Chronic Obstructive Pulmonary Disease (COPD)

Chronic Obstructive Pulmonary Disease (COPD) is a major cause of chronic morbidity and mortality throughout the world.

COPD is currently the fourth leading cause of death in the world and is projected to be the 3rd leading cause of death by 2020. COPD claimed 3.2 million lives in 2015, while lung cancer caused 1.7 million deaths. The COPD burden is projected to increase in the coming years because of an aging population and continued exposure to various risk factors such as tobacco smoke (including cigarettes, pipes, cigars and shisha pipes), environmental irritants and inhalation of drugs such as cannabis.

COPD is a common yet preventable condition. It is characterised by persistent respiratory symptoms of dyspnoea, cough and/or sputum production.

Patients with COPD may develop acute flare-ups, also called exacerbations, in which they have acute worsening of their respiratory symptoms. These are usually caused by infections.

In most patients, COPD is associated with significant concomitant chronic disease, such as heart disease and osteoporosis, which increase morbidity and mortality.

COPD is a heterogeneous condition. Treatment and care should be patient-centred taking into account patients’ needs and preferences. People with COPD should have the opportunity to make informed decisions about their care and treatment in partnership with their healthcare professionals.

Smoking cessation and pulmonary rehabilitation are first-line interventions for patients with COPD.

The following pathway is based on the evidence and recommendations laid down by NICE, GOLD and the 13 quality standards for good quality COPD care.

References:
1. Global Strategy for the diagnosis, management and prevention of COPD, 2018
Key priorities in COPD

Diagnosis and Assessment of COPD (Gold 2018)

- COPD should be considered in any patient who has dyspnoea, chronic cough or sputum production, and/or a history of exposure to risk factors for the disease.
- Spirometry is required to make the diagnosis; the presence of a post-bronchodilator FEV1/FVC < 0.70 confirms the presence of persistent airflow limitation.
- Routine reversibility testing is not normally indicated in COPD.
- Formal accreditation of healthcare professionals (HCPs) in COPD and spirometry is advised. HCPs should have access to high quality spirometry and be competent in the interpretation of the results.
- It is advisable that any HCP undertaking spirometry should have a certificate of competence from the Association for Respiratory Technology and Physiology (ARTP) following completion of either the Foundation (level 1) course or the Full Certificate (level 3).
- The goals of COPD assessment are to determine the severity of the disease, including the severity of airflow limitation, the impact of the disease on the patients’ health status, and the risk of future events (such as exacerbations, hospital admissions or death), in order to guide therapy.
- Concomitant chronic diseases occur frequently in COPD patients, including cardiovascular disease, skeletal muscle dysfunction, metabolic syndrome, osteoporosis, depression, anxiety and lung cancer. These comorbidities should be actively sought and treated appropriately when present as they influence mortality and hospitalisations independently.
- In addition to initial spirometric assessment, patients should have an assessment of symptoms, frequency of exacerbations, Body Mass Index (BMI), exercise tolerance and the Medical Research Council (MRC) dyspnoea score recorded at least annually. The COPD Assessment Tool (CAT) can be used as a validated measure of patients symptoms (www.catestonline.org).
- Patients with more severe disease should be reviewed at least twice a year, which should include documented pulse oximetry values and weight.
- Chest X-ray: there should be a low threshold for referral for chest X-ray, as patients with COPD are at high risk of lung cancer.

Smoking and smoking cessation

- 20% of all smokers will develop COPD whilst 50% of smokers will die of a smoking related illness.
- 30% of patients continue to smoke after a diagnosis of COPD because smoking is a nicotine addiction.
- Within a few months of starting to smoke there is a 300% increase in nicotine receptors in the brain that release dopamine. They never ever disappear.
- It takes 2-3 months for the receptors to ‘go to sleep’ and they can be reactivated with one cigarette.
- 70% of smokers want to stop, 30% try each year and only 2-3% succeed without support.
- Motivation to stop alone is not a predictor of success. Evidence suggests successful quits are achieved by a combination of patient motivation and good quality behavioural support, with pharmacotherapy/NRT (see table).

<table>
<thead>
<tr>
<th></th>
<th>No pharmacotherapy</th>
<th>Pharmacotherapy/NRT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Will power alone</td>
<td>2-3% success</td>
<td>4-6% success</td>
</tr>
<tr>
<td>Support from trained advisor</td>
<td>10-15% success</td>
<td>20-30% success</td>
</tr>
</tbody>
</table>

- It is important to see smoking cessation as a therapeutic treatment not just lifestyle advice. Stopping smoking is the single most evidence-based change a patient with COPD can make. Take every opportunity to encourage supported smoking cessation, however severe the COPD and regardless of age.
- For patients who wish to discuss and seek further advice regarding the use of E-cigarettes/Vaporisers as an aid to smoking cessation refer to the Stop Smoking Services for the correct advice and support.
Key priorities in COPD

Other Key Priorities

**Promote effective inhaled therapy**  Offer effective evidence-based inhaled therapy to people with stable COPD who remain breathless or have exacerbations. An assessment of inhaler technique should be undertaken including inspiratory flow.

