000 which corresponds to the annual prevalence among the Dutch population (20.7 per 1000) calculated from nine different GPs' registries [22]. The distribution of the care between GP and medical specialist, 75% versus 25%, is difficult to compare with the Dutch situation. In 2003, 78% of COPD patients visited the chest physician, but we do not know if they were treated in shared care [23].

The findings are difficult to compare with other study results because we could not find a similar care model in the literature. Studies on the use of a practice nurse are nearly always focussed on the effects on patient outcome parameters such as lung function, use of medication, symptoms, and quality of life, and not on participation in planned care. However, we can compare our study with a programme which was aimed at implementing guidelines into general practice in which 23% of the patients dropped out within one year [24]. In comparison, the participation of patients in our care model is considerably higher; only 136 (12%) of the eligible patients were not followed-up within the care model because they refused to take part.

With the introduction of the model in participating practices, patient registration was, for the first time, set up on the basis of clear (repeated) diagnostic parameters. This in itself should be seen as an enormous improvement in quality. The model provides insight into the prevalence figures for each practice and forms the basis for further monitoring of COPD patients. For the first time patients are being monitored and supported systematically.

Various components of the model – such as having a patient register with a recall system; periodical history taking and lung function measurement; asking diagnostic and therapeutic advice; and periodical patient visits with information and counselling – appear to fit very well into one model. The model equips general practices with facilities to meet COPD guidelines. Barriers to organising planned visits and periodic lung function measurement disappeared. This appears to be a promising model that offers general practices the opportunity to follow guidelines in a modern context [25]. Further research is needed to study the influence of this primary care-based disease management model on the health status of COPD patients.

## Conflict of interest

There was no conflict of interest for the authors in the preparation of this article.

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