BNF CHAPTER 3: RESPIRATORY

Information resources:
- If an inhaler device is changed then patients must be assessed to ensure inhaler technique is adequate
- Respiratory Futures
- Consider issuing a Steroid warning card to patients prescribed high dose inhaled steroids

Asthma guidelines
- NICE guideline [NG80] Asthma: diagnosis, monitoring and chronic asthma management
- NICE guidance TA 138 Asthma - inhaled corticosteroids for the treatment of chronic asthma in adults and children aged 12 years and over.
- https://www.sign.ac.uk/assets/sign153.pdf SIGN 153: British guideline on the management of asthma
- West Cheshire local guidelines

COPD guidelines:
- NICE [NG115] COPD in over 16s diagnosis and management. NICE guideline Dec 18 [NG115]
- GOLD: Global strategy for the diagnosis, management, and prevention of Chronic Obstructive Pulmonary Disease 2018 Report
- West Cheshire local guidelines

Abbreviations used:
MDI: metered dose inhaler
DPI: dry powder inhaler
SABA: short acting beta agonist
LABA: long acting beta agonist
SAMA: short acting muscarinic antagonist
LAMA: long acting muscarinic antagonist
ICS: inhaled corticosteroid
LTRA: leukotriene receptor antagonist
PDE4: phosphodiesterase-4 enzyme inhibitor
3.1 BRONCHODILATORS

3.1.1.1 SELECTIVE BETA$_2$-AGONISTS

Short acting Beta$_2$ Agonist (SABA)

- **Salbutamol**
  - 100 micrograms/metered inhalation MDI
  - 100/200 micrograms/metered inhalation DPI (Easyhaler®)
  - 100 micrograms/metered inhalation breath-actuated (e.g., Easi-Breathe®)
  - 200 micrograms/dose DPI (Ventolin Accuhaler®)
  - 2.5mg/2.5mL (1mg/mL) nebuliser solution
  - 5mg/2.5mL (2mg/mL) nebuliser solution
  - 2mg/5mL sugar free syrup
  - 500 micrograms/mL injection
  - 5mg/5mL solution for IV infusion

- **Terbutaline**
  - 500 micrograms/metered inhalation DPI (Bricanyl Turbohaler®)
  - 5mg/2mL (2.5mg/mL) nebuliser solution
  - 5mg tablets
  - 500 micrograms/mL injection

- **Bambuterol**
  - 10mg, 20mg tablets

(*RAG status: Amber – existing patients)  
Black – New patients)
**Longer acting Beta₂ Agonist (LABA)**

- **Formoterol fumarate**
  (Licensed for asthma and COPD)
  - 12 micrograms/metered inhalation MDI (Atimos modulite®)
  - 12 micrograms/metered inhalation DPI (Easyhaler®)
  - 6 micrograms/metered inhalation DPI (Oxis Turbohaler®)
  - 12 micrograms/metered inhalation DPI (Oxis Turbohaler®)

- **Salmeterol**
  (Licensed for asthma and COPD)
  - 25 micrograms/metered inhalation MDI
  - 50 micrograms/dose DPI (Serevent Accuhaler®)

- **Indacaterol**
  (Licensed for COPD)
  - 150 micrograms, 300 micrograms/capsule DPI (Onbrez Breezhaler®)

- **Olodaterol**
  (Licensed for COPD)
  - 2.5mcg (Striverdi Respimat®)

LABA inhalers should not be used alone without an inhaled corticosteroid component in asthma patients, for this reason combination LABA/ICS inhalers are recommended. Almost all COPD patients who experience more than occasional dyspnoea should be prescribed LABA therapy; either alone or as combination inhalers (LABA/LAMA, LABA/ICS or triple therapy inhaler). Prescribe inhalers by BRAND name so as to prevent confusion for the patient if they are given an unfamiliar device which they are not able to use properly.
3.1.2 ANTIMUSCARINIC BRONCHODILATORS

Antimuscarinic bronchodilators should be considered when inhaled SABA alone fails to adequately relieve bronchospasm.

**Short-acting Muscarinic Antagonists (SAMA)**

- **Ipratropium bromide**  
  20 micrograms-metered inhalation MDI  
  250 micrograms/mL nebuliser solution  
  500 micrograms/2mL nebuliser solution

**Long-acting Muscarinic Antagonists (LAMA)** - Not to be used with ipratropium; discontinue if ipratropium nebuliser commenced as inpatient.

