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Improving COPD outcomes in primary care

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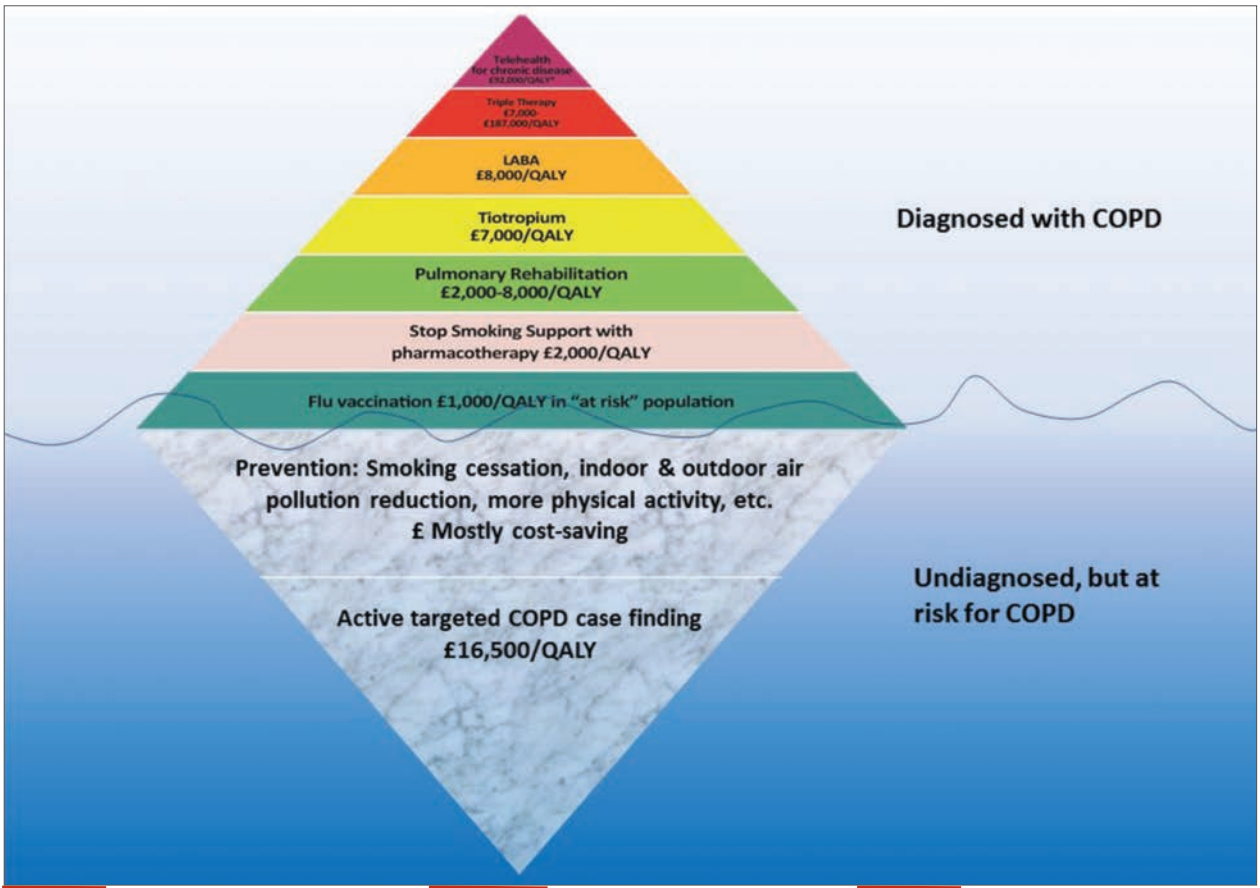


FIGURE 1
Updated COPD value pyramid including case finding for undiagnosed people at risk of COPD[7]

How can accuracy of diagnosis be improved?

THE NHS LONG TERM PLAN, PUBLISHED EARLY IN 2019, HAS A STRONG FOCUS ON RESPIRATORY ILLNESS AND reflects significant variations in outcomes both within the UK and when compared with other European countries, as shown in the 2012 European Respiratory Society (ERS) COPD audit.[1,2] The aim is to deliver effective interventions to reduce symptoms, improve quality of life and reduce acute exacerbations and hospitalisations in people with COPD.

