Department of Health

Consultation on a Strategy for Services for Chronic Obstructive Pulmonary Disease (COPD) in England

Consultation Impact Assessment

DH INFORMATION READER BOX

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Circulation list	Voluntary organisations/NDPBs
Description	The Department of Health is developing a national strategy for COPD services. This consultation draws on evidence from a wide range of reports and stakeholders and the recommendations of an external reference group. It invites everyone to give their views on ideas set out in the document, as well as contribute new ideas to the debate.
Cross reference	N/A
Superseded documents	N/A
Action required	N/A
Timing	Responses should be submitted by the closing date
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For recipient's use	

Consultation on a Strategy for Services for Chronic Obstructive Pulmonary Disease (COPD) in England

Consultation Impact Assessment

Please read this document along with the main *Consultation on a Strategy for Services for Chronic Obstructive Pulmonary Disease in England* and also the *Equality Impact Assessment*.

We would welcome your comments.

Department of Health		Consultation Impact Assessment – Consulting on a Strategy for Services for Chronic Obstructive Pulmonary Disease in England
Stage Consultation	Version 4.5 28/01/2010	Related Publications: COPD Consultation Document

Available to view or download at: www.dh.gov.uk/en/Consultations/DH_659

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What is the problem under consideration? Why is government intervention necessary?

The prevalence and burden of Chronic Obstructive Pulmonary Disease (COPD) in England are unnecessarily high and can be reduced. Mortalit rates for respiratory disease compare unfavourably with the rates in Europe. About 70% of people with COPD are undiagnosed, and those who are identified are generally diagnosed late,with adverse consquences for their quality of life and for public expenditure. In national health service, a COPD strategy is required to provide strategic direction to commissioners, providers, patients and carers.

What are the policy objectives and the intended effects?

We are consulting on how to drive improvement in COPD services by:

- providing a framework against which local services can secure improvements;
- providing advice, guidance and support for commissioners, strategic health authorities and local Authorities in the planning, development and monitoring of services; and
- informing patients' and their families' expectations of health and social care services by providing details of high-quality care.

What policy options have been considered? Please justify any preferred option.

The development of a strategy for services for COPD (which we are now consulting on) identifies two options:

(i) status quo – Do nothing (ii) phased implementation of the COPD strategy

The second option of implementing the COPD strategy taking a phased approach is the preferred option.The strategy will represent a comprehensive approach to COPD services which will maximise potential benefits. The strategy includes options on specific recommendations, where appropriate.

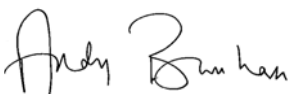
When will the policy be reviewed to establish the actual costs and benefits and the achievement of the desired effects?

A full impact assessment will accompany the publication of the final strategy.

Ministerial sign-off for consultation stage impact assessments:

I have read the Consultation Impact Assessment and am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options

Signed by the responsible Minister:



Date: 12 February 2010

Policy Option ii: *Phased implenentation of the COPD strategy*

ANNUAL COSTS

One-off (Transition) (total) **£2 million** Years **3**

Average annual cost (excluding one-off)

£56 million

Description and scale of **key monetised costs** by 'main affected groups.' The key costs and cost savings will relate to care plans, self-care and other improvements. -£235 million (PV) will relate to cost savings of care plans and self-care; £400 million for chronic disease management; £263 million for diagnostic review; £86 million for home oxygen; £54 million for confirmatory diagnosis; £39 million for review following exacerbation; and -£34 million for early discharge schemes.

Total Cost (PV) **£461 million**

Other **key non-monetised costs** by 'main affected groups'

ANNUAL BENEFITS

One-off (total) – Years -

Average annual benefit (excluding one-off)

£164 million

Description and scale of **key monetised benefits** by 'main affected groups.' The COPD strategy will release savings and provide benefits across health and social care due to a reduction in avoidable death and long-term disability. They key monetised benefits are £931 million (PV) health benefits from pulmonary rehabilitation and £605 million for home oxygen services.

Total Benefit (PV) **£1,536 million**

Other **key non-monetised benefits** by 'main affected groups.' At this stage, the impact assessment does not include all monetised benefits to individuals or the benefits to the wider economy, but these will be included in the final impact assessment. In addition, there are efficiency gains through prevention of COPD and delayed progression of the disease.

Key assumptions/sensitivities/risks. The strategy may increase demand for COPD services beyond planned activity, which could put pressure on services and/or require additional funding.

Price base year 2009/10	Time period years 10	**Net benefit range** (NPV) **-£235 million to £3,407 million**	**Net benefit** (NPV best estimate) **£1,075 million**

What is the geographic coverage of the policy/option?				England	
On what date will the policy be implemented?				From 2010	
Which organisation(s) will enforce the policy?				CQC, DH	
What is the total annual cost of enforcement for these organisations?				No additional cost	
Does enforcement comply with Hampton principles?				Yes	
Will implementation go beyond minimum EU requirements?				N/A	
What is the value of the proposed offsetting measure per year?				N/A	
What is the value of changes in greenhouse gas emissions?				Negligible	
Will the proposal have a significant impact on competition?				No	
Annual cost (£–£) per organisation (excluding one-off)	Micro -	Small -	Med -	Large	
Are any of these organisations exempt?	No	No	N/A	N/A	

Impact on admin burdens baseline (2005 prices)
Increase of £ Decrease of £ **Net impact** **£** (Increase - decrease)

Key: **Annual cost: constant prices** **(N)PV = (net) present value**

Contents

Chapter 1: Evidence base

Introduction

1. This consultation impact assessment sets out the major costs and benefits that may be associated with the national strategy for chronic obstructive pulmonary disease (COPD). It describes in detail the problem under consideration and why it is necessary for the Government to intervene. The document describes the policy objectives and their intended effects.

2. Two options have been identified:

   - Status quo – do nothing
   - Phased implementation of the COPD strategy.

3. This document outlines the costs and benefits associated with each element of the proposals set out in the strategy, and describes the assumptions that have been made in the calculations. For more detailed discussion of how these different elements fit overall, please see the main consultation document.

4. The costs and benefits outlined in this document are preliminary and will be refined following the consultation process being undertaken in February and March 2010.

5. At this stage, the calculations include the costs and benefits (savings) within the health and social care system, and some monetised benefits to individuals; they do not include all benefits to individuals or the benefits to the wider economy. As we refine the calculations for the final impact assessment, we will include the wider benefits, in order to reflect the impact of the strategy more comprehensively.

6. During the consultation period, the potential administrative burdens of the COPD strategy will be considered further, and they will be evaluated in light of the Government's administrative burden reduction strategy.

What is the problem under consideration?

Background – What is COPD?