- **Tiotropium**  
  (licensed for COPD)  
  10 micrograms/capsule DPI (Braltus Zonda®)  
  18 micrograms/capsule DPI (Spiriva Handihaler®)  
  (licensed for severe Asthma & COPD)  
  2.5 micrograms-metered inhalation (Spiriva Respimat®)

- **Aclidinium bromide**  
  (licensed for COPD)  
  322 micrograms/inhalation DPI (Eklira Genuair®)

- **Glycopyrronium bromide**  
  (licensed for COPD)  
  50 micrograms/capsule DPI (=glycopyrronium 44 micrograms) (Seebri Breezhaler®)

- **Umeclidinium bromide**  
  (licensed for COPD)  
  55 micrograms/inhalation DPI (Incruse Ellipta®)
**Compound bronchodilators (LAMA/LABA)**

- **Tiotropium with olodaterol**
  (licensed for COPD)
  Tiotropium 2.5 micrograms / olodaterol 2.5 micrograms inhalation solution (Spiolto Respimat®)

- **Aclidinium bromide with formoterol**
  (licensed for COPD)
  Aclidinium 340 micrograms / formoterol 12 micrograms / inhalation DPI (Duaklir Genuair®)

- **Glycopyrronium bromide with indacaterol**
  (licensed for COPD)
  Glycopyrronium 43 micrograms / indacaterol 85 micrograms / capsule (Ultibro Breezhaler®)

- **Umeclidinium bromide with vilanterol**
  (licensed for COPD)
  Umeclidinium 55 micrograms/ vilanterol 22 micrograms / inhalation DPI (Anoro Ellipta®)
3.1.3 THEOPHYLLINE & PDE4 (Phosphodiesterase 4) Inhibitor

The brands of modified release theophylline have different release characteristics and are not interchangeable. Preparations should be always be prescribed by BRAND.

- **Theophylline**  
  200mg, 300mg, 400mg m/r tablets (Uniphyllin Continus®)  
  60mg, 125mg, 250mg m/r capsules (Slo-phyllin®)  
  175mg, 250mg m/r tablets (Nuelin SA®)

- **Aminophylline**  
  225mg m/r tablets (Phyllocontin Continus®)  
  350mg m/r tablets (Phyllocontin Continus Forte®)  
  250mg/10mL injection

**Guidelines for aminophylline infusion for patients with exacerbations of asthma/COPD.**

Refer to ‘Guidelines for the use of Intravenous Aminophylline and Oral Aminophylline/Theophylline in Adults’ via COCH sharepoint.

**PED4 Inhibitors**

- **Roflumilast** – Amber Initiated  
  250mcg, 500mcg tablets

**Prescribing Guidance**

To be used in accordance with NICE TA461 and Summary Product Characteristics (SPC). Refer to GP Information Leaflet for prescribing information.

Must be started by a specialist in respiratory medicine i.e. consultant initiated.

Roflumilast: as an add-on to bronchodilator therapy, is recommended as an option for treating severe chronic obstructive pulmonary disease in adults with chronic bronchitis, only if:

- the disease is severe, defined as a forced expiratory volume in 1 second (FEV1) after a bronchodilator of less than 50% of predicted normal, and

- 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.

To be initiated in COPD patients after failed response with theophylline or when intolerance to theophylline observed e.g. tachycardia, history of arrhythmias.

Patient monitoring for first 3 months by respiratory consultant - (black-triangle status)

Treatment to continue in primary care once patient deemed stable on medication.
3.2 CORTICOSTEROIDS

Guidelines for the routine use of inhaled corticosteroids (ICS) in adults

None of the inhaled corticosteroids currently available are licensed for use alone in the treatment of COPD. There are different dose equivalences between the different brands of CFC free beclometasone inhalers. Therefore they should be prescribed by brand name.

Refer to Pan Mersey guidance on when to issue steroid warning cards.

Patients should be warned about the possible risk of pneumonia/osteoporosis and other side effects of high dose corticosteroid treatment.

