

# **Humber and North Yorkshire** **Integrated Care Board**

**2025**

## **Guideline for the diagnosis and** **management of COPD**

This document is designed to complement the HNY COPD Guideline: Quick Reference Guides that are available at <https://humberandnorthyorkshire.org.uk/diagnosing-and-treating-chronic-obstructive-pulmonary-disease-copd/>.

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## 1. COPD Diagnosis

COPD is a heterogeneous disease that is caused by exposure to noxious inhaled particles (most commonly tobacco smoke) in susceptible individuals over time. As such, COPD typically affects people over the age of 35 and causes breathlessness, cough and sputum production. Symptoms are typically persistent and progressive and can be punctuated by periods of rapid worsening, termed exacerbations that contribute to disease progression, frequently lead to healthcare utilisation and are a major cause of COPD related morbidity and mortality.

COPD diagnosis requires clinical suspicion, and should be considered in any adult presenting with respiratory symptoms and/or recurrent chest infections that has a relevant exposure history. All patients in whom COPD is suspected should undergo:

- post-bronchodilator spirometry to assess for airflow limitation;
- blood testing (full blood count) to i) assess for an alternative cause for presenting symptoms, ii) to assess blood eosinophils to predict ICS response if COPD confirmed, and iii) to assess for complications/comorbidities (e.g. polycythaemia, heart failure, etc). Also check alpha-1 antitrypsin level if young age, basal predominant emphysema, or family history of alpha-1 antitrypsin deficiency;
- chest x-ray to assess for evidence of hyperinflation and/or alternative cause for presenting symptoms (e.g. lung malignancy, interstitial lung disease, etc).

**A COPD diagnosis can be confirmed in the context of an appropriate clinical history, relevant exposure and evidence of airflow limitation on post-bronchodilator spirometry (FEV1/FVC <0.7).** Where the FEV1/FVC ratio on post-bronchodilator spirometry is between 0.6 and 0.8, consider repeating spirometry to confirm the result.

Using a fixed ratio of 0.7 may lead to over-diagnosis in the elderly, and under-diagnosis in younger adults (<50 years). In such individuals, clinical judgement should be applied and the lower limit of normal (LLN) for FEV1/FVC used to support your judgement.

### 1.1 Consider Alternative Diagnoses and Treatable Traits

Shortness of breath, cough and sputum production are common respiratory symptoms and while they should prompt consideration of COPD and prompt appropriate assessment and investigation, they are non-specific and can be caused by a range of thoracic and extra thoracic causes. Indeed, even in the presence of COPD, other causes for respiratory symptoms can co-exist (e.g., asthma, bronchiectasis, chronic cough, congestive cardiac failure, etc). In such circumstances, a treatable traits approach can be helpful to guiding treatment.

The following features should prompt consideration of common alternative/co-existing causes for respiratory symptoms:

**Asthma:** marked symptom variability, dramatic response to bronchodilators (>400ml/15% improvement in FEV1) and/or oral corticosteroids.

**Bronchiectasis:** chronic cough with copious sputum production, recurrent bacterial infective exacerbations, sputum colonisation with *Pseudomonas aeruginosa* and/or atypical mycobacteria, consistent abnormalities on thoracic imaging (bronchial dilatation).

**Chronic Cough:** Chronic cough is a common early symptom in COPD but is also a diagnosis in its own right. Individuals with chronic cough, normal lung function and imaging should have a diagnosis of chronic cough considered. Patients with COPD and a chronic cough may have pathophysiological mechanisms, such as cough hypersensitivity, underlying their cough that are more commonly associated with chronic cough than COPD. As such, chronic cough should be considered a treatable trait among those with COPD. For further information about chronic cough and its management, consult the [BTS Clinical Statement on Chronic Cough in Adults](#).

**Congestive Cardiac Failure:** prominent orthopnoea, paroxysmal nocturnal dyspnoea, peripheral oedema, cardiac history, consistent abnormalities on thoracic imaging (e.g., cardiomegaly, pulmonary oedema, bilateral pleural effusions etc).

**Interstitial Lung Disease:** presence of inspiratory crackles on chest auscultation, consistent imaging abnormalities.

## 2. COPD Case-finding

People often live with COPD for many years before they receive a diagnosis and are able to access evidence-based treatments. COPD case-finding provides an opportunity to identify people living with COPD without a diagnosis. Case-finding can be undertaken opportunistically, when at risk individuals attend a healthcare setting for other reasons, or proactively, utilising healthcare data to identify high risk individuals and inviting them for diagnostic assessment. In recent years, the roll out of Lung Cancer Screening programmes has provided an opportunity to identify and diagnose COPD earlier.

### 2.1 Lung Cancer Screening (formerly Lung Health Checks)

At the time of guideline creation, Humber and North Yorkshire has a number of active Lung Cancer Screening Programmes and others are in the process of being established. Lung cancer screening programmes invite individuals aged between 55 and 74 years that have ever smoked to attend screening. This cohort therefore reflects a population at risk of COPD. People attending a lung cancer screening appointment will be assessed to ascertain their risk of lung cancer and, when considered at risk, will proceed to have a low-dose CT scan performed. Some lung cancer screening programmes also include symptom assessment and undertake pre-bronchodilator spirometry.

Lung cancer screening programmes provide an opportunity to identify COPD among people that have not been diagnosed during their routine care. Patients attending lung cancer screening programmes should be considered for COPD diagnostic assessment/testing if they:

- do not have an existing COPD diagnosis
- AND one or more of:**
- relevant respiratory symptom (breathless, cough, sputum, chest infections)
- evidence of emphysema on their screening low dose CT
- unexplained pre-bronchodilator airflow limitation (when measured).

In the event that access to formal, post-bronchodilator spirometry is limited, clinicians should use clinical judgement, based on the available information, to make pragmatic treatment

decisions. Appendix A presents data based on the Hull Lung Health Check Programme, displaying the probability of confirmed COPD based on the varying levels of clinical information gathered during lung cancer screening and can be used to help inform clinical decision making:

### **Recommendation**

Patients with suspected COPD based on an incidental findings of relevant symptoms (breathlessness, cough, tendency to chest infections), emphysema, and/or abnormal pre-bronchodilator spirometry, should be offered formal diagnostic assessment including post-bronchodilator spirometry.