DIAGNOSIS

Diagnosis of COPD is based on the presence of airflow obstruction after the administration of a bronchodilator i.e. post-bronchodilator spirometry.[3] However, the National COPD Audit report for 2017-18 found that 59.5% of people hospitalised with a COPD exacerbation in England and Wales had no spirometry result available and in 12% of those who had undergone spirometry the test showed no airflow obstruction.[4] Several different factors may have contributed to this including: the availability of spirometry in primary care; the past often opportunistic nature of spirometry testing and problems with information sharing and access between primary and secondary care and between different hospitals.

The challenge of accurate and appropriate diagnostic testing is not confined to COPD, it also applies to the implementation and delivery of NICE asthma diagnostic algorithms.[5]

What is the role of case finding?

CASE FINDING

The benefit of case finding for COPD in current or former smokers, aged 40-79 years, was demonstrated in a UK study. The use of a simple electronic pop-up which appeared at the time of a consultation, reminding the clinician to hand the patient a screening questionnaire for COPD, significantly increased the number of new cases diagnosed. The highest detection rate was seen when this was combined with mailing a further questionnaire with two reminder letters to patients, asking »

How should patients be monitored?

them to complete and return the questionnaire. Respondents reporting relevant respiratory symptoms were invited for post-bronchodilator spirometry. Almost 75,000 patients from 54 GP practices were included. Overall, 4% of eligible patients in the case finding group had been newly diagnosed with COPD compared with 1% in the routine care group, after one year. In those who were also sent the screening questionnaire by post the rate of new diagnosis was 5%.[6]

Recent analysis highlighted the cost effectiveness of this strategy[7] and advocated inclusion of case finding in the COPD value pyramid see figure 1, p17.[8] This study also illustrated the risk of overdiagnosis where airflow obstruction is defined using a fixed FEV_1/FVC ratio of < 0.7 rather than using the lower limit of normal (LLN). An additional 13% of people screened were diagnosed with COPD. They were generally older, with nearer normal lung function, fewer symptoms and were more likely to have cardiac disease;[10] hence, at apparent risk of overdiagnosis.

As mentioned in a previous article in this journal, by one of the authors, more and more respiratory laboratories are using the LLN to report airflow obstruction.[11] This reduces overdiagnosis of COPD in older individuals and underdiagnosis in younger people (hence improving the chance for early intervention in the latter group) as shown in figure 2, left.

The 2019 international Global Obstructive Lung Disease (GOLD) COPD guideline[12] recommends using an FEV_1/FVC ratio of < 0.7 but specifically cautions against diagnosing COPD in a patient with a single post-bronchodilator FEV_1/FVC measurement of between 0.6 and 0.7, because of biological variation. Using LLN makes spirometry more complex to interpret than using the traditional fixed cut-off for FEV_1/FVC ratio of 0.7 and supports greater specialist input and oversight.

FIGURE 2
Change in predicted FEV_1/FVC with age illustrating under-diagnosis of COPD in younger adults (false negatives) and overdiagnosis in older adults (false positives)[9]

LLN = lower limit of normal

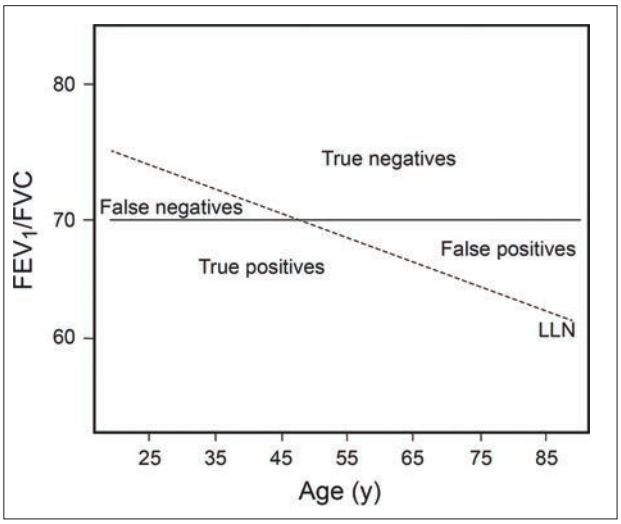


Table 1

Indications for referral for specialist review in patients with COPD[3]