**Education and self-management**  All patients should receive written and verbal education including the importance of smoking cessation, nutrition, physical activity, chest clearance if appropriate, weight management, self-management of exacerbations, vaccinations, avoidance of pollution and passive smoking and taking precautions in poor weather.

**Minimising admissions and managing exacerbations**  All patients at risk of exacerbations should agree a self management plan with the practice team. This should include rapid access to oral steroids +/-antibiotics, and short-term nebulised bronchodilators when appropriate. The Integrated Respiratory Teams (IRT) can offer a same day patient assessment that may avoid a hospital admission by supporting appropriate patients within their place of residence. Alternatively, the IRTs can provide supported early discharge for patients admitted with an acute exacerbation of COPD, which can reduce their length of stay in hospital. Admissions for COPD need to be recorded to guide future therapy, and there should be comprehensive communication between Secondary and Primary Care, including advice on an ongoing care plan. Patients with complex needs may also be appropriate for more intensive follow-up by the IRTs in the community setting in conjunction with the Primary Care teams and community matrons.

**Use of non-invasive ventilation**  Non-invasive ventilation (NIV) should be used as the treatment of choice for decompensated (acidotic) hypercapnic ventilatory failure during exacerbations not responding to medical therapy. When patients are started on NIV there should be a clear plan covering what to do in the event of deterioration and ceilings of therapy should be agreed (NICE 2010). This is best achieved, wherever possible, by discussing these issues with the patient and their carers prior to an acute event.

**Pulmonary rehabilitation**  People with COPD and self-reported exercise limitation (mMRC 2-4) should be offered pulmonary rehabilitation. Referrals are also accepted for patients with functional limitation due to other chronic respiratory diseases. Patients who have been hospitalised with an acute exacerbation of COPD should be offered referral for pulmonary rehabilitation to reduce the risk of subsequent readmissions. All patients are encouraged to continue exercising after pulmonary rehabilitation and are offered the option of referral to community COPD classes which are held at local leisure centres. The community classes are held at Macclesfield, Wilmslow, Congleton, Crewe, Nantwich and Sandbach leisure centres. Brio Leisure hold classes in Winsford and Northwich.

**Palliative care**  A variety of criteria may be used to guide appropriateness for the palliative care (Gold Standards Framework) register, including the level of their symptoms, carer support needs, level of lung function or the response to the question ‘would you be surprised if they died in the next twelve months?’. Patients should have access to appropriate therapies and services offered by multidisciplinary teams. Further guidance is available on www.cheshire-epaige.nhs.uk and later in these guidelines.

**Vaccinations**  Ensure annual Influenza vaccination and check Pneumococcal immunisation status.

**Ensure multidisciplinary working**  COPD care should be delivered by a multidisciplinary team pertinent to the severity of the patient’s condition (NICE 2010).

**Clinical research**  Offer patients the opportunity to participate in clinical research.
Making a diagnosis (NICE 2010)

Consider a diagnosis of COPD for people who are over 35 and smokers or ex-smokers with any of the following:

- exertional breathlessness, chronic cough, regular sputum production, frequent winter ‘bronchitis’ and wheeze
- and who do not have the clinical features of Asthma (chronic unproductive cough, significantly variable breathlessness and/or wheeze and significant diurnal or day to day variability of symptoms).

Perform initial diagnostic evaluation if COPD seems likely:

- Post-bronchodilator spirometry (record absolute and percentage of predicted values). Assess severity of airflow obstruction according to the tables on the following page.
- Chest X-ray to exclude other diagnoses (investigate abnormalities using a CT scan).
- Consider alternative diagnoses in older people without typical symptoms of COPD and FEV1/FVC ratio < 0.7, and younger people with symptoms of COPD and FEV1/FVC ratio > 0.7
- Full blood count to identify anaemia or polycythaemia
- Body Mass Index (BMI) calculation

Unless initial evaluation excludes COPD start treatment and assess response

Reassess diagnosis in view of response to treatment:

- Clinically significant COPD is not present if FEV1 and FEV1/FVC ratio return to normal with drug therapy
- Asthma may be present if:
  - FEV1 response of 12% or increase of 200mls in volume post short acting beta-2 agonist. This is considered a positive response.
  - >400ml response to bronchodilators. This response strongly suggests Asthma.
  - serial peak flow measurements show significant (≥20%) diurnal or day to day variability
- Specialist referral is recommended for patients with a restrictive pattern on spirometry and for all patients in whom alpha-1 antitrypsin deficiency is suspected.
- Specialist referral for further investigation may also be appropriate at all stages of the disease and not solely in the most severely disabled patients.