7. Chronic obstructive pulmonary disease (COPD) is an umbrella term adopted across the world in the early 1960s to describe a group of conditions that may be better known by the general public as chronic bronchitis or emphysema. COPD describes lung damage that is gradual in onset and that results in progressive airflow limitation. This lung damage, when fully established, is irreversible and, if it is not identified and treated early, leads to disability and eventually death. The greatest cause of COPD is smoking. Other factors include workplace exposure, genetic make-up and general environmental pollution.

8. The main symptoms of COPD are shortness of breath and reduced exercise ability, together with a cough and production of phlegm, which may get worse at certain times of the year. Further information on COPD, its prevalence and its national impact is provided in the consultation document.

9. Approximately 835,000 people in England have been diagnosed with COPD; however, we estimate that around 3.2 million people have the disease.

10. COPD causes more than 25,000 deaths a year in England and Wales. Data from the World Health Organization (WHO) shows that death rates from diseases of the respiratory system in the UK are higher than both the European average and the European Union (EU) average.

11. There has been a growing recognition in England of respiratory disease as a challenge to public services. In 2001, the British Thoracic Society report *Burden of Lung Disease*[1] was one of the first documents to point out the high levels of respiratory disease in this country and its potential impact.

12. The British Lung Foundation, which has long been campaigning for people with COPD, recently launched a campaign to help find the 'missing millions' with COPD and called on government to make COPD a national priority.

13. The Chief Medical Officer focused on smoking in his annual report for 2002 and 2003. In his 2004 annual report, in the chapter titled 'It takes your breath away'[2] he made a number of recommendations, including the need for a more accurate diagnosis (through an improvement in the standards of spirometry) and more structured care for people with COPD. At the same time he also commissioned a strategic scoping review of lung and respiratory disease. This then led to the decision to take national action on these conditions.

14. The NHS already has some guidance available through the *National Service Framework for Long-term Conditions* (2005).[3] This sets out a range of quality requirements and key priorities that can be applied to people with COPD and other respiratory conditions. However, as a 2006 report by the Healthcare Commission, *Clearing the air*,[4] highlighted, there remained a need for primary care trusts (PCTs) and the NHS in general to:

    - improve diagnosis for COPD – an estimated 2 million people with COPD remain undiagnosed and there are also significant numbers of misdiagnoses;
    - develop structured care appropriate to people's needs, focusing on accurate and earlier diagnosis;
    - help people manage their condition themselves by way of structured exercise and education, which have been shown to have a direct impact on people's lives;
    - reduce the number of people admitted to hospital. Between 1991 and 2001, age-adjusted rates of admission for COPD rose by 50%, and rates of readmission vary by up to five times in different parts of England;
    - address the poor prognosis for people with COPD, as on average 15% of those admitted to hospital with COPD die within three months, and around a quarter will die within a year of admission; and
    - improve access to end-of-life care for people with COPD.

15. COPD is not curable, but it is treatable, and can be managed to minimise the burden it imposes. This burden falls not only on the individual, but also on their families and on society as a whole, through the demands placed on public resources. The earlier COPD is identified, the better the outcome for all.

Why is government intervention necessary?

16. The public expects appropriate, integrated services planned and delivered around individual needs, from diagnosis to end-of-life. This strategy reviews the case for change and describes the good practice that is already taking place in the NHS to deliver good COPD services.

17. It does not set national targets or milestones, but points out where we expect the NHS to realise efficiency savings in its efforts to improve services, as well as where we expect investment to achieve significant returns.

18. Nevertheless, the Department of Health also has a role to play by developing tools, harnessing expertise and giving advice, where appropriate, on wider policy contexts. For this reason, the strategy also describes how the Department will take action to support the improvement of services for people with COPD.

19. Alongside the development of the draft strategy, the Department of Health has undertaken a series of measures designed to promote improvements in COPD services. This includes making recommendations on how the Quality and Outcomes Framework (payment mechanism for general practitioners) should be changed to align with the recommendations in the national strategy, piloting Patient–Reported Outcome Measures (PROMs) and programmes of integrated care, and also supporting professional and voluntary organisations to help develop services for people with COPD. We are also supporting the infrastructure to help drive forward the implementation of the strategy at a local level, working with the strategic health authorities (SHAs) and NHS Improvement.

20. Further advances can only be made through a sustained programme supported by the Department of Health. There are a number of areas where COPD services are still underperforming, and action must be taken to address the issues and promote new ways of working. The national strategy for COPD will be a necessary step in improving COPD services across England.

Policy objectives and intended effects

21. When published, the national strategy for COPD is intended to:

    - provide a guide on the provision of high-quality health and social care services to healthcare professionals and members of the public, including those diagnosed with COPD;
    - advise how local communities can prevent people from getting COPD, understand the risks of having poor lung health, secure improvements to the identification, diagnosis and care of people with the disease, and reduce health inequalities;
    - support people with COPD – and their carers – by offering practical advice and education on management of their disease. Our aim is to ensure that everyone diagnosed with COPD receives equitable, responsive, high-quality and effective provision of health and social care services from the right person, at the right time, in the right place; and
    - provide advice and support for commissioners, hospitals, general practice, PCTs and SHAs. All these constituent parts of the NHS must deliver services for COPD while planning, developing and monitoring services against the backdrop of *High Quality Care for All: NHS Next Stage Review Final Report* published in 2008 and the associated work of the SHA clinical pathway groups.

22. The strategy will support existing clinical guidelines from professional organisations, like the British Thoracic Society (BTS), and other national organisations, such as the National Institute for Health and Clinical Excellence (NICE), whose guidelines are currently being updated.

23. The consultation document promotes evidence-based approaches to the management of COPD patients, which will lead to improved clinical outcomes and efficiency savings. Where evidence does not exist, advice is based on expert opinion. It also recommends additional action to help collate further evidence, where appropriate.

24. The strategy essentially has two objectives in mind. The first is to ensure that those people currently diagnosed with COPD have a correct diagnosis, and are then managed proactively, using evidence-based interventions. The second is aimed at prevention, and at finding the 'missing millions' of people who have COPD.

Policy options

25. The consultation will identify two options:

    - Status quo – do nothing
    - Phased implementation of the COPD strategy.

26. The first option (of doing nothing and maintaining the status quo) is not a sustainable course of action. If current inefficiencies in COPD services persist, there will be significant additional cost pressures, due to higher incidence and prevalence of COPD, and sub-optimal patient outcomes, including greater levels of disability and dependence.

27. The second option of implementing the COPD strategy through a phased approach represents a comprehensive approach to COPD services, which will maximise potential benefits. The recommendations represent the best way forward as a whole, based on the current evidence base. The strategy itself will not be prescriptive, and will recognise that local areas will develop their services in line with local circumstances and priorities. The strategy will suggest models for service improvement, but local areas will be free to explore how they can best create high-quality COPD services.