Diagnostic uncertainty	To confirm diagnosis
The patient requests a second opinion	To confirm diagnosis
Alternative diagnosis such as dysfunctional breathing	To exclude other diagnoses and assess the impact of multiple conditions
Symptoms disproportionate to lung function	To exclude other diagnoses and assess the impact of multiple conditions
Frequent lower respiratory tract infections and regular phlegm production	To confirm or exclude bronchiectasis
Haemoptysis	To confirm or exclude other diagnoses (lung cancer, tuberculosis etc)
Assessment for oxygen including onset of cor pulmonale	Assessment for additional treatment
Assessment for lung volume reduction procedure	Assessment for additional treatment
Assessment for lung transplantation	Assessment for additional treatment
Rapid decline in lung function	Need to assess and attempt to arrest decline
Alpha-1-antitrypsin deficiency or COPD diagnosed before 40 years of age	For genetic counselling, potential sub-specialist national centre review and ongoing monitoring

MONITORING

Patients with COPD should be reviewed annually though the need to perform spirometry at these annual visits is less compelling now that FEV_1 is not used to guide common COPD treatments.

However, it is advisable to repeat spirometry if there is a significant change in symptoms. It is important to determine objective measures of breathlessness (MRC dyspnoea score), quality of life (CAT questionnaire) and exacerbations (annual exacerbation and hospitalisation rate) as part of this review.

This provides a good opportunity to encourage self-management, ensure appropriate use of rescue packs, check inhaler technique, review non-pharmacological and pharmacological treatments and ensure that patients know how to access local services in the event of an exacerbation.

The vast majority of COPD patients do not need regular specialist input and the reasons for referral are detailed in the NICE COPD guideline[3] (see table 1, left). However, referral and follow-up is appropriate in patients where bronchiectasis is suspected and, in some cases, where use of long-term antibiotics is considered, where therapies such as lung volume reduction procedures and lung transplantation may be an option and in patients who have severe alpha-1-antitrypsin deficiency where additional treatments and participation in clinical trials may be appropriate.

Referral is also required for long-term or ambulatory oxygen therapy. The prescription of oxygen and follow-up for these patients should be through commissioned oxygen teams.

ACUTE EXACERBATIONS

A sustained acute worsening of the patient's symptoms from their usual stable state, which goes beyond their normal day-to-day variations is considered an acute exacerbation. The worsening of symptoms, although acute, is sustained typically over 48 hours (most COPD exacerbations are relatively slow in onset) and exceeds day-to-day variation, in particular breathlessness.

Table 2

Antibiotic treatment recommended by NICE for an acute exacerbation of COPD[14]

First line
Amoxycillin 500 mg tds for 5 days
Doxycycline 200 mg then 100 mg daily for 5 days
Clarithromycin 500 mg bd for 5 days

Second line
Any first-line alternative (above)
Co-amoxiclav 625 mg tds for 5 days
Co-trimoxazole 960 mg bd for 5 days
Levofloxacin 500 mg daily for 5 days

Table 3

An overview of current COPD treatment

Non-pharmacological
- Smoking cessation
- Influenza and pneumococcal vaccination
- Self-management
- Pulmonary rehabilitation
- Lung volume reduction surgery
- Lung transplantation
- Chronic ventilation

