NHS Innovation Accelerator

Economic Impact Evaluation Case Study: myCOPD

1. BACKGROUND

Chronic obstructive pulmonary disease (COPD) is a serious long-term respiratory disease in which the flow of air into the lungs is gradually reduced over time. The two most common types of COPD are chronic bronchitis and emphysema. There is no cure for COPD and good symptom management is essential to stabilise disease and prevent recurrent flare-ups or exacerbations. Exacerbations often require intensive treatment and can be severe enough to require hospital admission. Compliance with medication in patients with COPD is generally found to be poor and is influenced by a number of factors (e.g. complexity, polypharmacy). 1 Errors in inhaler technique are common and impact upon adequate drug dose. 2 Compliance with non-drug treatment, such as leading a healthy lifestyle, pulmonary rehabilitation, is also poor.

myCOPD is a web-based COPD self-management programme that provides information, education, support and communications to give patients greater control over their disease, with consequent anticipated improvements in their clinical condition. 3 It can be accessed via any web-connected device and all or part of the patient’s record can then be shared with health care professionals. This allows remote monitoring of the patient’s symptoms/exacerbations, a means of changing patient medication remotely and patients being educated through myCOPD.

The key components within the system, as currently configured are:

- Symptom scoring – a self-management plan, using a short series of simple questions and a traffic light system to identify patients who may need to upscale their treatment or access medical help;
- Medication diary – based on the patient’s own treatment;
- Inhaler techniques – a simple clear video demonstration of the appropriate inhaler technique;

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2 Make BJ. Chronic obstructive pulmonary disease: developing comprehensive management. Respir Care 2003;48:1225-1234.
• Pulmonary rehabilitation – a complete six-week pulmonary rehabilitation programme (including education and exercises) using video demonstrations;
• A range of general educational videos and information about COPD and its management.

This case study summarises an economic analysis completed by the Department of Health on behalf of My mHealth. It describes the cost and potential savings, to enable a comparison of the benefits of myCOPD relative to its costs. The limitations of the analysis are as follows:

• The analysis includes assumptions - that exacerbations will be diagnosed at least 24 hours earlier and that the myCOPD system will improve the effectiveness of inhaled therapy;
• The evidence for improvements in hospital admission and re-admission rates comes from a study of a service offering a more intensive and targeted approach;
• The analysis does not include those patients whose length of stay in hospital is shortened as a consequence of using myCOPD;
• The analysis does not include/measure the value of improved quality of life for patients that may result from improved COPD management.

2. INPUT COSTS

Access to myCOPD is negotiated with individual CCGs. The costs have been stated as £4 per patient per year, when purchased for the entire COPD population. These costs are based on the prevalence of COPD in the populations in the Quality and Outcomes Framework (QOF) and give unlimited access to myCOPD in the CCG area for a year. If certain populations are targeted, then the CCG or hospitals can purchase myCOPD for £20 per patient (based on a minimum order 500). This includes the clinician dashboard, analytics and administrative costs.

Although baseline disease prevalence figures are difficult to establish confidently, a figure of 835,000 diagnosed patients in England as a whole is used by the NHS, which is equivalent to a prevalence of 1.7%. In a CCG with a population of 250,000, this would be 4,250 patients. At a cost of £4 per patient per year, the annual cost to the CCG would therefore be £17,000.

3. OUTCOMES

The benefits of systematic symptom documentation, explicit care planning, improved inhaler technique, improved adherence and better access to pulmonary rehabilitation can all be expected to yield improved disease control. The myCOPD system has been evaluated and each individual component has been shown to reduce the likelihood of an acute exacerbation, or allow it to be identified early enough to avoid hospital admission.

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An evaluation of these types of improvements in Southampton, although offering a more intensive and targeted approach, showed impressive improvements in hospital admission and re-admission rates.

The cost of an unplanned COPD admission used in the Department of Health analysis was taken to be £1,590.

Improved disease control can be expected to result in improved patient outcomes and associated health gain in terms of symptom management and improved quality of life.

4. ECONOMIC ANALYSIS

A key potential economic benefit from myCOPD is derived from the potential to avoid unplanned hospital admissions. The proposed cost savings for a typical CCG with a population of 250,000 are summarised in Table 4.1.