- If COPD is confirmed, treatment should be initiated in accordance with this guideline.
- If COPD is not confirmed, alternative diagnoses should be considered and treated appropriately.

Where access to post-bronchodilator spirometry is limited and/or will be delayed, the following actions can be considered based on their probability of having COPD:

- Individuals with moderate-severe emphysema and no pre-bronchodilator spirometry should be considered to have a high probability of having COPD and treatment should be initiated while confirmatory tests are awaited. Patients should be informed that they are suspected to have COPD but further confirmatory tests will be required.
- Individuals with no or mild emphysema and without pre-bronchodilator airflow limitation, have a low probability of having COPD and, in most cases, should have formal diagnostic assessment completed prior to treatment being initiated.
- Individuals with pre-bronchodilator airflow limitation (i.e.,  $FEV1/FVC < 0.7$ ), particularly when symptomatic and/or with emphysema on LDCT, have a high probability of COPD and in the absence of an alternative explanation (e.g., asthma), should have treatment initiated pending formal diagnostic assessment. Patients should be informed that they are suspected to have COPD but further confirmatory tests will be required.
- Individuals without pre-bronchodilator airflow limitation on spirometry (i.e.,  $FEV1/FVC \geq 0.7$ ) have a low probability of COPD, particularly when there is no or mild emphysema on LDCT. In most cases, such patients should have formal diagnostic assessment completed prior to treatment being initiated. Patients should be informed that they might have COPD and will require further diagnostic tests.

### 3. COPD Management

COPD is a heterogenous condition that typically progresses overtime. As such, treatment requirements will vary between individuals and overtime within individuals. As such, treatment plans should be personalised based on initial assessment, response to treatment monitored and treatment adjusted if necessary, and regular review (at least annual) undertaken to reassess treatment needs. COPD treatments should aim to i) reduce symptoms and improve exercise capacity, and ii) reduce risk of disease progression, exacerbations and mortality.

#### 3.1 Non-pharmacological

##### 3.1.1 Smoking Cessation: Treating Tobacco Dependence

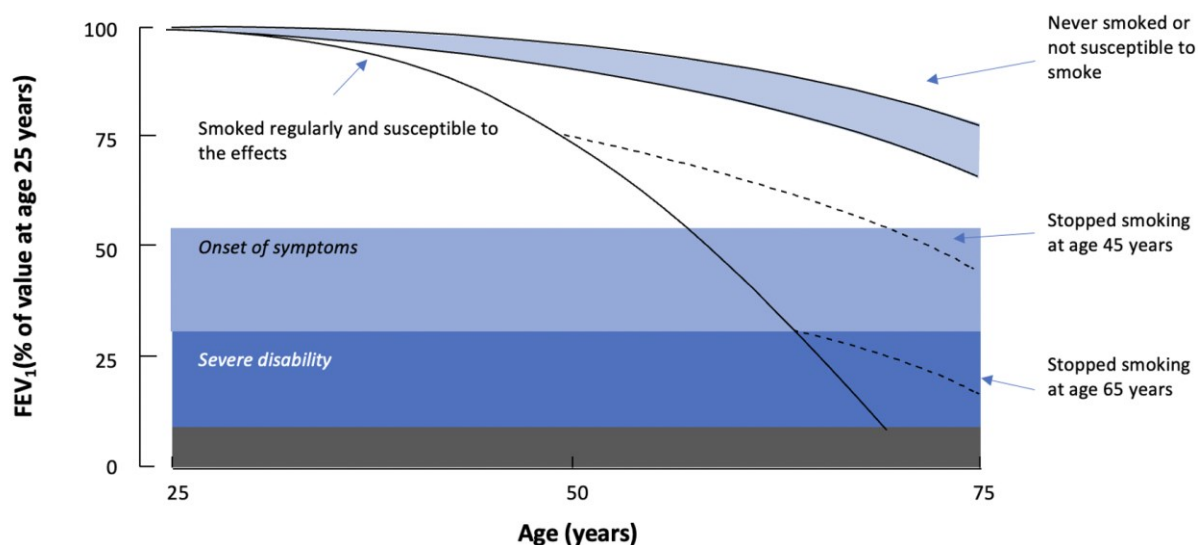


Figure 1. Lung function trajectories based on smoking status, susceptibility to lung injury from smoking, and age stopped smoking.

Supporting people with COPD to stop smoking is the most impactful intervention you can do to improve their long-term outcomes.

All COPD patients that smoke should be offered Very Brief Advice (VBA) during every clinical contact. VBA includes:

- **Ask** – ask and record smoking status
- **Advise** – the most effective way to stop smoking is with a combination of medication and specialist support
- **Act** – refer to their local specialist stop smoking service for advice and support.

Smokers that get expert support are 3 times more likely to successfully stop smoking.

For more information, see [NICE Guideline 209: Tobacco – preventing uptake, promoting quitting and treating dependence.](#)

### 3.1.2 Pulmonary Rehabilitation

#### **What is pulmonary rehabilitation (PR)**

Pulmonary rehabilitation is an individually tailored multidisciplinary programme comprising both education and exercise. It is effective at improving people's symptoms, increasing their exercise capacity and quality of life, and reducing risk of exacerbations.

#### **Who should be referred for PR**

PR should be offered to all people with COPD who are functionally disabled by their symptoms (typically mMRC  $\geq 2$ ).

#### **How to increase engagement with pulmonary rehabilitation**

PR is a highly effective treatment for COPD, with proven benefits (described above). Additionally, PR improves patients emotional functioning and sense of control. Despite this, uptake and completion is low. It is important to clearly communicate the benefits of PR to patients, to explain that the programme will be tailored to their individual needs, and patients not wanting to attend classes, will be able to discuss this with the PR team following referral and consider alternative options.

#### **When not to refer for PR**

PR is unsuitable for people that:

- Are unable to walk
- Who have unstable angina or have had a recent myocardial infarction
- Individual services may have additional exclusion criteria (e.g. low BMI [ $<18$ ], uncontrolled hypertension, second or third degree heart block, significant aortic stenosis etc.) If you are unsure whether to refer or not, contact your local pulmonary rehabilitation service for advice.

### 3.1.3 Oxygen Therapy

#### **Forms of Oxygen Therapy used in COPD**

There are 3 forms of home oxygen therapy that are used for people with COPD, each with different indications and goals:

##### ***- Long Term Oxygen Therapy (LTOT)***

LTOT is indicated for people with COPD who have persistent hypoxia when stable. LTOT aims to improve long-term prognosis and requires  $>15$  hours use per day to provide the desired benefit.