28. Other options that were considered, but rejected, as part of the policy development include:

- Implementing all the recommendations in one tranche at publication. The initial focus of the strategy is to ensure that both primary and secondary care have programmes in place to correctly diagnose people with COPD, and, once they are diagnosed, to make sure there are effective management strategies in place. It was decided that this should be the primary focus of the strategy, before the recommendations set out in Chapter 3 are implemented.
- Introducing specific recommendations on areas such as routine screening of individuals for COPD from birth and the introduction of a lung health check. These were discounted at this stage because of lack of evidence.

Detailed consideration of options

29. The main consultation document is divided into seven broad sections, and under each section there are a number of aspects of the strategy, with specific cost and benefit implications:

- Chapter 1: Setting the scene
- Chapter 2: Prevention and identification
- Chapter 3: Finding the 'missing millions'
- Chapter 4: High-quality care and support
- Chapter 5: End-of-life care
- Chapter 6: Asthma
- Chapter 7: Delivering the strategy

30. The consultation document is not duplicated here. However, the following sections do discuss the key recommendations in the document, including their rationale, and an analysis of costs and benefits.

31. Some aspects of the document are concerned with restating best practice that is already established. For example, the document discusses the provision of pulmonary rehabilitation, using quality assured spirometry for accurate diagnosis and access to non-invasive ventilation when in hospital.

32. Where the document is proposing new developments in service provision, these have been identified for cost–benefit analysis and are detailed below.

33. The following table summarises the costs and benefits of the main recommendations, with resource implications. Cost savings are shown as negative costs.

34. Each of Chapters 2 to 6 has been subdivided into a series of recommendations. In performing the analysis, the recommendations have been considered and costed individually before a final cost range is estimated.

Assessment of costs and benefits

113. This is not expected to have additional resource implications, but there are anticipated benefits to the ongoing treatment and management of people with COPD, including more accurate drug therapy and better access to non-pharmacological interventions.

RECOMMENDATION 11: Good-quality information should be provided at diagnosis and delivered in a format that any person can understand.

What is the problem?

114. Not everyone who is newly diagnosed with COPD leaves their doctor or consultant fully understanding their condition and how it can be managed. This may be due in part to language difficulties, or to insufficient information being provided by the relevant healthcare professional. Consequently, the patient does not manage their condition as well as they might, leading to treatment not being optimised and to additional costs to the NHS.

Recommendation to address the problem

115. Good-quality information can be delivered by a variety of sources (the hospital, their GP, a pharmacist), by a wide range of providers (the Department of Health, the NHS, charities), in a number of different formats (online, as leaflets). The key elements are that the information is of a high quality, comes from a validated and trusted source, and covers all the issues that are relevant to the patient.

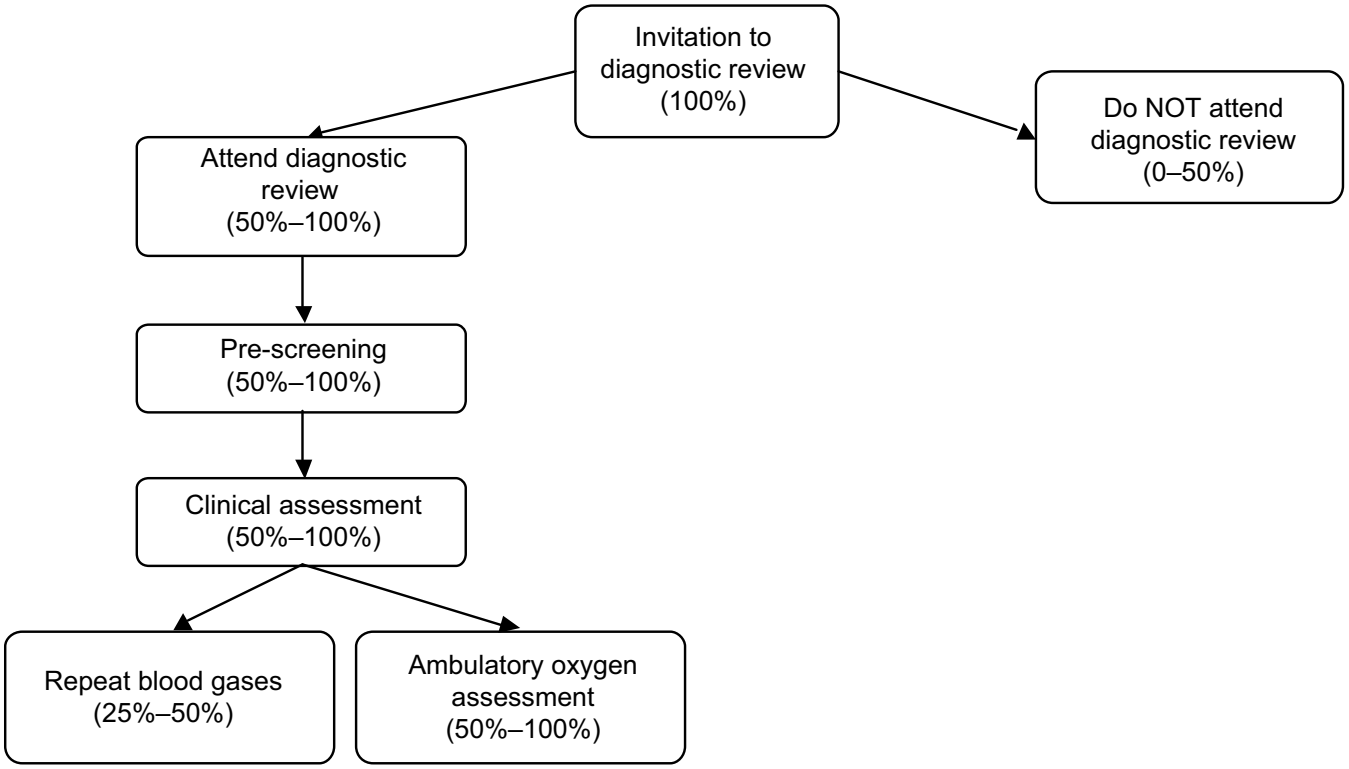
Assessment of costs and benefits

116. There is already extensive material about COPD produced by various organisations, but the material needs to be reviewed and made more extensively available at the point of diagnosis. With the right information at the outset, people are better able to manage their condition.

Risks

117. If current provision of information is significantly below what is expected, this recommendation will potentially increase public awareness of COPD services. An increased demand for GP or hospital treatment could put NHS services under pressure. Additional funding would be required to ease such pressure, should it arise.

139. The diagram below illustrates the stages all people diagnosed with COPD who use HOT are assumed to follow. The percentages in brackets represent the proportion of all COPD HOT users.