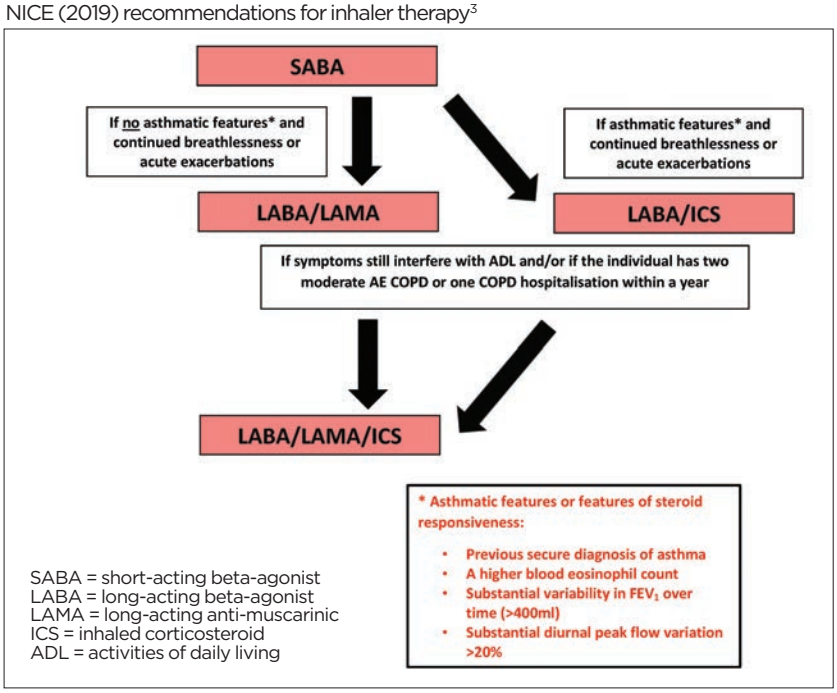
Pharmacological
- Short-acting bronchodilators
- Long-acting bronchodilators (LABA and LAMA)
- Inhaled corticosteroids
- Theophylline and roflumilast
- Low-dose antibiotics
- Long-term oxygen therapy and ambulatory oxygen

Post-hoc analysis of a UK telemonitoring study[13] highlights a large group of individuals who are treated repeatedly with antibiotics and most worryingly oral corticosteroids where the primary symptom is change in breathlessness on a background of a large day-to-day variation in that symptom. In this situation, an increase in bronchodilator medication is likely to represent the most effective treatment and it is vital that healthcare professionals who prescribe rescue packs consider to what degree symptoms relate to anxiety and background symptom variability.

This should be suspected where a high number of rescue packs are used (more than four per year), where exacerbations are typically non-infective and dominated by breathlessness and in people previously diagnosed with anxiety problems. This will need to be discussed directly and is often recognised by the individual if the subject is raised. It is worth considering bone protection for any individual prescribed more than three courses of prednisolone per year.

The first step in managing an acute exacerbation is to increase bronchodilator therapy, typically with additional inhaled beta-agonist. Where there is sign of infection (a change in phlegm volume and in particular purulence) a five-day course of antibiotics is indicated, and NICE produced guidance on this in 2018 (see table 2, above).[14] A short, typically five-day, course of prednisolone may be appropriate to speed up recovery but high-dose, intravenous and prolonged steroids are rarely justified.

FIGURE 3
NICE (2019) recommendations for inhaler therapy[3]



SABA = short-acting beta-agonist
LABA = long-acting beta-agonist
LAMA = long-acting anti-muscarinic
ICS = inhaled corticosteroid
ADL = activities of daily living

Many patients with acute COPD exacerbations who were previously treated in hospital can be managed at home by community respiratory teams consisting of specialist nurses and physiotherapists. With appropriate case selection this has been shown to be as safe as treatment in hospital and is popular with patients and their carers. As a minimum each area should offer early discharge from hospital, without a limit on caseload numbers, and ideally a community admission prevention scheme.

CHRONIC MANAGEMENT

In most cases treatment will involve multiple individualised therapies. A broad summary is shown in table 3, above.

For those who continue to smoke, smoking cessation is the most important intervention to prevent disease progression, and it is a key area of the NHS Long Term Plan.

The use of vaping as an aid to quitting has been strongly advocated by Public Health England[15] but recent reports from the USA have raised concerns about the safety of e-cigarettes. The ERS has consistently advised caution about heated nicotine products previously stating that 'human lungs are made to breathe clean air and any substance inhaled long term may be detrimental'. The 2019 ERS position statement recommends not using these products.[16] This is clearly an area with conflicting views. A lack of evidence on long-term effects means that definitive recommendations are not possible at present.

The aims of treatment are to reduce symptoms such as breathlessness, exercise limitation, sleep disturbance, and the consequent effect of these on quality of life, and exacerbations in order to reduce risk including mortality.