##### ***- Ambulatory Oxygen Therapy (AOT)***

AOT may be indicated for people using LTOT that require AOT to enable 15 hours use per day. It may also be indicated for people where LTOT is not indicated but have been shown on formal exercise testing to desaturate on exertion and benefit from AOT. AOT aims to benefit patients' symptoms and exercise capacity rather than provide prognostic benefit. It should only be prescribed when such benefits are objectively demonstrated on formal assessment.

### ***Palliative Oxygen Therapy (POT)***

POT can be trialed for people receiving end-of-life care that have refractory breathlessness and hypoxia and have not responded to opioids and non-pharmacological measures.

When considering the appropriateness of home oxygen therapy, it is important to consider both the indication and safety. Home oxygen therapy should typically be arranged through referral to the local home oxygen service who will formally assess eligibility and safety prior to arranging provision. Additionally, the home oxygen service will arrange the most appropriate equipment to ensure patients' needs are met in a safe and efficient manner.

*NB. There is no indication for short burst oxygen therapy for the management of COPD.*

### **When to consider oxygen assessment for people with COPD**

The following clinical features should prompt consideration for referral for oxygen assessment:

- FEV1 < 30% predicted
- Cyanosis
- Polycythaemia
- Peripheral oedema
- Raised JVP
- SpO2 ≤92% on air

### **3.1.4 Vaccinations**

Patients with COPD should be offered and encouraged to receive the following vaccinations:

- Influenza (annual)
- COVID (annual)
- RSV (single dose for those aged 75-79 years [based on 24/25 schedule])
- Pneumococcal (single dose)
- 

### **3.1.5 Inhaler Technique Assessment and Training**

All COPD patients receiving inhaled therapy should have their inhaler technique assessed and taught during every consultation. Inhaler videos are available on the [Asthma + Lung UK website](#) and can be useful for reenforcing inhaler technique education.

## **3.2 Pharmacological**

Pharmacological treatment for COPD aims to improve symptoms and reduce risk.



### 3.2.1 Initiating and Optimising Pharmacological Treatment

**Step 1. Newly diagnosed COPD patients should be assessed for their risk of exacerbations and likelihood of response to inhaled corticosteroid (ICS). Risk and likelihood of ICS response can be classified as low or high.**

- Low: Blood eosinophil count  $< 0.3 \times 10^9/L$  **or** absence of features indicating high risk and likelihood of ICS response.
- High: Blood eosinophil count  $\geq 0.3 \times 10^9/L$  **and** history of 2 or more chest infections treated in the community or 1 or more hospitalisation for a chest infection in the prior year.

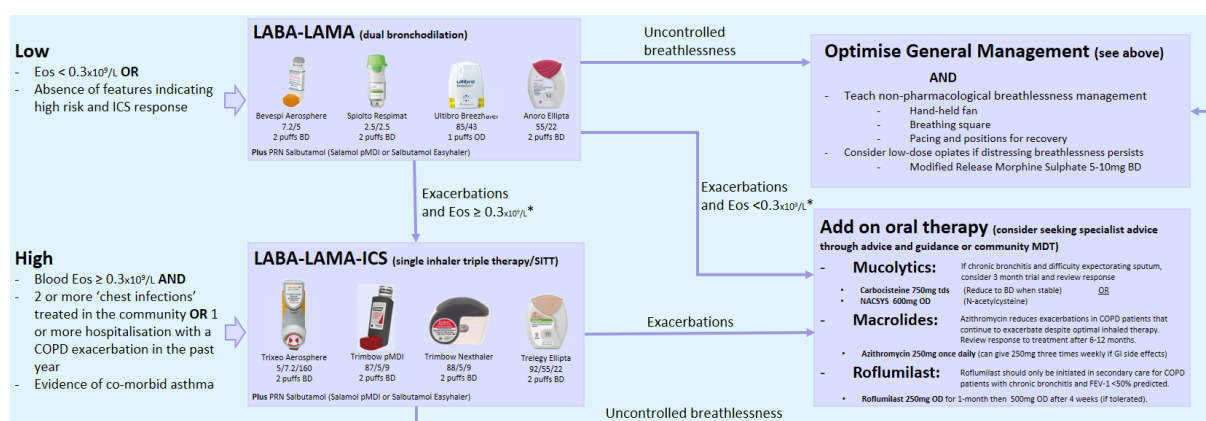
Individuals with evidence of co-morbid asthma should be treated either i) in accordance with COPD patients categorised as high risk with likelihood of ICS response, or ii) according to asthma guidelines with maintenance and reliever therapy (MART) plus additional long-acting muscarinic antagonist (LAMA), depending on the clinical judgement about whether COPD or asthma is the dominant condition.

**Step 2: Initial treatment choice should be based on assessment of risk and likelihood of ICS response.**

- Low: commence a LABA-LAMA combination inhaler
- High: commence single inhaler triple therapy (SITT)

**Step 3: Assess response to treatment and optimise treatment.**

All COPD patients should have their treatment reviewed annually to ensure that they are receiving the most appropriate treatment to maximise their symptom control and to minimise their future risk. Additional reviews should be undertaken following an exacerbation, a change in clinical condition or after a change in treatment. See figure 2 for recommended treatment optimisation based on initial treatment.



*Figure 2. Guide to treatment optimisation depending on the treatment goal and existing treatment. Patients can have treatment escalated along both uncontrolled breathlessness and exacerbation pathways in parallel where both treatment goals are applicable.*

### 3.2.2 Add on therapies: special considerations

#### *Mucolytics and Antioxidant Agents*

Oral mucolytic therapy should be considered for people with COPD that have a chronic cough that is productive of sputum. A 3-month trial of therapy is recommended and oral mucolytics should only be continued if there is symptomatic improvement.

Two oral mucolytics are available and included on the Humber and North Yorkshire formulary:

- Carbocisteine
  - Starting dose 750mg three times daily
  - Reduce to 750mg twice daily after a satisfactory response has been obtained
- NACSYS (acetylcysteine)
  - Starting and maintenance dose 600mg once daily

Carbocisteine is contraindicated in individuals with active peptic ulcer disease and should be used in caution in those with a past history of peptic ulcers. Caution is also advised when using NACSYS in people with a history of peptic ulcer disease and a careful assessment of risk and benefit should be undertaken in such patients and when used alongside other medicines that may increase the risk of gastrointestinal ulceration/irritation.