Table 4.1: Summary of typical cost savings from avoided admissions for COPD exacerbation for a CCG with 250,000 patients

<table>
<thead>
<tr>
<th>For a CCG with population of 250,000</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of myCOPD</td>
<td>£17,000</td>
</tr>
<tr>
<td>Number of exacerbations per year</td>
<td>4,023</td>
</tr>
<tr>
<td>Number of exacerbations per year resulting in admission</td>
<td>503</td>
</tr>
<tr>
<td>Mean cost of admissions per year (£1,590 x 503)</td>
<td>£800,000</td>
</tr>
<tr>
<td>Number of admissions if reduced by 20% by being diagnosed 24 hours earlier (503 x 0.8)</td>
<td>402</td>
</tr>
<tr>
<td>Mean cost of admissions after reduction (£1,590 x 402)</td>
<td>£639,180</td>
</tr>
</tbody>
</table>

Net saving per year for CCG:
- Savings = £800,000 - £639,180
- Cost of myCOPD = £17,000

Return on investment (value of benefits / costs) = 846%

The assumptions underpinning the analysis are derived from the literature and are described below:

- A UK audit of patients attending a hospital out-patient clinic found that one in eight acute exacerbations of COPD required admission to hospital (i.e. 12.5%).
- For a CCG of 250,000 patients, there will be around 4,250 patients with significant COPD (as stated in Section 2). Approximately 35% of these (n=1,490) will have severe or very severe disease and therefore may be considered at high risk for acute exacerbations. Based on the Secondary Care study, this group has a median annual attack rate of 2.7

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8 Wilkinson T, North M, Bourne S. Reducing hospital admissions and improving the diagnosis of COPD in Southampton City: methods and results of a 12-month service improvement project. Primary Care Resp Med 2014;24:14035
9 Based on the 2013-2014 NHS Tariff and 2012/13 hospital episode statistics, the mean cost of an admission for COPD in England is currently £1,590 (range £419-£4,990).
per patient per year and would therefore be expected to experience 4,023 acute exacerbations each year (1,490 x 2.7) requiring 503 admissions (4,023 x 12.5%);

- For the purposes of this analysis, it has been assumed that all exacerbations will be diagnosed at least 24 hours earlier, resulting in a reduction of 20% in the proportion requiring admission. It has also been assumed that modules within the myCOPD system will improve the effectiveness of inhaled therapy more in line with published data.  

There is also the potential that, for those patients who do require admission, earlier diagnosis may result in a shorter length of stay. These benefits are not estimated or valued in the analysis. It also does not include patients with mild and moderate disease, as they are less likely to be given access to myCOPD. Nevertheless, as self-management should begin at the point of diagnosis, there is potential for these patients to gain from the use of myCOPD, at no extra cost to the CCG.

A further benefit of myCOPD is the ability to provide an alternative model of access to pulmonary rehabilitation. The cost of providing pulmonary rehabilitation to a CCG population of 250,000 with average prevalence of COPD is estimated to be approximately £70,000 per year. Therefore, at a cost of £17,000 for the pulmonary rehabilitation element to be available to 100% of eligible COPD patients, the proportion of patients being able to access pulmonary rehabilitation can be markedly increased. It also has the advantage of being performed at home and may therefore be easier for people with mobility limitations to benefit.

5. CONCLUSION

myCOPD is found to be cost saving compared with standard care, with a potential ROI of 846% from an NHS perspective. The web-based patient self-management tool offers the potential for improved control of COPD symptoms, and a more cost effective means to provide access to pulmonary rehabilitation. The estimated net benefit from avoided hospital admissions in a CCG with 250,000 patients is £143,820 per year. myCOPD can also be expected to result in improved patient outcomes and associated health gain in terms of symptom management and improved quality of life.

As previously mentioned, there are some limitations within the analysis, as it includes some assumptions and also does not include some of the potential benefits of myCOPD.

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12 Chandra D, Tsai CL, Camargo CA, Jr. Acute exacerbations of COPD: delay in presentation and the risk of hospitalization. COPD 2009; 6:95-103
14 Based on 2013/15 National Tariff prices.