- **Beclometasone**  
  (Licensed for asthma)  
  Qvar®  
  50, 100 micrograms / metered inhalation MDI  
  50, 100 micrograms / actuation breath actuated inhaler  
  (e.g., Easi-Breathe® Autohaler®)  
  (licensed for adults and children >12 years)

  Clenil modulite®  
  50, 100, 200, 250 micrograms / metered inhalation MDI  
  (licensed for adults and children <12 years [100-200 micrograms twice daily])

  **Easyhaler® beclometasone**  
  200 micrograms / metered inhalation DPI  
  (licensed for adults)

- **Budesonide**  
  (Licensed for asthma)  
  100, 200, 400 micrograms / metered inhalation DPI  
  Easyhaler®  
  100, 200, 400 micrograms / metered inhalation DPI  
  Turbodel®  
  500 micrograms/2mL (250 micrograms/ml) nebuliser solution  
  1mg/2mL (500 micrograms/ml) nebuliser solution  
  (Budesonide Respules®)  
  (licensed for adults and children >5 years)
• **Ciclesonide** *(Licensed for asthma)*  
  **Alvesco®**  
  80, 160mcg micrograms/dose aerosol inhaler MDI  
  (licensed for adults and children >12 years)  
  **Reserved for patients who are susceptible to oropharyngeal side effects of steroids.**

• **Fluticasone** *(Licensed for asthma)*  
  50, 125, 250 micrograms/metered inhalation MDI *(Evohaler®)*  
  50, 100, 250, 500 micrograms/blister DPI *(Accuhaler®)*  
  (licensed for adults and children >4 years [max 200 micrograms twice daily])  
  500 micrograms/2mL (250 micrograms/mL) unit dose vials  
  2mg/2mL (1mg/mL) unit dose vials *(Flixotide® nebuler)*

**Compound corticosteroid preparations**

**Inhaled Corticosteroid/Long-Acting Beta2- agonist (ICS/LABA)**

Combination inhalers containing a steroid and long-acting beta-2 agonist (LABA) are useful in ensuring that beta-2 agonists are not used without concomitant inhaled steroid for management of asthma.  
LABA + ICS fixed dose combination inhalers are used in COPD when FEV₁<50% to reduce the exacerbations and slow decline in lung function.  
Triple combination inhalers (ICS+LABA+LAMA) are only licensed for use in moderate to severe COPD in patients who aren’t adequately treated by a combination of ICS/LABA.

• **Fostair®** *(Licensed for asthma and COPD)*  
  Beclometasone 100 micrograms / formoterol 6 micrograms per metered inhalation MDI

*(Licensed for asthma)*  
  Beclometasone 200 micrograms / formoterol 6 micrograms per metered inhalation MDI

Fostair® has extra-fine particles and is more potent than traditional beclometasone dipropionate CFC-free inhalers.  
Fostair® MDI must be stored in the fridge; once dispensed it no longer requires refrigeration but must then be discarded after 3 months.  
Fostair 100/6 can be prescribed for patients with asthma who require maintenance and reliever therapy (MART). **Ensure patient has been adequately counselled on how to use the MART regime before issuing a prescription.**
• **Fostair® NEXThaler**  
  (Licensed for asthma and COPD)  
  Beclometasone 100 micrograms / formoterol 6 micrograms per inhalation DPI

  (Licensed for asthma)  
  Beclometasone 200 micrograms / formoterol 6 micrograms per inhalation DPI

• **Symbicort Turbohaler®**  
  (Licensed for asthma)  
  Budesonide 100 micrograms / formoterol 6 micrograms per inhalation DPI *

  (Licensed for asthma and COPD)  
  Budesonide 200 micrograms / formoterol 6 micrograms per inhalation DPI *

  (Licensed for asthma and COPD)  
  Budesonide 400 micrograms / formoterol 12 micrograms per inhalation DPI

• **Symbicort® MDI**  
  (licensed for COPD)  
  Budesonide 200 micrograms / formoterol 6 micrograms / metered inhalation MDI

*Symbicort SMART® may be used as both regular preventative therapy and reliever therapy, for mild to moderate asthmatics. Ensure patient has been adequately counselled on how to use the SMART regime before issuing a prescription.