140. A clinical assessment is likely to include a spirometry test, blood gases tests, oxygen saturation tests and a possible chest X-ray.[40] These tests also form part of the requirements of the diagnostic review so the costs have been included in that recommendation. To undertake some of the tests it is assumed that staff resources (30 minutes of a clinical physiologist's time) of **£21** per patient are required. This cost forms part of the additional cost of the HOT clinical assessment.

141. In the context of a HOT assessment, the blood gases test (pulse oximetry) will be repeated in patients detected as having chronic hypoxaemia. The unit cost of the repeat test, which is not included in the diagnostic review, is estimated at **£18**.[41]

142. Furthermore, patients will have their need for AO assessed through a simple exercise test which is conducted several times (e.g. practice, on air, on oxygen). It is estimated that 30 minutes of a clinical physiologist's time is required to undertake this additional assessment at a unit cost of **£21**. It should be noted that all current HOT users are assumed to receive this additional assessment.

143. In summary, the estimated (average) additional total unit cost of a clinical assessment is **£51**.

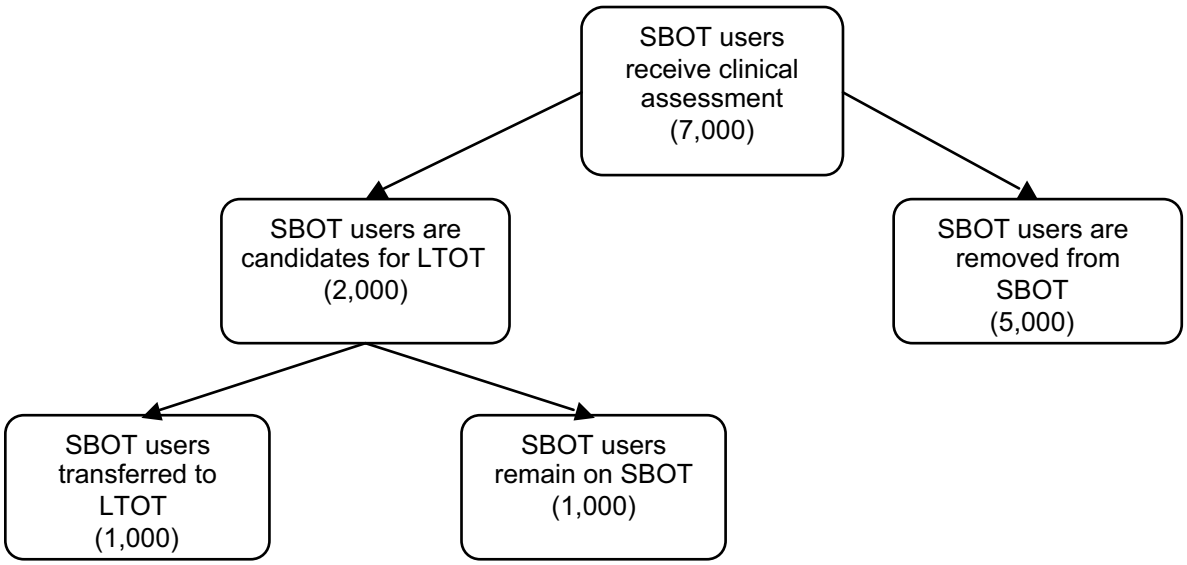
Follow-up assessment

144. For all patients completing a clinical assessment, it is assumed the follow-up assessment take-up rate is 75% (50%–100%). It is estimated that a follow-up assessment requires 30 minutes of a district nurse's time,[42] at a unit cost of **£24**. Where HOT is deemed unnecessary, this further assessment would not be required (i.e. excludes SBOT removed from HOT – see 'Cost savings' below).

Cost savings

145. It is estimated that 75% of SBOT users will be removed from SBOT after a clinical assessment.[43] It should be noted that SBOT patients are assumed to have the same take-up rate of 75% (50%–100%) for the clinical assessment (and diagnostic review) as all current HOT users. It is assumed that SBOT users are 50% into an average duration of HOT usage, three years. Hence, there will be a cost saving per SBOT user removed of **£645**.

146. Furthermore, it is estimated the clinical assessment will reveal that 25% of current SBOT users are candidates for LTOT. It is assumed that half of the candidates will be prescribed LTOT in place of SBOT at an additional annual cost of **£105**, while the other half will remain on SBOT. It should be recognised that while there are 13,000 COPD patients using SBOT, approximately half (6,000) currently receive a clinical assessment. Therefore, the analysis is focused on the additional patients not receiving an assessment at the baseline (7,000). The diagram below illustrates the process for SBOT users over a three-year period (for annual estimates divide figures by 3).



Intervention – new patients

147. It is estimated that 40% of the Global Initiative for Obstructive Lung Disease (GOLD) stage 4 COPD patients should be LTOT users, whereas only an estimated 20% of GOLD stage 4 COPD patients are current LTOT users.[44] Hence, there is unmet need in 20% (30,000) of COPD GOLD stage 4 patients and this group of patients requires a HOT clinical assessment to determine the need for HOT.

Pre-screening and clinical assessment

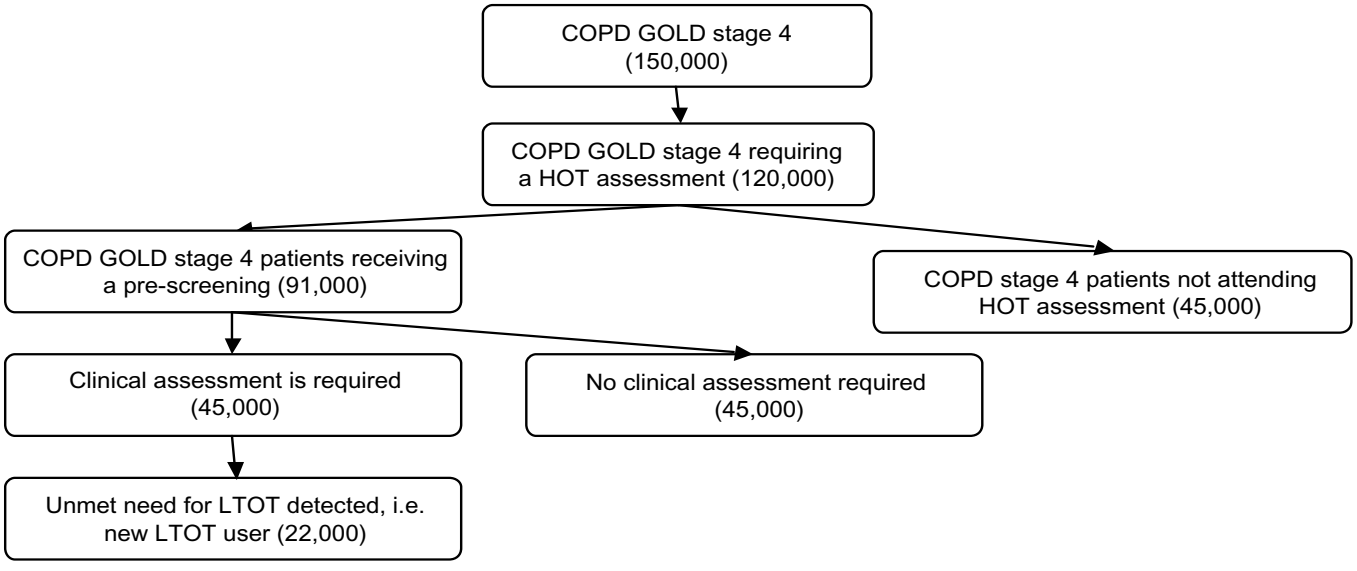
148. It is assumed that all GOLD stage 4 patients (150,000) will undergo a pre-screening assessment to determine their need for a clinical assessment. However, the impact assessment will focus only on the resource impact for current GOLD stage 4 non-LTOT users. Expert opinion suggests that approximately half of GOLD stage 4 patients receiving a pre-screening will require a clinical assessment.