For all people with diagnosed COPD:

- Highlight the diagnosis of COPD in notes and clinical system using Read codes (or Snomed)
- Record the results of spirometric tests at diagnosis—both absolute and percentage of predicted values
## Classifying Airflow Obstruction and Breathlessness

### Classification of airflow limitation severity in COPD (Based on post-bronchodilator FEV1)

In patients with FEV1/FVC < 0.70

<table>
<thead>
<tr>
<th>GOLD 1:</th>
<th>Mild*</th>
<th>FEV1 ≥ 80% predicted</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOLD 2:</td>
<td>Moderate</td>
<td>50-79</td>
</tr>
<tr>
<td>GOLD 3:</td>
<td>Severe</td>
<td>30-49</td>
</tr>
<tr>
<td>GOLD 4:</td>
<td>Very severe</td>
<td>&lt;30</td>
</tr>
</tbody>
</table>

*Symptoms should be present to diagnose COPD in people with mild airflow obstruction

### Modified MRC dyspnoea scale (mMRC)

| mMRC Grade 0: | I only get breathless with strenuous exercise. |
| mMRC Grade 1: | I get short of breath when hurrying on the level or walking up a slight hill |
| mMRC Grade 2: | I walk slower than people of the same age on the level because of breathlessness, or I have to stop for breath when walking at my own pace on the level |
| mMRC Grade 3: | I stop for breath after walking about 100 metres or after a few minutes on the level |
| mMRC Grade 4: | I am too breathless to leave the house or I am breathless when dressing or undressing |

### Assess patient exacerbation history and symptoms (MRC and CAT scores)

<table>
<thead>
<tr>
<th>Exacerbations per year</th>
<th>CAT</th>
<th>mMRC</th>
<th>MRC (as on EMIS)</th>
<th>GOLD patient Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 1 not leading to hospital admission</td>
<td>&lt; 10</td>
<td>0-1</td>
<td>1-2</td>
<td>A</td>
</tr>
<tr>
<td>≤ 1 not leading to hospital admission</td>
<td>≥ 10</td>
<td>≥ 2</td>
<td>≥ 3</td>
<td>B</td>
</tr>
<tr>
<td>≥ 2 or ≥ 1 leading to hospital admission</td>
<td>&lt; 10</td>
<td>0-1</td>
<td>1-2</td>
<td>C</td>
</tr>
<tr>
<td>≥ 2 or ≥ 1 leading to hospital admission</td>
<td>≥ 10</td>
<td>≥ 2</td>
<td>≥ 3</td>
<td>D</td>
</tr>
</tbody>
</table>

Modified MRC (mMRC) is used in GOLD and other related publications, MRC is used in EMIS and in NICE
Pharmacological treatment algorithms by GOLD Grade (highlighted boxes and arrows indicate preferred treatment pathways) adapted from GOLD Guidelines 2018

Group C

- **LAMA + LABA**
- **LABA + ICS**

Further exacerbation(s) → **LAMA**

Group D

- **Consider roflumilast if FEV1 <50% predicted and patient has chronic bronchitis**
- **Consider macrolide in former smokers**

Further exacerbation(s) → **LAMA**
- **LABA + ICS**

Persistent symptoms/further exacerbation(s) → **LAMA**
- **LABA + LABA**
- **LABA + ICS**

Group A

- If poor response stop and try alternative bronchodilator
- **Evaluate effect**
- **A bronchodilator e.g. SABA**

Group B

- **LAMA + LABA**
- Persistent breathlessness
- **A long-acting bronchodilator (LABA or LAMA)**

Preferred treatment indicated by Specialist initiation

In patients with a major discrepancy between the perceived level of symptoms and severity of airflow limitation, further evaluation is warranted.

**Key:**
- **SABA** short acting beta agonist;
- **LABA** long acting beta agonist;
- **LAMA** long acting muscarinic antagonist;
- **ICS** inhaled corticosteroid.
Principles for inhaled therapy in stable COPD

When considering which inhaler device to use, the main criteria are appropriateness to the level of symptoms/functional impairment, risk of exacerbations, patient preference for device and inspiratory flow.

The Local Health Economy Formulary (see www.centralandeasterncheshiremmt.nhs.uk) shows the devices included and recommended for use locally, and where there are no compelling clinical or patient factors, the lowest cost devices should be considered first line. Where possible, give combination inhalers in place of separate component inhalers.

Select a device that the patient prefers and that is appropriate to their level of inspiratory flow. Dry powder inhalers (DPIs) require quick and forceful inhalation and metered dose inhalers (MDIs) require a slow, gentle inhalation. Record observation and read code inhalation technique and inspiratory flow at least annually, when new inhalers are prescribed and following a change in condition (e.g. exacerbations, progressive breathlessness). The In-Check device may be used to aid selection of an appropriate device and for coaching purposes once a device has been selected. It may be appropriate to use a spacer alongside an MDI for people who have difficulty with co-ordination and dexterity.