#### *Macrolides*

Azithromycin 250mg, either 3 times weekly or once daily, is an effective treatment to reduce the risk of COPD exacerbations in those that continue to exacerbate despite optimal inhaled therapy. The effectiveness of azithromycin appears to be lower in people with COPD that continue to smoke and it is therefore important to support people to stop smoking to maximise therapeutic benefit.

Specialist advice should be sought prior to commencing azithromycin in individuals with bronchiectasis and/or known atypical mycobacterial infection. The [British Thoracic Society clinical statement](#) recommends undertaking an ECG to confirm a normal QTc (<450ms for men and <470 in women) and checking liver function tests prior to commencing azithromycin. As for all treatments, the small risk of adverse effects should be considered alongside the benefits of reducing exacerbation frequency and the rationale for the treatment recommendation discussed with patients. Follow-up 3-6 months after treatment initiation is recommended to assess for evidence of clinical response and for any evidence of treatment related adverse effects.

#### *Roflumilast*

Roflumilast is an oral phosphodiesterase (PDE) 4 inhibitor used as an add on therapy for people with severe COPD (FEV1 < 50% predicted), chronic bronchitis, and recurrent exacerbations despite taking optimal inhaled therapy. Roflumilast should only be initiated by a specialist in respiratory medicine. Gastrointestinal side effects are common and are reduced by starting at a sub-therapeutic dose, prior to dose escalation if tolerated. Therefore, Roflumilast is typically prescribed as:

- Roflumilast 250 micrograms once daily for 28 days and, if tolerated, up titrate to:
- Roflumilast 500 micrograms once daily maintenance dose

A full list of cautions and contraindications for Roflumilast are listed in the [summary of product characteristics](#) (SmPC), but particular caution should be exercised when Roflumilast is prescribed for i) patients where weight loss is undesirable (e.g. COPD patients with BMI  $\leq 20$ ), and ii) co-morbid psychiatric disorders such as insomnia, anxiety, nervousness, and depression. Rare instances of suicidal ideation and behaviour have been described in patients without a past history of depression and roflumilast is not recommended for people with a prior history of suicidal ideation.

### *Opiates for breathlessness*

Opioids should only be considered for COPD patients that continue to experience severe breathlessness despite optimal inhaled therapy and despite non-pharmacological management, including training and practicing non-pharmacological breathlessness management techniques. The [Hull York Medical School Guide to Living Well with Breathlessness](#) is a useful resource to support non-pharmacological breathlessness management.

When opioids are considered to be indicated to support management of severe, refractory breathlessness, it is recommended to use a modified release oral morphine preparation at a starting dose of 5mg twice daily. Consideration can be given to increasing the dose to 10mg twice daily after 7 days if required to achieve the desired therapeutic effect. For individuals with severe renal impairment, 2.5mg of immediate release morphine (e.g. Oramorph) can be used up to 4-hourly for symptom relief. If higher doses of opioids are being considered for breathlessness management, consider referral for specialist palliative care review.

### *Managing mucus hypersecretion / sputum clearance*

People with chronic bronchitis (a chronic cough with sputum production) can sometimes struggle with sputum clearance, worsening symptoms and leading to distress. Smoking cessation, optimal inhaled therapy, and use of add on therapies (including mucolytics) can help to manage this symptom. Further information about these treatments can be found in the respective sections of this guideline. This section will focus on the role mechanical methods of mucus clearance that can be used in COPD patients.

#### **- Active cycle of breathing (ACBT)**

ACBT is an airway clearance technique that patients can be trained to use to aid sputum clearance. ACBT comprises three stages:

- Breathing control
- Thoracic expansion / deep breathing exercises
- Forced expiratory technique / huffing

For further information about ACBT, please review the [The Association of Chartered Physiotherapists in Respiratory Care leaflet no. GL-05](#).

- **Oscillating positive expiratory pressure (OPEP)**

OPEP can help with mucus mobilisation, symptoms and quality of life among people with COPD that have daily sputum production. OPEP devices should only be prescribed following review and advice by a respiratory physiotherapist or other respiratory specialist (physician, nurse or other AHP), with experience using such devices. In such circumstances, the patient should receive instruction and training in the use of the device by the requesting clinician.

The following OPEP devices are available for use across Humber and North Yorkshire:

- Aerobika
- Acapella
- Flutter

Some patients may choose to buy an OPEP device themselves, although this is not recommended, unless under the supervision of an appropriate specialist.

OPEP devices are contraindicated in the following circumstances:

- Untreated pneumothorax
- Recent/active haemoptysis
- Raised intracranial pressure
- Known or suspected middle ear pathology and/or tympanic membrane rupture
- Patient intolerance due to work of breathing
- Haemodynamic instability
- Recent facial, oral, or skull surgery / trauma
- Acute sinusitis
- Recent/recurrent epistaxis
- Recent endobronchial valve insertion
- Oesophageal surgery
- Active nausea/vomiting

If you are unsure about whether your patient may benefit from using an OPEP device, consider seeking advice from specialist respiratory services.

- **Outpatient Respiratory Physiotherapy**

Specialist respiratory physiotherapy services may be able to provide education and support for patients requiring assistance with secretion clearance, including the use of the above techniques/devices. Some respiratory physiotherapy services only accept referrals from secondary care services so please check what services are available in your area before referring.

#### **Step 4. Reassess and consider further optimisation as per Step 3**

For patients that remain uncontrolled despite optimal therapy and optimisation of all elements of general and non-pharmacological COPD management, consider referral for review by local specialist COPD services for consideration of specialist therapies. In all patients that are uncontrolled despite optimal therapy and where referral to specialist services is being considered, undertake advanced care planning and complete appropriate documentation in partnership with the patient (see section 3.8).

### 3.3 Lung Volume Reduction Interventions

Lung hyperinflation is a common feature in people with COPD that have an emphysema predominant phenotype. Hyperinflation contributes to breathlessness, exercise limitation and is associated with increased risk of hospitalisation and mortality. Lung volume reduction is a treatment for hyperinflation and can be achieved either surgically (lung volume reduction surgery [LVRS]) or bronchoscopically (bronchoscopic lung volume reduction [BLVR]) using endobronchial valves. People with COPD that remain breathless with exercise limitation, despite optimal medical and non-pharmacological therapy, should be considered for suitability for lung volume reduction interventions. Abstinence from tobacco and completion of pulmonary rehabilitation are required prior to being considered eligible for lung volume reduction interventions.