Current (2019) NICE guidance on inhaler therapy is summarised in figure 3, left.[3] Patients with COPD should be »

key points

SELECTED BY

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Diagnosis of COPD is based on the presence of airflow obstruction after the administration of a bronchodilator i.e. post-bronchodilator spirometry. However, the National COPD Audit report for 2017-18 found that 59.5% of people hospitalised with a COPD exacerbation in England and Wales had no spirometry result available and in 12% of those who had undergone spirometry the test showed no airflow obstruction. There is a risk of overdiagnosis in older people and underdiagnosis in younger individuals where airflow obstruction is defined using a fixed FEV_1/FVC ratio of < 0.7 rather than using the lower limit of normal.

The benefit of case finding for COPD in current or former smokers, aged 40-79 years, was demonstrated in a UK study. The use of an electronic pop up which appeared at the time of a consultation, reminding the clinician to hand out a screening questionnaire for COPD significantly increased the number of people diagnosed. The highest detection rate was seen when this was combined with mailing a further screening questionnaire, and reminding the patients twice by letter to complete the questionnaire.

Patients with COPD should be reviewed annually though the need to perform spirometry is less compelling now that FEV_1 is not used to guide common COPD treatments. It is advisable to repeat spirometry if there is a significant change in symptoms. It is important to determine objective measures of breathlessness MRC dyspnoea score), quality of life (CAT questionnaire) and exacerbations (annual exacerbation and hospitalisation rate) as part of this review. This provides a good opportunity to encourage self-management, ensure appropriate use of rescue packs, check inhaler technique, review non-pharmacological and pharmacological treatments and ensure that patients know how to access local services in the event of an exacerbation.

Referral and follow-up is appropriate in patients where there is diagnostic uncertainty, where use of therapies such as lung volume reduction procedures and lung transplantation are being considered and in patients with severe alpha-1-antitrypsin deficiency. Referral is also required for long-term or ambulatory oxygen therapy.

In most COPD exacerbations the worsening of symptoms is sustained typically over 48 hours and exceeds day-to-day variation, in particular breathlessness. The first step in managing an acute exacerbation is to increase bronchodilator therapy, typically with additional inhaled beta-agonist. Where there is sign of infection a five-day course of antibiotics is indicated, a short, typically five-day, course of prednisolone may also be appropriate.

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offered a short-acting bronchodilator for as required use. Those with continued breathlessness or acute exacerbations should be offered regular inhaler therapy. NICE recommends the use of long-acting beta-agonist (LABA)/long-acting anti-muscarinic (LAMA) inhalers first line but with an option to commence a LABA/inhaled corticosteroid (ICS) if there are strong asthmatic features.

Subsequent escalation to a triple LABA/LAMA/ICS inhaler can be considered if there are ongoing symptoms affecting activities of daily living and/or at least two moderate exacerbations or one severe exacerbation (requiring hospitalisation) within a year while prescribed either two drug combinations, see figure 3, p19.

Inhaled corticosteroids reduce exacerbation rate so are not indicated for people who do not, or rarely, suffer exacerbations. Most benefit has been shown in those patients with an eosinophil count > 300, at a time of disease stability, with no benefit seen in those with counts < 100.[12]

The indications for pulmonary rehabilitation have been covered in an earlier article, by one of the authors, in this journal.[17] Lung volume reduction procedures and lung transplant are appropriate for only a small minority of patients with advanced COPD.[12]

SELF-MANAGEMENT

National and international COPD guidelines recommend self-management. Although, trials from the USA have shown disappointing outcomes from self-management,[18,19] the largest UK trial showed benefits in outcomes in a substantial minority of participants.[20] This study included 464 patients with, typically, severe COPD (mean FEV_1 40% of predicted) and almost all had at least one comorbidity with an average of three. Overall, 42% of patients successfully self-managed judged by whether they responded appropriately to the onset of an exacerbation and used rescue medication appropriately. This group who self-managed successfully showed a significant reduction in COPD readmissions (hazard ratio = 0.44; P = 0.003) and a longer time to first exacerbation.

Telehealth interventions have often shown disappointing outcomes and this is an area where more research is needed to improve understanding about the barriers to successful self-management. This should provide greater insight into the role of online and app-based programmes.

Competing interests: None

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Useful information

British Thoracic Society
www.brit-thoracic.org.uk

British Lung Foundation
www.blf.org.uk