Branded prescribing is recommended to ensure consistency of dispensed device. For a more comprehensive list of inhaled devices included in the Local Health Economy Formulary see the website: www.centralandeasterncheshiremmt.nhs.uk
# Examples of Central and Eastern Cheshire Local Health Economy Formulary Choices for Inhaled Therapy in COPD

<table>
<thead>
<tr>
<th>LAMA</th>
<th>LAMA+LABA</th>
<th>ICS/LABA</th>
<th>ICS/LABA/LAMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAMA is first line choice. Review symptoms at 4-6 weeks and continue if improved.</td>
<td>Add LABA to LAMA as a combination device if persistent breathlessness. Review at 4-6 weeks.</td>
<td>Add ICS to LABA if persistent breathlessness and at least one exacerbation leading to hospital admission or at least 2 exacerbations in past 12 months.</td>
<td>Triple therapy for patients with advanced COPD, persistent breathlessness and at least one exacerbation leading to hospital admission or at least 2 exacerbations in past 12 months. Can be considered for patients already taking triple therapy in different devices to aid compliance and facilitate good inhaler technique.</td>
</tr>
</tbody>
</table>

## Dry Powder Devices

<table>
<thead>
<tr>
<th>Incruse Ellipta (Umeclidinium) 55mcg</th>
<th>Anoro Ellipta (Umeclidinium + Vilanterol) 55mcg/22mcg</th>
<th>Relvar Ellipta (Fluticasone furoate + Vilanterol) 92mcg/22mcg</th>
<th>Trelegy Ellipta (Fluticasone furoate + Umeclidinium + Vilanterol) 92mcg/55mcg/22mcg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 puff once daily</td>
<td>1 puff once daily</td>
<td>1 puff once daily</td>
<td>1 puff once daily</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Eklira Genuair (Aclidinium) 322mcg</th>
<th>Duaklir Genuair (Aclidinium + Formoterol) 340mcg/12mcg</th>
<th>Ultibro Breezhaler (Indacaterol + Glycopyrronium 85mcg/43mcg)</th>
<th>Spiolto Respimat (Tiotropium + Olodaterol) 2.5mcg/6mcg x 2 puffs twice daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 puff twice daily</td>
<td>1 puff twice daily</td>
<td>1 puff once daily</td>
<td>2 puffs twice daily</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Seebri Breezhaler (Glycopyrronium) 44mcg</th>
<th>Ultibro Breezhaler (Indacaterol + Glycopyrronium 85mcg/43mcg)</th>
<th>Relvar Ellipta (Fluticasone furoate + Vilanterol) 92mcg/22mcg</th>
<th>Trimbow MDI (Budesonide + Formoterol + Glycopyrronium) 87mcg/5mcg/9mcg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 puff once daily</td>
<td>1 puff once daily</td>
<td>1 puff once daily</td>
<td>2 puffs twice daily</td>
</tr>
</tbody>
</table>

## Metered Dose Devices

<table>
<thead>
<tr>
<th>Spiriva Respimat (Tiotropium) 2.5mcg</th>
<th>Spiolto Respimat (Tiotropium + Olodaterol) 2.5mcg/2.5mcg</th>
<th>Fostair MDI (Budesonide + Formoterol) 100mcg/6mcg x 2 puffs twice daily</th>
<th>Trimbow MDI (Budesonide + Formoterol + Glycopyrronium) 87mcg/5mcg/9mcg</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 puffs once daily</td>
<td>2 puffs twice daily</td>
<td>2 puffs twice daily</td>
<td>x 2 puffs twice daily</td>
</tr>
</tbody>
</table>

| Fostair Nexthaler (Budesonide + Formoterol) 100mcg/6mcg x 2 puffs twice daily | Symbicort Turbohaler (Budesonide + Formoterol) 200mcg/6mcg x 2 puffs twice daily | Trimbow MDI (Budesonide + Formoterol + Glycopyrronium) 87mcg/5mcg/9mcg |
|------------------------------------|--------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|
| 100mcg/6mcg x 2 puffs twice daily  | 200mcg/6mcg x 2 puffs twice daily                      | 2 puffs twice daily                                         | x 2 puffs twice daily                                           |
Concordance

- Check concordance with prescribed medicines if there is poor control, and address issues such as poor inhaler technique, lack of understanding of the purpose of each device, exacerbation plans and understanding of the repeat prescribing process.
- Review all changes in therapy after 4 weeks to assess benefit of change and any adverse effects.
- Community pharmacists can support patients with inhaler technique during Medicines Use Reviews (MURs) or the New Medicines Service (NMS) consultations, and patients may find it helpful to watch videos of correct inhaler technique (via NHS choices, British Lung Foundation, YouTube etc).
- If patients need a spacer, they should be advised to inhale one actuation at a time and to clean the device monthly with water and washing up liquid and air dry. Patients can be provided with a new spacer annually, at their review appointment.

Bronchodilators

- All patients should have access to a short acting bronchodilator. SABA as salbutamol MDI is the preferred choice for the majority of patients. Patients using SABA regularly and asking for 2 each month should be reviewed and treatment optimised according to local guidelines.
- LAMAs are the preferred first-line long acting bronchodilators, with the choice of agent being determined by cost and patient preference for the device. As tiotropium and glycopyrronium levels are increased with reduced renal function the benefit v risk of continuing in moderate to severe impairment must be considered. No dosage adjustment is required for aclidinium or umeclidinium in renal impairment. LABAs may be trialled if LAMAs are not tolerated / contraindicated.
- The LAMA + LABA combination inhalers are more cost effective for patients with persistent breathlessness, compared with the separate component devices. If patients who have had LAMA + LABA device for increasing symptoms develop exacerbations, consider a change to a triple therapy device.
- The only short-acting antimuscarinic (SAMA) available is ipratropium, which may be an alternative or addition to a SABA in some patients. Ipratropium should be stopped before starting any LAMA. Patients are no longer recommended to commence a SAMA, as there is a range of LAMAs to choose from, which frequently makes a SAMA obsolete. Legacy patients on a SAMA may be considered for a change to a LAMA, particularly if the patient is breathless during the night.