Assessment for lung volume reduction interventions requires detailed investigations, including: pulmonary function tests (spirometry, gas transfer, and plethysmography); a high resolution (HR)CT scan to characterise emphysema distribution, emphysema severity, and fissure integrity; 6-minute walk test to assess exercise capacity; arterial or capillary blood gas assessment; and echocardiogram to assess cardiac function and identify pulmonary hypertension. Referral to a specialist in respiratory medicine is therefore advised for patients potentially suitable for lung volume reduction interventions. If considered potentially suitable for lung volume reduction interventions following specialist review, referral will be made to a specialist lung volume reduction/emphysema MDT where the results of investigations will be reviewed, treatment options (LVRS versus BLVR) considered, and management planned.

#### **Recommendation**

Lung volume reduction interventions can lead to significant improvements in lung function, symptoms, quality of life, and exercise capacity for well selected COPD patients with significant emphysema. Consider referral of all potentially suitable patients (former smokers that have completed pulmonary rehabilitation and remain significantly breathless with limited exercise capacity) for specialist review to consider suitability for lung volume reduction interventions.

### 3.4 Domiciliary Non-Invasive Ventilation

Domiciliary non-invasive ventilation can be considered for some people with COPD and severe, chronic hypercapnic respiratory failure. There is evidence of benefit in the following groups of COPD patients with chronic hypercapnic respiratory failure:

- Persistent hypercapnia following hospitalisation requiring acute non-invasive ventilation for acute, decompensated respiratory failure;
- People with comorbid obesity hypoventilation and/or sleep disordered breathing (i.e. obstructive sleep apnoea);
- People with persistent hypoxia that experience worsening hypercapnoea when administered oxygen therapy;
- People with an alternative indication for ventilatory failure (e.g. neuromuscular disease).

### **Recommendation**

Any COPD patient considered potentially suitable for domiciliary non-invasive ventilation should be referred for assessment by their local specialist respiratory / home ventilation service.

### **3.5 Biologics in COPD**

There are currently no NICE recommended biological therapies for people with COPD, unless they are indicated for a comorbid condition, such as, severe asthma.

However, Dupilumab, a monoclonal antibody that blocks interleukin (IL)-4 and IL-13 receptor signalling, has shown benefits in Phase 3 trials including people with eosinophilic COPD and recurrent exacerbations, despite otherwise optimal therapy. Dupilumab is being reviewed by NICE and it is expected that a decision will be announced in 2025 whether it will be approved for use in the NHS. A number of other biologics are also currently being trialled in COPD, with Phase 2 studies providing reason for optimism.

### **Recommendation**

Patients with COPD that continue to exacerbate (3 or more times per year) despite optimal treatment (figure 2), should be considered for referral to specialist respiratory services. Measurement of blood eosinophils should be performed when COPD patients are reviewed and during exacerbations, prior to treatment with oral corticosteroids if possible, to establish their COPD phenotype, likelihood of response to steroids (see section 5.4), and potential eligibility for future biological therapies (when available).

### **3.6 Supporting Self-Management**

Self-management support aims to motivate, engage and coach patients to adopt health behaviours that will positively impact their health status and enable them to better manage their COPD. While patient education is important, it does not change patients' health behaviours by itself and it is therefore important to engage patients as active partners in their care and to utilise resources available to support self-management (e.g., action plans) and to provide training in specific self-management techniques (e.g. breathlessness).

Digital tools can help to support self-management but access is variable across Humber and North Yorkshire. Consult your directory of services for further information about local services. Humber and North Yorkshire ICB have compiled a library of Health Apps that may be able to support self-management (the App Library can be accessed [here](#)).

### **3.7 Managing people with emphysema without airflow limitation**

Emphysema is a common incidental finding on CT thorax and should prompt consideration of possible undiagnosed COPD among people without a known diagnosis, prompting diagnostic assessment as per this guideline. However, not all people with emphysema have airflow limitation on spirometry and therefore do not meet the threshold for COPD diagnosis. These individuals can be considered to have pre-COPD. There is no evidence of inhaled or other pharmacological therapies in people with pre-COPD. However, the presence of emphysema indicates susceptibility to lung injury from tobacco smoke exposure and can result in respiratory symptoms. As such, treatments should aim to i) prevent further lung injury/lung

function decline, ii) minimise symptoms, and iii) maximise exercise capacity and physical activity. People with pre-COPD are at increased risk of progressing to develop COPD and should therefore be advised to report any new or deteriorating respiratory symptoms so that repeat diagnostic assessment can be offered.

### **Recommendations**

Very brief advice and referral to specialist stopping smoking services for stop smoking support is the most important treatment for current smokers. Individuals with exertional breathlessness and exercise limitation should be counselled about the importance of physical activity and referred for pulmonary rehabilitation. Individuals with a family or personal history of lung or liver disease should be considered for alpha-1 antitrypsin deficiency testing. See figure 3 for a summary of treatment recommendations for people with emphysema on lung imaging without airflow limitation.

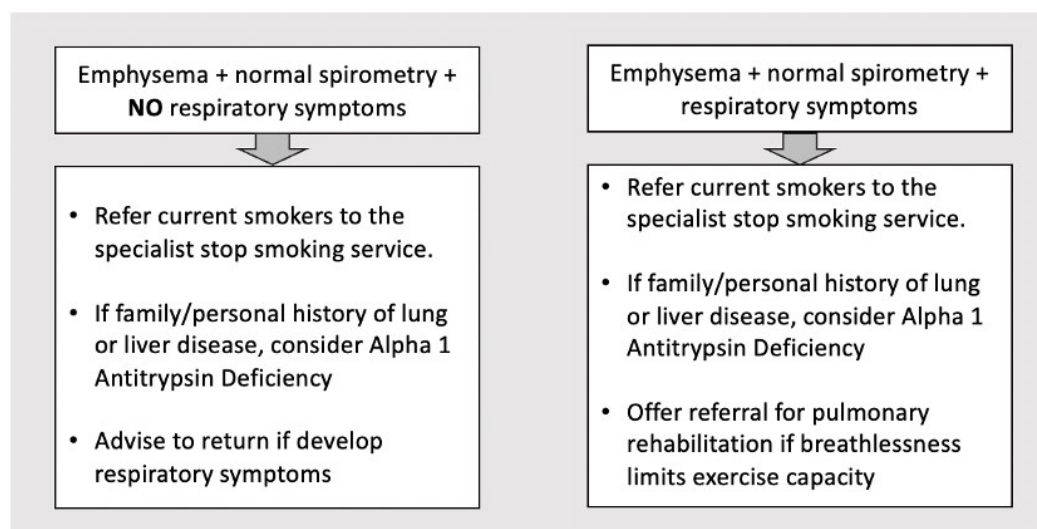


Figure 3. Treatment recommendations for individuals with an incidental finding of emphysema on CT imaging without airflow limitation on spirometry, depending on presence or absence of respiratory symptoms.