149. The same take-up rate for a HOT assessment is assumed (based on the diagnostic review), i.e. 75% (50%–100%). Similarly, the tests, assessments and unit costs for the pre-screening and clinical assessment are assumed to be the same as those described for existing users.

Follow-up assessment

150. For patients completing a clinical assessment, it is assumed the follow-up assessment take-up rate is 100%. During the first year, new LTOT users are assumed to receive one 45-minute home visit from a district nurse[45] at a total of **£36** per new LTOT user. The following visit is assumed to be a 30-minute home visit from a district nurse at a total cost of **£80** per LTOT user. It is estimated that one additional visit will occur in the first year and one visit in the second year.

151. The diagram below illustrates the process for new LTOT users described above, over a three-year period (for annual estimates divide by 3).



Summary of costs and benefits

172. In summary, the average annual cost of extending the provision of pulmonary rehabilitation is estimated to be £155 million (£1,553 million over ten years), including the healthcare costs associated with patient service usage. At the baseline (i.e. without pulmonary rehabilitation), the estimated average annual healthcare costs are around £169 million per year (£1,694 million over ten years). This implies a total ten-year (undiscounted) estimated net cost of the recommendation of **–£141 million** (–£592 million–£12 million), with an average annual net cost of **–£12.1 million**.

173. The estimated total monetised health benefit of providing pulmonary rehabilitation to new COPD patients is £1,003 million (£357 million–£1,003 million), which provides a net benefit of **£1,144 million** (£345 million–£1,595 million).

RECOMMENDATION 16: People with COPD should be encouraged to learn how to help manage their condition themselves and how to have positive interactions with healthcare professionals and others about their condition. They should also be encouraged to engage with others who have COPD in order to promote exchanges of information, support and advice.

What is the problem?

174. People with COPD want information, advice, education and support. Many will want to understand their condition in detail. Those who do should be encouraged to take 'ownership' of their condition and thus feel more confident in managing it. The concept that works well in other disease areas is that of the 'expert patient': people have a wealth of educational materials, advice and support that helps them with every aspect of their disease from recognising and acting on symptoms through to developing strategies to deal with the psychological consequences of illness. Other aspects of education and support which are effective but not routinely utilised include the development of personalised care plans (personalised care planning means that people with COPD should be offered a discussion about their condition, what is important to them and what their goals are). They should also be offered information and support for self-care.

Recommendation to address the problem

175. Information, advice, education and support should be widely available for people with COPD. This involves more widespread access to expert patients programmes, offering everyone with COPD a personalised care plan, and supporting people with COPD to self-care.

176. The aim of care plans and self-care support is to prevent exacerbations through lifestyle adaptation and to allow people to acquire the skills to treat their exacerbation at an early stage. Turnock et al (2005) systematically reviewed the literature comparing action plans with the usual care for COPD.[51] From the three studies included, there was no evidence of any effect on healthcare utilisation, health-related quality of life, lung function, functional capacity, symptom scores, mortality, anxiety and depression. Evidence of a positive effect was detected in one primary (medication usage) and one additional outcome (self-management). The number of exacerbations, length of exacerbations and days lost from work were not recorded as outcomes in any of the trials.

Intervention cost and assumptions

212. The recommendation is that early discharge schemes should continue to be encouraged for COPD patients. It should be recognised that not all COPD patients will be eligible for early discharge because of, for example, the severity of their exacerbation, other health problems etc. It is estimated that approximately a quarter of all COPD admissions for an exacerbation should be eligible for early discharge schemes.[70] Compared with the baseline, this implies that there is a potential to increase the number of admissions placed on the early discharge scheme by 7 percentage points, or 7,000 admissions.

213. The early discharge scheme involves a specialist nurse visiting a COPD patient's home over a period of approximately eight days to provide support. It is assumed that each specialist nurse visit lasts 20 minutes and there is an average of 3.8 visits,[71] giving an estimated staff cost of **£105** per patient.[72]

214. COPD patients on the early discharge scheme may be given medication (for example antibiotics, corticosteroids, nebulised bronchodilators) and possible temporary oxygen to aid their recovery.[73] It is assumed that all patients accepted onto the scheme will receive these at an estimated combined cost of **£80** per patient.[74] Hence, overall the cost of providing the early discharge scheme is approximately **£185** per patient.

215. Before a COPD patient is considered for an early discharge scheme they would have received support in hospital to stabilise and assess their condition. It is assumed that a patient eligible for the scheme would have an average length of stay of around 1.5 days at a cost of **£526.**[75] This implies that the total cost generated by an early discharge COPD patient is approximately **£710**.

216. It is assumed that previously the 7,000 annual admissions would have an average length of stay of around five days at a cost of **£1,288**.[76] This figure used is for a COPD patient who could potentially be considered stable enough for an early discharge scheme (i.e. no non-invasive ventilation (NIV) required or complications).

217. In summary, for each additional COPD patient placed on the early discharge scheme it costs £710, as opposed to £1,288 if they were to remain under hospital care. Hence there is a cost saving of around **£580** per COPD patient, and a bed-day saving of three days.

Evidence on the effectiveness of early discharge schemes

218. Several studies have reported that there is no statistically significant difference between standard care and early discharge schemes for COPD patients in terms of readmissions, mortality, health-related quality of life, GP visits and increased carer support.[77] All of the studies were conducted over an eight-week period after the initial exacerbation. Therefore, it is possible to conclude that early discharge schemes have no adverse impact on the health of the patient or on health resources. It should be noted that a number of studies have reported high patient satisfaction with the early discharge scheme.[78]

Summary of costs and savings

219. In summary, the average annual cost of extending early discharge schemes for COPD patients is estimated to be £4.8 million (£48.7 million over ten years). At the baseline (i.e. without early discharge schemes), the estimated average cost is around £8.8 million per year (£88 million over ten-years). This implies that the total ten-year (undiscounted) estimated net cost of the recommendation is -£39 million (-£35 million – -£43 million), with an average annual net cost of -£3.9 million. It should be noted that the efficiency savings are achieved through an estimated annual bed reduction of 21,000 bed days.