• **DuoResp Spiromax®**  
  (Licensed for asthma and COPD)  
  Budesonide 160 micrograms / formoterol 4.5 micrograms per inhalation DPI  
  Budesonide 320 micrograms / formoterol 9 micrograms per inhalation DPI

Duoresp Spiromax® (160/4.5, 320/9) delivers an equivalent dose with the same indications for use as Symbicort® (200/6 and 400/12 doses respectively) and may be used as regular preventative therapy (160/4.5 and 320/9) or preventative and reliever therapy (160/4.5 only).  
Ensure patient has been adequately counselled on how to use the SMART regime before issuing a prescription.
- **Flutiform®**  
  (Licensed for asthma)  
  Fluticasone propionate 50 micrograms / formoterol 5 micrograms / metered inhalation MDI  
  Fluticasone propionate 125 micrograms / formoterol 5 micrograms / metered inhalation MDI  
  Fluticasone propionate 250 micrograms / formoterol 10 micrograms / metered inhalation MDI  

- **Sirdupla®**  
  (Licensed for asthma)  
  Fluticasone propionate 125 micrograms / salmeterol 25 micrograms per metered inhalation MDI  
  Fluticasone propionate 250 micrograms / salmeterol 25 micrograms per metered inhalation MDI  

- **Relvar Ellipta®**  
  (Licensed for asthma and COPD)  
  Fluticasone furoate 92 micrograms / vilanterol 22 micrograms per inhalation DPI  
  Fluticasone furoate 184 micrograms / vilanterol 22 micrograms per inhalation DPI  

- **Seretide Evohaler®**  
  (Licensed for asthma)  
  Fluticasone propionate 50 micrograms / salmeterol 25 micrograms per metered inhalation MDI  
  Fluticasone propionate 125 micrograms / salmeterol 25 micrograms per metered inhalation MDI  
  Fluticasone propionate 250 micrograms / salmeterol 25 micrograms per metered inhalation MDI  

- **Seretide Accuhaler®**  
  (Licensed for asthma and COPD)  
  Fluticasone propionate 100 micrograms / salmeterol 50 micrograms per blister DPI  
  Fluticasone propionate 250 micrograms / salmeterol 50 micrograms per blister DPI  
  Fluticasone propionate 500 micrograms / salmeterol 50 micrograms per blister DPI
**Triple combination inhalers (Inhaled Corticosteroid (ICS)/Long-Acting Beta2- agonist (LABA) + Long-acting Muscarinic Antagonist (LAMA))**

**Trimbow®**  
(licensed for COPD)  
Beclometasone dipropionate 87 micrograms, Formoterol fumarate dehydrate 5 microgram, Glycopyrronium bromide 9 microgram per metered inhalation MDI

**Trelegy Ellipta®**  
(licensed for COPD)  
Fluticasone furoate 92 microgram, Umeclidinium bromide, 55 microgram, Vilanterol trifenate 22 microgram per metered inhalation DPI
3.3.1 CROMOGLICATE AND RELATED THERAPY

Not recommended for routine use

3.3.2 LEUKOTRIENE RECEPTOR ANTAGONISTS (LTRAs)

- **Montelukast**
  - 10mg tablets
  - 4mg chewable tablets/granules
  - 5mg chewable tablets

Effectiveness should be assessed after 6-12 weeks and discontinued if no improvement.

LTRAs may be of benefit in exercise induced asthma and concomitant allergic rhinitis.

Churg-Strauss syndrome is a very rare side effect of LTRAs and usually occurs following oral corticosteroid withdrawal or reduction.

CSM advice: Prescribers should be alert to the development of eosinophilia, vasculitic rash, worsening pulmonary symptoms, cardiac complications or peripheral neuropathy.
3.4 ANTIHISTAMINES, HYPOSENSITISATION, AND ALLERGIC EMERGENCIES

3.4.1. ANTIHISTAMINES

“Sedating” antihistamines

First choice

- **Chlorphenamine**
  - 4mg tablets
  - 2mg/5mL syrup
  - 10mg/mL injection

Second choice

- **Promethazine**
  - 10mg, 25mg tablets
  - 5mg/5mL elixir
  - 25mg/mL, 50mg/2mL injection

“Non-sedating” antihistamines

- **Cetirizine**
  - 10mg tablets
  - 5mg/5mL oral solution

- **Loratadine**
  - 10mg tablets
  - 5mg/5mL syrup

NB: levocetirizine and desloratadine remain more expensive than cetirizine and loratadine. There is a lack of evidence confirming clinical benefit over the older preparations and therefore they remain non-formulary.