### **3.8 Advanced Care Planning and Advanced Decisions**

COPD is a chronic and progressive condition that is life-limiting. Advanced care planning discussions therefore best undertaken overtime with a patient's usual clinician than during emergency presentations with COPD exacerbations.

Factors associated with increased risk of mortality in COPD include:

- Frequency and severity of exacerbations
- Hospitalised (severe) exacerbations
- Significant lung function impairment (severe and very severe COPD)
- Low BMI
- Inactivity
- Co-morbidities such as cardiovascular disease and malignancy
- Requiring home oxygen therapy

Due to the nature of COPD, prognosis can be very difficult to predict for individuals. The surprise question, 'would you be surprised if this patient were to die in the next few



months/weeks/days?', can be helpful to guide need to progress advanced care planning discussions.

The following frameworks should be considered for people with COPD and factors associated with risk of mortality and/or when advanced care planning discussions are initiated by COP patients:

- [The Gold Standards Framework](#)
- [ReSPECT Discussions and Documentation](#)

## 4. COPD as a Multisystem Disease

COPD is a complex, multisystem disease that is associated with an increased risk of a number of co-morbidities that add to the morbidity and risk of mortality associated with the disease. Here we set out some key recommendations relating to a small number of important comorbidities encountered in people with COPD.

### 4.1 Cardiovascular Risk in COPD

People with COPD have an elevated risk of cardiovascular (CV) disease compared with people without COPD.

The risk of CV events is significantly increased during and after exacerbations of COPD. A UK study revealed that the risk of a CV event was almost 15 x higher in the first 14 days post exacerbation.

Existing CV risk scores (e.g. QRISK3) underestimate the CV risk in people with COPD, particularly in younger and female patients, and all COPD patients should therefore be considered high risk. QRISK4 incorporates COPD into its risk calculations but is not yet in routine use within primary care.

### **Recommendations**

All patients with COPD should be assessed for conventional CV risk factors (see [NICE Guideline 238](#)).

Assess for:

- Diabetes
- Hypertension
- Hyperlipidemia
- Smoking

Modify risk in accordance with relevant guidelines. COPD should be considered an independent risk factor and treatment should be optimised in accordance with this guideline (figure 2).

### 4.2 Bone Health and COPD

Patients with COPD are at increased risk of osteoporosis. Both disease and treatment related factors contribute to osteoporosis risk. Measures to reduce the risk of osteoporosis include smoking cessation, promoting physical activity / weight bearing exercise, and minimising OCS exposure, among others.



### **Recommendations**

Assess bone health for all patients with COPD using [FRAX](#) and follow [National Osteoporosis Guideline Group \(NOGG\) guidelines](#).

The specific following recommendations should be considered:

- Patients receiving maintenance prednisolone 5mg od or more for 3 months (or equivalent)\* should have a DEXA scan arranged and treat as per guidelines.
- Patients with a history of vertebral or other major osteoporotic fracture should be consider for empirical treatment with Alendronate 70mg or Risedronate 35mg once weekly, along with Calcium 1-1.2 grams and Colecalciferol 800 units daily.

**\*NB. 3 or more short courses of prednisolone 30mg od has the same cumulative oral corticosteroid dose as 3 months treatment at 5mg daily.**

### **4.3 Mental Health and COPD**

People with COPD have a high prevalence of anxiety and depression which can contribute to their symptom burden. Anxiety and depression are often under-recognised and diagnosed in people with COPD and symptom questionnaires such as the Hospital Anxiety and Depression Scale (HADS), can aid identification

#### **Recommendation**

Potential co-morbid anxiety and depression should be considered in all patients with COPD. HADS or PHQ-9 and GAD-7 can be considered to aid identification.

Anxiety and depression in COPD should be treated the same as for people without COPD.

Consider:

- Psychological interventions: refer to IAPT
- Drug treatment
- Pulmonary rehabilitation
- 

For more information about diagnosing and treating depression and anxiety in adults with COPD, see [NICE Guideline 91](#) and [113](#) respectively.

### **4.4 Nutrition and Diet**

People with COPD that have a low BMI (<20 kg/m<sup>2</sup>) are at risk of worse outcomes than people with a normal BMI. Malnutrition in COPD is associated with lung function impairment, reduced exercise tolerance, worse quality of life, and increased risk of hospitalisation and mortality.

#### **Recommendations**

- Weight should be measured during each COPD review and BMI calculated to help to identify people with low or falling BMI.
- People with low or falling BMI should be considered for referral for dietetic advice.

- People with COPD and low BMI should be considered for nutritional supplements to increase both caloric and protein intake (e.g., Fortisip Compact Protein).
- Nutritional support should be offered alongside rehabilitation and other elements of optimal COPD care (both pharmacological and non-pharmacological).

## 5. Acute Exacerbations of COPD

An acute exacerbation of COPD is defined by increased breathlessness and/or cough and sputum that worsen over <14 days. Exacerbations are typically associated with increased local and/or systemic inflammation and can have a wide array of triggers including, viruses, bacterial infection, and environmental exposures, among others.

Acute exacerbations of COPD are associated with significant morbidity and mortality in COPD. People with frequent exacerbations have higher symptom burden, worse quality of life, accelerated lung function decline, increased risk of mortality, and are at greater risk of important comorbidities. It is therefore essential that, in addition to treating the acute exacerbation to minimise the immediate negative effects, every exacerbation should be considered an opportunity to review an individual's treatment and to optimise their care in order to reduce their risk of future exacerbations.