RECOMMENDATION 20: All people with acute respiratory failure should be identified and investigated promptly and offered treatment with non-invasive ventilation (NIV) with access to mechanical ventilation, if required.

What is the problem?

220. According to a recent RCP audit, some hospitals that treat people with COPD have little or no access to NIV.

Recommendation to address the problem

221. For those with severe COPD, use of a nasal or face mask can improve breathing and quality of life, while reducing costs, and it is therefore important to identify quickly those who would benefit from this approach, which can be provided on specialist wards and therefore does not incur the cost of intensive care admission. Prompt assessment for NIV is therefore necessary.

Assessment of costs and benefits

Baseline exacerbation assumptions

222. Expert opinion suggests the following:

COPD severity stage (GOLD)	Number of patients in severity group*	Exacerbations per year**	Proportion requiring a hospital admission**
1 – mild	56,511	0.5	0%
2 – moderate	263,717	1.5	1%
3 – severe	301,391	3	5%
4 – very severe	150,695	4	7.5%

*DH analysis of Health Survey for England (2001). See annex 1 for further details.
**DH COPD programme board member.

223. Using the table above, it is estimated that there are 94,000 hospital admissions for COPD exacerbations each year.

224. The RCP audit (2008) found that of COPD patients admitted to hospital (non-elective), 11% received NIV and 1% received invasive ventilation (IV).

225. The criterion for when ventilatory support should be required is based on national guidelines:

"*NIV should be considered in all patients with an acute exacerbation of COPD in whom a respiratory acidosis (pH <7.35 PaCO2 >6kPa) persists, despite immediate maximum standard medical treatment on controlled oxygen therapy for no more than 1 hour.*"[79]

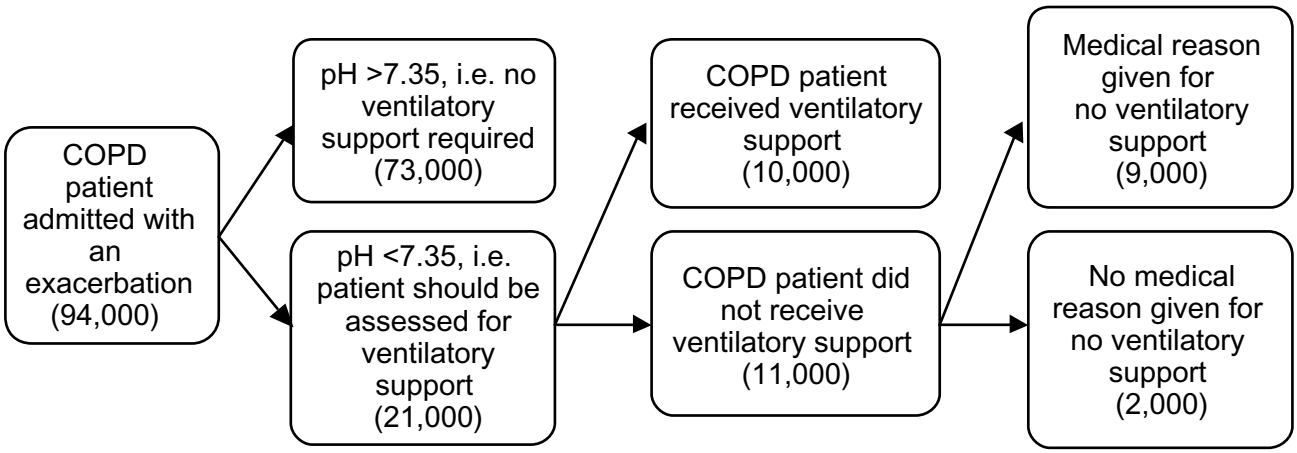
226. The RCP audit (2008) reported that 22% of COPD patients admitted to hospital (non-elective) had pH <7.35 at some time during their admission. Using the estimate for annual hospital admissions for COPD exacerbations, it implies that there are approximately 21,000 admissions where an assessment for ventilatory support should be undertaken.

227. Of COPD admissions with pH <7.35, the RCP audit (2008) reported that approximately 50% (10,000) received either NIV or IV. Hence an estimated 11,000 admissions were candidates for ventilatory support, according to national guidelines, but did not receive either NIV or IV.

Intervention

228. Of COPD patients with pH <7.35 and no ventilatory support (11,000), approximately 22% (2,000) had no recorded medical reason for not receiving NIV.[80] Therefore it is assumed that approximately an additional 2,000 patients admitted to hospital should receive NIV who currently do not. This equates to an additional 2.7% of all COPD admissions.

229. The diagram below illustrates the process and the number of admissions in brackets.



230. Evidence suggests that if COPD patients experiencing an exacerbation are not given NIV (under the criterion), there is a higher probability of requiring endotracheal intubation and of complications, both of which lead to a longer length of stay.[81] Therefore, giving NIV to COPD patients who should receive it but currently do not may reduce the need for intubations. This should produce cost savings from a reduction in bed days.

231. To analyse the impact of the intervention, it is assumed that at the baseline COPD patients who should receive NIV but do not would have a higher probability of requiring endotracheal intubation and of complications. This implies higher costs associated with treating the exacerbation. With the intervention, the same patients would have a lower probability of requiring endotracheal intubation and of complications, hence treatment costs would be lower. The difference between the two approaches gives the net cost.

Summary of costs and savings

235. In summary, the average annual cost of extending NIV for COPD patients is estimated to be £3.4 million (£34 million over ten years). At the baseline (i.e. without NIV) the estimated average cost is around £4.5 million per year (£45 million over ten years). This implies that the total ten- year (undiscounted) estimated net cost of the recommendation is **–£10.5 million** (–£9.5 million – –£11.5 million), with an average annual net cost of **–£1.5 million**.

Assessment of costs and benefits

247. The development of the guidelines will assist commissioners in developing good-quality services for people with asthma. We estimate that this will result in fewer admissions and better quality of life, and detailed assessment of costs and benefits will be developed to support the publication of the Good Practice Guide.

Estimates of COPD prevalence by stage

There are two key issues for estimating COPD prevalence by Stage:

- Alternative definitions of stage, namely the Global Initiative for Obstructive Lung Disease (GOLD) guidelines[82] and the National Institute for Health and Clinical Excellence (NICE) COPD guidance.[83] It should be noted that the GOLD and NICE definitions are not equivalent, in that the GOLD stage refers to airway obstruction, while the NICE stage refers to the COPD severity stage more broadly.
- Pre- and post-bronchodilator measurements of lung function.