Inhaled Corticosteroids

- The main role of ICS in COPD is to reduce the risk of exacerbations. However, patients with asthma /COPD overlap syndrome should be treated primarily according to asthma guidelines where the ICS devices have a more prominent role. ICS monotherapy is not licensed or recommended in COPD.
- ICS treatment is associated with increased risk of non-fatal pneumonia. Risks may outweigh benefits in mild to moderate COPD. Follow GOLD guidelines and only use ICS in patients who are exacerbating two or more times per year or with one severe exacerbation leading to hospitalisation.
- Patients who have previously used a combination LAMA + LABA device for breathlessness may need to be changed to a triple therapy device if they develop exacerbations.
## Exacerbation management

### Community and self-management of exacerbations

Patients with moderate or severe COPD should develop a written plan for self-management of exacerbations in conjunction with a named Primary Care contact (usually a practice nurse).

| How to minimise the risks of an exacerbation | • Be aware of local weather forecasts and conditions. Advise patients to avoid going out in adverse weather conditions and if this cannot be avoided advise to wrap up warmly and wear a hat in cold spells.  
| | • Advise patients to use alcohol hand gels to reduce infection risk.  
| | • Encourage smoking cessation and advise patients to avoid passive smoking as well. |

| How to recognise an exacerbation | A sustained worsening of symptoms from the usual stable state that is worse than usual day to day variability and comes on suddenly.  
| | Symptoms of an exacerbation may include:  
| | • Worsening breathlessness  
| | • Increased sputum volume  
| | • Change in colour of sputum  
| | • Cough |

| Increasing use of bronchodilators | Use inhaled B2 agonists  
| | Some patients may require nebulised treatment to be available short-term during an exacerbation - discuss with the IRT on a case-by-case basis |

| Access to oral corticosteroids and oral antibiotics | **Oral steroids** are recommended for exacerbations with the presence of wheeze, chest tightness and breathlessness. Local consultants recommend 30mg prednisolone daily (as a single morning dose of 6x5mg plain tablets) for 5 days for mild exacerbation increasing to 40mg for up to 10 days for more severe exacerbation. There is no need to taper prednisolone after a single short course. Patients do not always require steroids for mild exacerbations.  
| | **Antibiotics** are recommended in addition to oral corticosteroids if there is increased sputum purulence **with** either increased breathlessness and/or increased sputum volume. Antibiotic treatment should follow current local Management of Infection Guidelines. See [www.centralandeasterncheshiremmt.nhs.uk](http://www.centralandeasterncheshiremmt.nhs.uk)  
| | Guidance from the 14th edition is as follows:  
| | • Amoxicillin 500mg tds for 5 days  
| | • Doxycycline 200mg stat then 100mg od for 5 days (first-line if penicillin allergic)  
| | • Clarithromycin 500mg bd for 5 days (second-line only)  
| | • If resistance use Co-amoxiclav 500/125mg TDS for 5 days.  
| | Risk factors for antibiotic resistant organisms include co-morbid disease, severe COPD, frequent exacerbations and antibiotics in the last 3 months. If there are resistance risk factors present send sputum sample for culture and start antibiotics. Patients need to know how to access prednisolone +/- antibiotics quickly, i.e. have a supply at home and know when and how to take them with instructions on follow-up, or a rapid access pathway via the surgery. However, rescue packs are not suitable for all patients. Frequency of use of rescue packs must be monitored. |

| Post-exacerbation review | All patients should be reviewed after each exacerbation, ideally within 1-2 weeks of resolution of symptoms. This review should include:  
| | • Review of self-management plans, inhaler technique, understanding of how/when to use the medication, and ability to cope in usual environment  
| | • Record FEV1 (once stable) using COPD6 or equivalent and consider need for chest X-ray  
| | • Review of treatment regimen according to local Guidelines  
| | • Smoking cessation advice and immunisations (if necessary). |
Monitoring in primary care

The degree of airflow obstruction, as measured by FEV1, doesn’t always correlate with patient symptoms but can guide therapy. Airway obstruction should be monitored annually, but following a good initial diagnostic spirometry test Micro spirometry is recommended for monitoring purposes (e.g. the COPD6). The use of the COPD6 or equivalent will save 20-30 minutes of spirometry time per patient thus freeing up valuable time for patient assessment, support and education.