### 5.1 Prevention

Preventing exacerbations is a key objective of COPD treatment and requires a combination of pharmacological and non-pharmacological interventions. Delayed escalation of COPD treatment following COPD exacerbations, when indicated, is associated with a significantly increased risk of future exacerbations. As such, all patients that are treated for an acute exacerbation of COPD, whether in primary care, the community, or in a hospital setting, should have a comprehensive review of their COPD treatment and have their treatment optimised in a timely manner, with clear communication between healthcare teams (primary, community, and secondary care) regarding any treatment change.

See figure 2 and the COPD guideline quick reference guides for information about how to optimise COPD care in order to reduce exacerbation risk.

### 5.2 Management

Immediate treatments for acute exacerbations of COPD aim to reduce symptoms, prevent deterioration necessitating hospital attendance, and hasten recovery. Key considerations and treatments for acute exacerbations of COPD are set out below:

- All people with COPD that present with an acute deterioration of symptoms should have a clinical assessment to confirm a diagnosis of COPD exacerbation and to exclude alternative causes for their symptoms (e.g. pneumothorax, pneumonia, pulmonary oedema, pulmonary embolism, etc).
- Consider need for investigations to inform management:
  - Bloods tests
    - FBC to assess white cell count and eosinophils
    - CRP to assess for evidence of infection
    - Other

- nt-proBNP to assess for heart failure
  - Troponin if concern regarding potential myocardial ischaemia
  - D-dimer if clinical suspicion of PE with low Wells score
- Blood gas – if there is concern about respiratory failure
- Chest radiograph to assess for consolidation and/or pneumonia
- ECG
- Other (e.g., CT pulmonary angiogram if high probability PE)
- Consider indications for hospital assessment/treatment:
  - Need for investigations that are only available in a hospital setting (consider same day emergency care [SDEC] pathways if there is no other indications for hospital admission).
  - Severe symptoms with sudden deterioration, including, breathlessness at rest, elevated respiratory rate (compared with patient's usual baseline), decreased oxygen saturation (<88% and reduced from patient's baseline), confusion, drowsiness.
  - New onset chest pain, haemoptysis, cyanosis, peripheral oedema, or tachyarrhythmia.
  - Acute respiratory failure

**Some regions in Humber and North Yorkshire have Respiratory Virtual Wards with pathways to support the assessment and management of exacerbating COPD patients at home, without need for hospital admission. Please consult your local directory of services for further information about eligibility criteria and how to make a referral.**

- Initiate treatment
  - **Short-acting bronchodilators** can be used to provide relief of symptoms relating to bronchoconstriction. Short-acting bronchodilators can be administered using the patients usual inhaled therapy, a pMDI inhaler plus spacer, or a nebuliser (salbutamol 2.5mg), when available. Short-acting beta agonists (SABA) are the first line short-acting bronchodilator. Addition of a short-acting muscarinic antagonist (ipratropium) can be considered if patients fail to respond to initial SABA (do not continue regularly if the patient is already prescribed a long-acting muscarinic antagonist inhaler).
  - **Oral corticosteroids** can be considered in the form of prednisolone 30mg once daily for 5-days. There is no evidence of added benefit with longer courses of prednisolone but there is increased risk of harm from steroid related side effects. Steroids are likely to be less effective in individuals with lower eosinophil levels and consideration should be given to guiding treatment based on eosinophil counts (see 'role for biomarkers'), particularly in individuals with frequent exacerbations who are at greatest risk of treatment related side effects.
  - **Oral antibiotics** can be considered for patients with evidence of infection (e.g. increased sputum volume and purulence). Measurement of blood CRP can be used to guide need for antibiotic therapy (see 'role for biomarkers'). The following antibiotics regimes can be considered for people with an exacerbation of COPD with suspected bacterial infection:

- Amoxicillin 500mg orally, 8 hourly, for 5 days
- Doxycycline 200mg orally on day 1 followed by 100mg orally, once daily, from days 2-5

Alternative antibiotics can be considered where felt clinically appropriate by the treating clinician.

- **Oxygen Therapy.** There is no role for new or amended oxygen therapy in the home setting during an acute exacerbation of COPD apart from in one of the following circumstances:
  - during a medical emergency while awaiting an ambulance,
  - during provision of palliative care where hospital admission is felt inappropriate/undesirable and under appropriate clinical supervision,
  - under the direct supervision of a virtual ward/hospital at home service
 If new or amended oxygen therapy is indicated during an exacerbation, hospital admission should be considered.

### Special Considerations

- **Regular inhaled therapy:** all patients should continue to receive their usual inhaled therapy throughout their acute exacerbation treatment. Regular inhalers that contain a long-acting muscarinic antagonist (LAMA) should not be stopped in exchange for nebulised short-acting muscarinic antagonists (SAMA). Patients regular therapy should be reviewed at the time of exacerbation to ensure it is optimised to minimise future risk.
- **Patients taking prophylactic macrolides:** long-term azithromycin prophylaxis is associated with an increased risk of macrolide resistance. Therefore, if antibiotics are indicated for acute exacerbation treatment, use of an alternative macrolide antibiotic acutely will have no added value. See above for recommended antibiotics for exacerbation treatment. Prophylactic azithromycin can be continued alongside acute exacerbation treatment with the above recommended antibiotics. Only consider temporarily stopping azithromycin during acute exacerbation treatment if an alternative antibiotic that is associated with QT prolongation is being administered (e.g., moxifloxacin).

### 5.3 Role for Rescue Packs

The term 'Rescue Pack' refers to the prescription of antibiotics and/or prednisolone for a patient to keep at home and to use in the event of an exacerbation. The proposed benefits of Rescue Packs include:

- Rapid access to and initiation of treatment in the event of exacerbation;
- Patients feel reassured that they have immediate access to treatment when they feel they need it.

However, there also a number of disadvantages to Rescue Pack provision:

- Potential overuse of antibiotics and prednisolone when not indicated, exposing patients to increased risk of treatment related adverse effects;

- Exacerbation events may go unnoticed by healthcare professionals, preventing opportunity for clinical review and optimisation of regular therapy to reduce future risk;
- Inappropriate use of antibiotics and/or prednisolone for other causes of increased symptoms, leading to delays in diagnosis and appropriate treatment.