Prevalence estimates in this annex are based on GOLD definitions of stage and using a bronchodilator adjustment.

Given measurements of lung function from the *Health Survey for England 2001* (HSE), it is possible to derive an estimate of the breakdown of the individuals with COPD – **by severity stage** – i.e. mild, moderate, severe or very severe, using GOLD (2007) definitions of airway obstruction.

Estimates of the underlying prevalence of COPD

There is a requirement to adjust the underlying prevalence to account for the use of bronchodilators and the need for a distribution of the underlying prevalence by age. The following approach is used to estimate the prevalence:

- The adjustment is applied to the raw prevalence data from the HSE to provide age-specific prevalence rates.[84]
- The age-specific prevalence rates are then summed to provide an overall population prevalence rate.
- There is an assumption that the effect of bronchodilators is independent of age, but varies across severity stage. Bronchodilators have an impact at the GOLD mild and moderate stages.

Underlying prevalence and undiagnosed prevalence, using the GOLD definition

The breakdown of these results by severity stage and the post-bronchodilator estimates are presented in Tables 2 to 4 below. There is a substantial difference when the adjustment is made for the lack of bronchodilator use compared to the raw data before this adjustment. In 2009, the estimates are **4.65 million** (pre-bronchodilator prevalence) and **3.5 million** (post-bronchodilator prevalence).

Table 2: The underlying prevalence of GOLD severity stage COPD (after post-bronchodilator adjustment)

COPD GOLD severity stage	Proportion of underlying COPD in the population (2008)	Number of COPD cases in the population (2008 estimate)*	Proportion of underlying COPD in the population (2009)	Number of COPD cases in the population (2009 estimate*)
Mild	31.75%	1,095,000	31.74%	1,107,000
Moderate	39.82%	1,373,000	39.81%	1,389,000
Severe	23.37%	806,000	23.38%	815,000
Very severe	5.06%	175,000	5.07%	177,000
Total		3,448,000		3,488,000

Source: Department of Health analysis of HSE 2001; disease severity stage based on GOLD (2007) guidelines
*Numbers are rounded, so may not tally.

Table 3: Underlying COPD prevalence by age and severity using GOLD-defined underlying prevalence (post-bronchodilator)

Age bands	COPD GOLD stage				Total
	1	2	3	4	
16–24	72,090	45,861	15,322	0	133,274
25–34	85,513	74,183	26,506	0	186,202
35–44	155,890	120,941	23,571	3,367	303,769
45–54	240,022	176,186	42,513	13,081	471,803
55–64	208,949	296,352	140,989	38,772	685,062
65–74	219,323	301,510	146,473	50,947	718,254
75+	125,228	373,675	420,017	70,789	989,710
Total*	**1,107,015**	**1,388,709**	**815,392**	**176,957**	**3,488,073**
Proportion of total by severity stage	31.74%	39.81%	23.38%	5.07%	100.00%

Source: Department of Health analysis of HSE 2001; disease severity stage based on GOLD (2007) guidelines
*Numbers are rounded, so may not tally

Table 4: Undiagnosed COPD prevalence by severity, using GOLD-defined underlying prevalence

	2008	2009
Mild	1,095,000	1,107,000
Moderate	1,088,000	1,102,000
Severe	481,000	488,000
Very severe	12,000	13,000
Total*	**2,676,000**	**2,710,000**

*Numbers are rounded, so may not tally

Sources

The key data sources, which form the basis of these estimates, are the following:

- Department of Health analysis of HSE 2001 data;[85] the HSE 2001 is the most up-to-date national health survey, which includes estimates of lung function in a large sample of the population. In 2001, the HSE involved sending a nurse to the respondent's house to conduct spirometry and obtain a measure of lung function.
- Office for National Statistics population projections for England;[86] this data is based on projections from 2006 and represents the most up-to-date national population estimates available.
- Quality and Outcomes Framework statistical bulletin;[87] this provides annual data on recorded disease prevalence, on GP registers in England.
- Supplemental data from a study by Perez-Padilla et al. (2007).[88]

- unit costs for a GP consultation based on the Personal Social Services Research Unit (2008) unit costs for an average GP consultation (11.7 minutes); uprated using the Hospital and Community Health Staff (HCHS) pay inflation scale.

Table 2: Costs attributed to COPD for GP consultations

Costing for consultation	Consultations with COPD recorded as the reason for consultation	All consultations for people with COPD
Number of people with recorded COPD	772,000	772,000
Number of consultations per person due to COPD	2.76	7.03
Cost of consultation per person	£36.50	£36.50
Total cost	**£78m**	**£198m**

Pharmaceuticals

Pharmaceutical costs for the treatment of COPD specifically are not available. However, the costs and volumes of drugs typically used to treat COPD are available – although most of these drugs are also used to treat asthma. The costs and volumes of these drugs are listed in the NHS Information Centre's *Prescription cost analysis* (2008).[89] The net ingredient costs of each drug and a total cost are presented in the table below. Drugs that are multi-purpose, i.e. for asthma and COPD, have been apportioned using Quality and Outcomes Framework prevalence rates for the respective diseases. COPD represents 19% of the registered population of people with asthma and COPD, and hence this value is used for apportioning.

Table 3: Drug costs for COPD

Drug prescribed exclusively for COPD	Net ingredient cost
Tiotropium	£98.8m
Carbocisteine	£8.8m
Subtotal (drugs used exclusively for COPD)	£107.6m

Drugs prescribed for COPD and asthma	
Salbutamol	£92.2m
Ipratropium	£16.0m
Salmeterol	£53.9m
Formoterol	£5.5m
Oral theophylline preparations	£2.2m
Respiratory corticosteroids	£577.7m
Total cost of drugs used for asthma and COPD	£747.5m
Apportionment to COPD (%)	19%
Total apportioned to COPD	£155.7m
Total cost of all drugs used for COPD	**£263.3m**

*Based on the number of people with COPD as a proportion of the number of people with COPD and asthma (QOF prevalence data).

Secondary care

Secondary care costs consists of:

- accident and emergency attendances;
- inpatient admissions; and
- outpatient cases.

Accident and emergency (A&E) attendances and emergency journeys

Quarterly data on A&E attendances is collected by the Department of Health.[90] However, this is not broken down by reason for attendance. A study by Downing and Wilson (2004)[91] provides estimates of the reasons for A&E emergency journeys, analysing data available from acute trusts between April 1999 and March 2002. This is used as a proxy for the number of A&E attendances. Combining these estimates with 2008 data from the Personal Social Services Research Unit on the unit cost of an A&E attendance allows us to estimate a cost for A&E attendances attributable to COPD. A cost of approximately £30 million, for 2008/09, is estimated and presented in Table 4 below.