Annual assessment should include:

- An assessment of change in symptoms since last review
- Smoking status and desire to quit
- Measurement of FEV1 using the COPD6
- Assessment of breathlessness (use mMRC Dyspnoea Scale)
- COPD Assessment Test (CAT score) www.catestonline.org
- Frequency of exacerbations in the last year
- BMI: being underweight (BMI <20) is an indicator of poor prognosis and warrants referral to a dietitian
- Presence of complications and co-morbidities
- Inhaler technique/Inspiratory flow
- Review of lifestyle and exercise levels
- Anxiety and depression rating scales
- Need for referral (e.g. smoking cessation, chest X-ray, social services, pulmonary rehabilitation, dietitian, specialist services)
- Record of attendance for pulmonary rehabilitation (patients can attend this programme more than once)
- Ensuring the patient has a self-management plan. An IRT self-management plan is available for general distribution
- Ensure immunisations are up to date, including influenza and pneumococcal vaccination
- The following sites produce excellent patient information:
  - British Lung Foundation (see http://www.lunguk.org)
  - NICE via http://pathways.nice.org.uk
  - Primary Care Respiratory Society (www.pcrs-uk.org)

More severely affected patients should be assessed at least twice a year.

Pulse oximetry should be conducted in addition to the assessments listed above in patients with FEV1<30% predicted.
Hospital management of exacerbations

Many exacerbations can be managed successfully in the community, and the decision to admit to hospital should be taken on clinical grounds. Patients who may struggle to cope at home for social reasons (e.g. lives alone, isolated) may be suitable for community care / additional social support services. Patients with any of the following should be considered for admission to hospital:

- Severe breathlessness
- Cyanosis
- Poor / deteriorating condition
- Worsening peripheral oedema
- Poor activity / confined to bed
- Abnormal arterial blood gases
- Acute confusion
- Impaired consciousness
- Low oxygen saturation (SaO2 <88%)
- Significant comorbidity (e.g. heart disease, diabetes)
- Already receiving oxygen with acute changes in oxygen requirement
- Rapid rate of onset

Advise patients to take their inhalers into hospital with them if possible.

Hospital interventions may include the following:

- Controlled oxygen therapy
- Oral corticosteroids
- Antibiotics (if increased sputum volume/purulence or respiratory failure)
- Nebulised bronchodilator therapy
- Aminophylline
- Ventilatory support (non-invasive ventilation [NIV] is an important and life-saving intervention in COPD)
- Discussion around palliative care issues.

The risk of death from an exacerbation is closely related to the development of respiratory acidosis, presence of significant comorbidities and the need for ventilatory support.

Supported early discharge (SED) can reduce the duration of hospitalisation for patients with resolving exacerbations. SED is co-ordinated by the IRT.

All patients who develop hypoxaemia (low arterial blood oxygen concentration) during an exacerbation should be reviewed and assessed by the IRT as an inpatient. This will include an assessment for home oxygen therapy, based on national guidelines. This group of patients should be followed up at 4-6 weeks post-discharge by Secondary Care or the IRT. This should be clearly documented on their discharge information.

If home oxygen is appropriate on discharge, blood gases should be taken both on discharge and at 8 weeks post discharge. If the patient remains hypoxaemic they should be assessed for long term oxygen therapy (LTOT) by IRT in accordance with British Thoracic Guidelines (BTS) Home Oxygen Assessment Guidelines (2015). For those patients newly prescribed oxygen it is especially important that there is good communication between the practice team and the IRT or secondary care.

The risk of readmission after hospital discharge is 9% at one week and 18% at one month. The 90-day mortality for this group of patients is around 15%.

It remains best practice for all patients to be reviewed in primary care, ideally within 1-2 weeks of discharge.

The IRT will review identified housebound patients, and other patients who may require more intensive supervision by the IRT. The IRT will communicate fully with the practice.
**Additional considerations**

**Oxygen**

The need for oxygen therapy should be assessed in patients with:
- stage 4, very severe airflow obstruction (FEV1 < 30% predicted)
- oxygen saturations ≤92% breathing air identified on pulse oximetry
- cyanosis
- polycythaemia
- peripheral oedema
- raised jugular venous pressure

Oxygen assessment may also be considered in patients with stage 3, severe airflow obstruction (FEV1 30-49%).

All practices should have a pulse oximeter and perform oxygen saturations at least every 6 months in patients with severe and very severe COPD, including those who are housebound.

**All patients being referred for oxygen assessment must have had their COPD treatments optimised in accordance with this guidance prior to referral.**

Patients who require assessment for long term oxygen (LTOT) or ambulatory oxygen should be referred to the IRT who will assess the patients as per recommended Department of Health (DH) guidelines and complete the Home Oxygen Order Form (HOOF), risk assessment (IHORM), consent form and send to the oxygen provider as appropriate. Patients on LTOT who require oxygen for use during holidays should contact their oxygen provider for advice.

If patients require a flight assessment prior to air travel they should be referred into the Cardio-Respiratory Department at Macclesfield General Hospital. There will be a charge to the patient for this assessment service.

Clinicians, both GPs and Hospital Doctors, may occasionally need to complete HOOFs for short-term oxygen for emergency use or palliative care. The IRT are available 8am-6pm 7 days a week to discuss and guide the correct completion of the HOOF and IHORM. Subsequent early referral of these patients to the IRT will establish any ongoing need for LTOT.

A risk assessment approach should be adopted for assessing safety of all forms of home oxygen, especially in smokers in line with BTS recommendations, local home oxygen team and oxygen provider.