### **Recommendation**

Routine use of Rescue Packs for people with COPD is **NOT** currently recommended. Provision of a Rescue Pack may be considered on a case-by-case basis and only where the treating clinician is confident that the patient i) is confidently able differentiate an exacerbation from day-to-day symptom variation, ii) will not over-use their medications and systems are in place to prevent this, and iii) has timely access to support and advice in the event that they feel they need to start treatment.

**Rescue Packs should NEVER be prescribed on repeat prescription and a request for a reissue of Rescue Pack medications should always trigger a clinical review to ensure optimisation of regular COPD treatment.**

## **5.4 Role for biomarkers**

A number of clinical studies have investigated the role of biomarkers to predict response to antibiotics and/or steroids for the treatment of acute COPD exacerbations.

### **Predicting Response to Oral Corticosteroids (OCS)**

Blood eosinophil levels can help to identify people that are likely to benefit from corticosteroids in COPD. At the time of exacerbation, the blood eosinophil threshold that has been examined to direct COPD treatment is 2%, which equates to a blood eosinophil count of around  $0.2 \times 10^9/L$  when the patients white cell count is  $10 \times 10^9/L$ . The [STARR2 trial](#) demonstrated that eosinophil biomarker guided therapy, where patients with blood eosinophils <2% at exacerbation diagnosis were not prescribed oral prednisolone, was non-inferior to standard care, in which all patients were treated with oral prednisolone. Therefore, using blood eosinophil count at the time of exacerbation to guide OCS prescription can be considered a safe way to reduce OCS exposure.

### **Recommendation**

Where feasible and safe to do so, measure full blood count prior to commencing OCS (prednisolone) for treatment of a COPD exacerbation, and use table 2 to inform likelihood of benefit from prednisolone treatment based on white cell count (WCC) and respective eosinophil threshold (see next page). When urgent treatment is deemed necessary, start treatment and consider rationalising it once FBC result is available.

White Cell Count (Count $\times 10^9/L$ )	2% Eosinophil Threshold (Count $\times 10^9/L$ )	Likely Benefit from OCS
12	0.24	If Eos $\geq 0.24 \times 10^9/L$ , consider prescribing OCS If Eos $< 0.24 \times 10^9/L$ , consider not prescribing OCS
11	0.22	If Eos $\geq 0.22 \times 10^9/L$ , consider prescribing OCS If Eos $< 0.22 \times 10^9/L$ , consider not prescribing OCS
10	0.20	If Eos $\geq 0.20 \times 10^9/L$ , consider prescribing OCS If Eos $< 0.20 \times 10^9/L$ , consider not prescribing OCS
9	0.18	If Eos $\geq 0.18 \times 10^9/L$ , consider prescribing OCS If Eos $< 0.18 \times 10^9/L$ , consider not prescribing OCS
8	0.16	If Eos $\geq 0.16 \times 10^9/L$ , consider prescribing OCS If Eos $< 0.16 \times 10^9/L$ , consider not prescribing OCS
7	0.14	If Eos $\geq 0.14 \times 10^9/L$ , consider prescribing OCS If Eos $< 0.14 \times 10^9/L$ , consider not prescribing OCS
6	0.12	If Eos $\geq 0.12 \times 10^9/L$ , consider prescribing OCS If Eos $< 0.12 \times 10^9/L$ , consider not prescribing OCS
5	0.10	If Eos $\geq 0.10 \times 10^9/L$ , consider prescribing OCS If Eos $< 0.10 \times 10^9/L$ , consider not prescribing OCS

Table 2. Decision aid for using blood eosinophil count as a biomarker to identify patients where OCS (prednisolone) can be safely omitted from COPD exacerbation management.

### Predicting response to oral antibiotics

A [large UK clinical trial](#) has examined the use of CRP testing to guide the need for antibiotics for the management of COPD exacerbations. Use of the below protocol based on CRP criteria was found to reduce antibiotic prescribing with no evidence of harm:

- CRP  $< 20$  mg/L – antibiotics unlikely to be indicated
- CRP 20-40 mg/L – antibiotics may be beneficial, mainly if purulent sputum present
- CRP  $> 40$  mg/L – antibiotics are likely to be beneficial

### Recommendation

Where feasible and safe to do so, measure CRP prior to commencing oral antibiotics for treatment of a COPD exacerbation and use the above thresholds to guide likelihood of benefit from antibiotic therapy. When urgent treatment is deemed necessary, start treatment and consider rationalising it once CRP result is available.

## Appendix 1: Probability of COPD based on Lung Cancer Screening Incidental Findings.

Symptoms	Emphysema Severity	Pre-bronchodilator Spirometry	Probability of COPD
CAT <10	None	-	16%
CAT <10	Mild	-	45%
CAT <10	Moderate	-	80%*
CAT <10	Severe	-	No data
CAT ≥10	None	-	26%
CAT ≥10	Mild	-	53%
CAT ≥10	Moderate	-	82%
CAT ≥10	Severe	-	78%*
CAT <10	None	FEV1/FVC ≥ 0.7	1%
CAT <10	Mild	FEV1/FVC ≥ 0.7	8%
CAT <10	Moderate	FEV1/FVC ≥ 0.7	42%*
CAT <10	Severe	FEV1/FVC ≥ 0.7	No data
CAT <10	None	FEV1/FVC < 0.7	56%*
CAT <10	Mild	FEV1/FVC < 0.7	79%
CAT <10	Moderate	FEV1/FVC < 0.7	96%*
CAT <10	Severe	FEV1/FVC < 0.7	No data
CAT ≥10	None	FEV1/FVC ≥ 0.7	2%
CAT ≥10	Mild	FEV1/FVC ≥ 0.7	21%
CAT ≥10	Moderate	FEV1/FVC ≥ 0.7	58%
CAT ≥10	Severe	FEV1/FVC ≥ 0.7	50%*
CAT ≥10	None	FEV1/FVC < 0.7	73%
CAT ≥10	Mild	FEV1/FVC < 0.7	83%
CAT ≥10	Moderate	FEV1/FVC < 0.7	95%
CAT ≥10	Severe	FEV1/FVC < 0.7	86%*

Table 1. Proportion of patients going onto receive a confirmed diagnosis of COPD based on clinical assessment and post-bronchodilator with the corresponding features. CAT: COPD Assessment Test. \*denotes where estimates are based on data from fewer than 50 patients with the corresponding combination of features. 'No data' indicates that no patients in the cohort had this combination of features.