Table 4: Costs of A&E attendances attributable to COPD

	Number	Cost
Total A&E attendances 2007/08	**19,127,993**	
% of Attendances for under-65s related to COPD*	0.1%	
% of Attendances for over-65s related to COPD*	1.4%	
Total COPD attendances for under-65s	19,128	
Total COPD attendances for over-65s	267,792	
Total COPD-related A&E attendances	**286,920**	
Average cost per patient A&E visit		£104
Total A&E attendance cost for COPD patients		**£30m**

*Downing A and Wilson R. Older people's use of accident and emergency services. *Age and Aging* 2004; 34: 24–30.

The results of the approximate costs for emergency journeys apportioned to COPD are presented in Table 5. This uses the same methodology as for A&E attendances (see above) and results in an approximate cost of £39 million.

Table 5: Total cost of emergency journeys attributable to COPD*

	Number	Cost
Total emergency ambulance journeys	7,200,000	
% of A&E journeys for under-65s related to COPD	0.1%	
% of A&E journeys for over-65s related to COPD	1.4%	
Total COPD A&E journeys for under-65s	7,200	
Total COPD A&E journeys for over-65	100,800	
Total COPD-related emergency journeys	**108,000**	
Average cost per emergency journey**		£359
Total COPD emergency journey cost		**£39m**

*PSSRU. Unit costs of Health and Social Care 2008.
**www.ic.nhs.uk/pubs/precostanalysis2008

Inpatient admissions

The most recently available costs for inpatient admissions where COPD was the primary cause of the treatment, are for 2007/08. The total costs were approximately £276 million. The overwhelming majority were for non-elective, ordinary consultations. The total number of cases was around 180,000. This cost is estimated to be **£286 million** for 2008/09 (uprating to 2008/09 by the Hospital and Community Health Staff pay and price inflation series).

Outpatient cases

The following table presents the number of cases and national average unit cost for outpatients. The costs are calculated using NHS reference costs; however, they are not COPD-specific, but are for all respiratory medicine (NHS reference code specialty number 340). To apportion these costs, the proportion of COPD inpatient bed days in relation to total respiratory inpatient bed days is used as a proxy.

Table 6: Outpatient cases and costs for respiratory medicine and COPD

Outpatient (2007/08)	Number of cases	National average unit cost	Total
Consultant-led first attendance face-to-face	196,991	£186	£36.6m
Consultant-led follow-up attendance face-to-face	483,196	£118	£56.8m
Consultant-led follow-up attendance non-face-to-face	250	£50	£0.01m
Non-consultant-led first attendance face-to-face	35,951	£145	£5.2m
Non-consultant-led first attendance face-to-face	402	£48	£0.02m
Non-consultant-led follow-up attendance face-to-face	62,471	£98	£6.1m
Non-consultant-led follow-up attendance non-face-to-face	2,264	£38	£0.09m
		Total all respiratory admissions	£104.9m
		Apportionment used for COPD*	22.54%
		Total outpatient cost apportioned to COPD (2007/08)	£23.6m
		Estimated outpatient cost for 2008/09**	**£24m**

*Apportioned using the number of COPD inpatient bed days as a proportion of the total number of inpatient bed days for respiratory disease.

**Uprated using the Hospital and Community Staff (HCHS) pay and price inflation series.

Table 7: Summary of secondary care costs

Component	Total cost (2008/09)
A&E attendances	£30m
Emergency journeys	£39m
Inpatient	£293m
Outpatient	£24m
Total	**£386m**

Preventive care

Preventive costs include pneumococcal and influenza vaccinations for patients with COPD (which aid prevention of exacerbations). NICE guidelines recommend that patients with COPD receive the influenza and pneumococcal vaccines as part of the management and prevention of exacerbations. Immunisation policy recommends that those over 65 and all those in at-risk groups are given a number of immunisations. Those with COPD are included in the at-risk group.[92] There is limited data available on the number of vaccinations given per year, so the following components are used as presented in the tables below:

Influenza vaccinations

- The unit cost of the vaccination to Department of Health of £14.20. This includes the unit cost of the vaccine and an administration fee paid to the GP.
- Number of people with COPD, based on Department of Health prevalence estimate of 8%.
- Take-up/coverage of the vaccine approximated using 74% coverage of vaccinations among over-65-year-olds based on NHS immunisation statistics sourced from the Health Protection Agency (HPA).[93]
- The estimate is an upper bound in that some COPD patients (e.g. those aged over 65) would have received the vaccine anyway.

Table 8: Estimates of costs of influenza vaccine for those with COPD

Total unit cost of vaccine	£14.20
Number of people with COPD	772,000
Number of people with COPD receiving influenza vaccine	571,000
Total cost	**£8.1m**

Pneumococcal vaccinations

The delivery of the pneumococcal vaccine is different from that of the influenza vaccine. The former is given once in a lifetime whereas the latter is given annually. The policy of providing the pneumococcal vaccine has been recommended since 2005. The proportion of over-65s who have received the vaccination up to March 2008 is 69%. For consistency with the rest of the document, the 2007/08 figure is estimated to be a third of this. Hence, the calculation is made up of:

- the total cost of the vaccination of £46.75, which includes the cost of the vaccine and the payment to the GP for administering the vaccine;
- number of people with COPD, based on the Department of Health's prevalence estimate of 8%; and
- the proportion of over-65s vaccinated (as a proxy for take-up of the vaccine) of 69%.

The estimate is an upper bound in that some COPD patients (e.g. those aged over 65) would have received the vaccine anyway.

Table 9: Estimates of costs of pneumococcal vaccine for those with COPD

Total unit cost of vaccine	£46.75
Number of people with COPD	772,000
Number of people with COPD receiving pneumococcal vaccine (since 2005)	361,000
Total cost	**£12m**

Community services

There is no data available on the level of community services provided for COPD patients; hence, it is possible to present only the unit costs of healthcare professionals who may be involved in providing these services.

Oxygen therapy

Based on data from the Department of Health, the total cost of the home oxygen service was £105 million in 2008/09, and there were 85,000 patients receiving home oxygen services as of June 2008. This provides an approximate cost of £1,235 per patient per year. Some patients receive the service for cystic fibrosis, asthma or palliative care. Approximately 60% of patients on home oxygen therapy are COPD sufferers. **Hence, apportioning the total cost of home oxygen therapy on this basis gives an estimated cost of £63 million.**

Caution should be given to these estimates, as they do not take into account variation in oxygen consumed by all patients registered on home oxygen therapy.

Using the evidence in the table above, it is estimated that between 2.5 million and 3.5 million of the workforce in England are in occupations deemed a risk for developing COPD. However, it has not been possible to identify data on the number of occupations without sufficient protective equipment (against COPD) in place.

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