E-cigarettes may represent a fire hazard and are considered to pose the same risk as cigarettes when assessing for oxygen use.

**Oxygen does not treat breathlessness in the absence of hypoxaemia. Treatment with palliative oxygen therapy does not have a role in patients with cancer or end-stage cardiorespiratory disease with intractable breathlessness if their resting saturations are normal or only mildly hypoxaemic.**

**Pulmonary Rehabilitation**

Pulmonary rehabilitation (PR) is an evidence-based intervention that both increases a patient’s wellbeing and ability to manage their condition and also reduces symptom levels and admission to hospital. It is an important intervention in the management of patients with long term chronic respiratory disease. If patients have any conditions that may affect their ability to participate in an exercise session please inform PR. The patients must be motivated and committed to complete the course and be able to provide their own transport.

There are services available that may help with non-emergency transport including the Red Cross. For East Cheshire patients referrals can be made directly to the pulmonary rehabilitation service via referral form, clinic letter or IRT referral proforma. The referral form must be completed fully. Central Cheshire referrals can be made directly to the PR team via referral form or clinic letter or by emailing tmc-tr.communityrehabteam@nhs.net
Additional considerations

Nebulised Therapy

When it is clinically necessary, patients should be supplied with an NHS nebuliser. This should be supplied by the Acute Trust when necessary on discharge or supplied by the IRT when the patient is managed in the community. Generally, GPs should only prescribe nebulised therapy on the recommendation of the IRT.

- Nebulised therapy can be used short-term as part of managing exacerbations at home, but ideally only after appropriate assessment by the IRT.
- Nebulised therapy may be used as a component of supported early discharge following an exacerbation and will be reviewed by the IRT once the acute exacerbation has settled.
- Longer term nebuliser treatment may be necessary (rarely) when breathlessness is not adequately controlled with usual inhaled therapy or if specialised nebulised medication such as antibiotics or hypertonic saline is required.

Mucolytics (Carbocisteine, Acetylcysteine)

Do not routinely use mucolytic drugs to prevent exacerbations in people with stable COPD (NICE CG101). Do not initiate mucolytic therapy during an exacerbation. Before prescribing mucolytics, ensure that the patient has had education on chest clearance techniques, posture and exercise. It is important that there is a formal review following a trial of mucolytic therapy as side effects are common and effectiveness varies. Only continue beyond 4 weeks if there is symptomatic improvement (for example, reduction in frequency of cough and improved sputum production).

Mucolytics should be used with caution in the elderly, in patients with a history of gastrointestinal ulcers or with medications known to cause gastric bleeding. Carbocisteine and acetylcysteine are included in the local formulary – please check for cost effective options. Carbocisteine may be initiated as a trial dose of 750mg three times daily for 4 weeks and reduced to a maintenance dose of 750mg twice a day or 375mg four times daily if a satisfactory response is obtained. Acetylcysteine may cause bronchospasm and should not be prescribed to patients with asthma. Discontinue acetylcysteine immediately if bronchospasm occurs. Erdosteine is not included in the local formulary.

Oral Theophylline - specialist initiation only

Theophylline may have a role in patients with persistent symptoms despite other treatments; any patient being considered for oral theophylline should be referred to specialist services who will initiate treatment if appropriate. Plasma levels need to be monitored and any potential drug interactions considered, particularly in smokers. Levels should be checked in patients who stop smoking or reduce their cigarette / nicotine use.

Particular caution needs to be taken with the use of theophylline in older people because of the differences in pharmacokinetics, the increased likelihood of comorbidities and the use of other medications.

The effectiveness of theophylline treatment should be assessed by improvements in symptoms, activities of daily living, exercise capacity and lung function.

The dose of theophylline prescribed should be reduced at the time of an exacerbation if a macrolide or quinolone antibiotic (or other drug known to interact) is prescribed.

Oral Corticosteroid therapy

Maintenance use of oral corticosteroid therapy in COPD is not recommended. In exceptional circumstances, some patients with advanced COPD may receive maintenance oral corticosteroids when these cannot be withdrawn following an exacerbation. In these cases, the dose of oral corticosteroids should be kept as low as possible and the prescriber should ensure that the patient has a Steroid card (obtained from Primary Care Services England [PCSE]).
Patients treated with both frequent courses (>3 courses in 12 months) or long-term oral corticosteroid therapy should be monitored for the development of osteoporosis and given appropriate prophylaxis - see NICE CG146.

**Leukotriene Receptor Antagononist (LTRA)**

LTRA (montelukast) are not licensed in COPD. However some patients may also have a co-existing history of atopy/Allergic Rhinitis where a LTRA may be of benefit.

**Phosphodiesterase-4-enzyme inhibitor (PDE4) – specialist initiation only**

Roflumilast (Daxas) is an orally administered long-acting selective PDE4. It is recommended as a treatment option for treating severe chronic obstructive disease in adults with chronic bronchitis. It is only recommended when:

- The disease is severe, defined as a post-bronchodilator FEV1 of less than 50% of predicted normal
- The person has had 2 or more exacerbations in the previous 12 months despite triple inhaled therapy with a long-acting muscarinic antagonist, a long-acting beta-2 agonist and an inhaled corticosteroid.

**Guidance for use**

1. Specialist secondary care team to prescribe Roflumilast for first 3 months. GP will then be asked to prescribe. GP to continue the triple therapy (LAMA + LABA + ICS) throughout.
2. Patients to be reviewed for first year at 6 weeks and 3, 6 and 12 months either at Consultant clinic or IRT clinic review.
3. Patients taking roflumilast should be subject to additional monitoring for weight loss with weight, CAT score, treatment response and number of exacerbations recorded at each appointment.

**Prophylactic antibiotics – specialist initiation only**

Prophylactic antibiotics should be generally avoided but azithromycin may occasionally be initiated by respiratory consultants as an anti-inflammatory in certain patient subgroups. Primary care may continue to prescribe following specialist initiation as part of shared care arrangements including specialist review.

**Pulmonary hypertension and cor pulmonale**

Cor pulmonale is a clinical syndrome that includes patients with right sided heart failure secondary to lung disease and those in whom the primary pathology is retention of salt and water, leading to the development of peripheral oedema. A diagnosis of cor pulmonale should be considered if patients have:

- Peripheral oedema
- Raised venous pressure
- Systolic parasternal heave
- Loud pulmonary second heart sound
- Warm peripheries
- Bounding pulse

It is recognised that the diagnosis of cor pulmonale is made clinically following exclusion of other causes of peripheral oedema.

All patients suspected of having cor pulmonale should be referred for a specialist opinion and a care plan (including assessment for oxygen and diuretics as appropriate). The threshold for initiation of oxygen is lower in patients with features of cor pulmonale (PaO2 <8kPa) than in other patients (PaO2<7.3 kPa).
Palliative care

Up to 30% of patients with severe COPD will live for 5 years or more, and many patients with COPD will die with COPD rather than from COPD. Clinicians should consider discussing palliative care needs and patient wishes with the patients and their carers. The triggers for the discussion are:

- worsening obstruction
- increasing number and severity of exacerbations
- increasing breathlessness on exertion with decreasing exercise tolerance
- weight loss
- increasing anxiety and panic
- already established on LTOT and maximum inhaled therapy
- any exacerbation requiring NIV (NIV is an indicator of poor prognosis).

Patients should be placed on the practice palliative care register and managed by a multidisciplinary team. The IRT offer specialist palliative care advice, support and care for those patients with end-stage respiratory disease in collaboration with the district nursing teams.

NICE (2010) also recommends consideration of opioids, benzodiazepines and tricyclic antidepressants in patients with advanced COPD not responding to other medical therapy. Oxygen therapy should only be considered in patients with objective evidence of hypoxaemia. Patients should be considered for hospice day care referral for the breathlessness programme, management of debilitating anxiety and panic, relaxation and complementary therapies or patients may be referred for admission for further symptom management and support.

Key Contacts

Respiratory Specialist Teams

East Cheshire Trust / Macclesfield District General Hospital
Consultants for Respiratory Medicine
Dr Marta Babores Tel: 01625 661350/3211
Dr Jo Gallagher
Dr Thapas Nagarajan
Dr Serene Shashaa
Lead Nurse: Alison Graham

Mid Cheshire Hospital Foundation Trust
Consultants for Respiratory Medicine:
Dr Duncan Fullerton: Tel: 01270 612419
Dr Diana Lees
Dr Wa’el Osman

The Integrated Respiratory Teams
Central Team: Central Cheshire Integrated Care Partnership (CCICP)
Team Leader Kath Morgan: Tel: 01270 275437
tmc-tr.irt@nhs.net

East Cheshire Trust Team
Team Leader Jackie Bayliss: Tel: 01625 663380

Pulmonary Rehabilitation
Carol Jones (East Cheshire Trust): Tel: 01625 661442
Jane Wilmer (CCICP): 01270 275435

Stop Smoking Service
Kickstart (For East and South Cheshire):
Tel: 0800 085 8818
Email: info@kickstartcheshire.co.uk
Website: www.kickstartcheshire.co.uk

Cheshire Change Hub For Vale Royal:
Tel: 0300 777 0033
https://cheshirechangehub.org
hello@cheshirechangehub.org (email)

Other information

Oxygen providers
Air Liquide: For healthcare professionals Tel: 0808 202 2099
Customer services for home oxygen patients Tel: 0808 143 9992
Baywater Healthcare
(for ST7 postcodes; Alsager and Scholar Green only):
Tel: 0800 373580

Medicines Management Team
Tel: 01270 275331
www.centralandeasterncheshiremmt.nhs.uk

British Lung Foundation - Breathe Easy
www.blf.org.uk
Support Groups - Crewe & Macclesfield
Helpline: 03000 030 555
Breathe.easy@blf.org.uk

The British Lung Foundation website contains patient information about lung diseases including COPD, and several of their leaflets have been translated into other languages.

Primary Care Respiratory Society:
www.pcrs-uk.org

My health Apps
Myhealthapps.net