- **Fexofenadine**
  - 120mg, 180mg tablets
3.4.2 ALLERGEN IMMUNOTHERAPY

- **Bee & wasp allergen extracts (Pharmalgen®)**
  - Bee venom injections
  - Wasp venom injections
  - (As per NICE TA246)

- **Grass Pollen extract (Grazax®)**
  - Tablets, 75,000 units grass pollen extracts
  - Specialist service

- **Mepolizumab**
  - 100mg injection
  - (NHSE commissioned as per NICE TA431)

- **Omalizumab**
  - 75mg in 0.5mL, 150mg in 1mL pre-filled syringe
  - (NHSE commissioned as per NICE TA278 & TA339)

3.4.3 ALLERGIC EMERGENCIES

- **Adrenaline 1 in 1,000**
  - 1mg/mL injection

- **Adrenaline 1 in 10,000**
  - 100 micrograms/mL injection

Injection technique is device specific therefore adrenaline auto-injectors should be prescribed by brand. Patients should receive adequate instruction on how to use the device prescribed.

- **Emerade® (adrenaline 1 in 1000)**
  - (500mcg dose recommended by Resuscitation Council (UK) for adults and children aged >12 years)
  - 150mcg in 0.5ml Auto-injector device
  - 300mcg in 0.5ml Auto-injector device
  - 500mcg in 0.5ml Auto-injector device

- **Jext® (adrenaline 1 in 1000)**
  - 150mcg in 1.4ml Auto-injector device
  - 300mcg in 1.4ml Auto-injector device

- **EpiPen® (adrenaline 1 in 1000)**
  - 150mcg in 2ml Auto-injector device
  - 300mcg in 2ml Auto-injector device
3.5 RESPIRATORY STIMULANTS AND PULMONARY SURFACTANTS

- **Caffeine citrate**
  - 10mg in 1mL oral solution
  - 10mg in 1mL injection

- **Doxapram**
  - 2mg/mL in glucose 5% solution for intravenous infusion (500mL)
  - (20mg/mL injection for use in ITU and fluid restricted patients only)

**Doxapram infusion administration guidelines**

**indication:** In adult respiratory failure (hypercapnia in acute on chronic respiratory failure) non-invasive positive pressure ventilation (NIPPV) is the treatment of choice. Doxapram may be used while patients await to start NIPPV. Doxapram infusion with oxygen therapy is used for up to 24 hours, only in patients who fail to tolerate NIPPV whilst an alternative mode of therapy is investigated.

**dose:** 1.5 to 4mg/minute as continuous IV infusion, adjusted according to response. See regime below.

<table>
<thead>
<tr>
<th>Time from start of infusion</th>
<th>Dose</th>
<th>Infusion rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 15 mins</td>
<td>4mg/min</td>
<td>120mL/hr for 15 mins</td>
</tr>
<tr>
<td>15 - 30 mins</td>
<td>3mg/min</td>
<td>90mL/hr for 15 mins</td>
</tr>
<tr>
<td>30 - 60 mins</td>
<td>2mg/min</td>
<td>60mL/hr for 30 mins</td>
</tr>
<tr>
<td>60 mins onwards</td>
<td>1.5mg/min</td>
<td>45mL/hr continuously</td>
</tr>
</tbody>
</table>

**Monitoring:** Frequent arterial blood gasses and pH to ensure correct dosage.
3.7 MUCOLYTICS

- **Carbocisteine**
  - 375mg capsules
  - 250mg/5mL oral solution
  - 750mg/10mL oral solution
  - 10ml sachets sugar free

**Place of mucolytics in the management of COPD**
Consider in people with a chronic productive cough, not for routine use in prevention of exacerbations.

Commence carbocisteine 2.25g daily in divided doses (e.g., caps; 750mg tds, syrup; 15mL tds for 4 weeks) **THEN REVIEW**, if no improvement in symptoms **DISCONTINUE**.

If symptomatic improvement, continue on maintenance dose of 1500mg daily in divided doses.

- **Hypertonic sodium chloride**
  - Nebuliser solution 7%, 4ml ampoules
  - **Resp-Ease®**
  - **Amber Shared-Care**: Nebuliser solution used up to twice daily in conjunction with physiotherapy. Temporary irritation (e.g. coughing, hoarseness or reversible bronchoconstriction) may occur with hypertonic saline. Using an inhaled bronchodilator (e.g., salbutamol) before treatment may minimise such adverse effects.

**Mucolytic Options for patients with cystic fibrosis**

- **Dornase alpha**
  - Nebuliser solution 1,000 units (1mg)/mL
  - (NHSE commissioned)

- **Ivacaftor (Kalydeco®)**
  - 150mg tablets
  - (NHSE commissioned)

- **Lumacaftor and ivacaftor (Orkambi®)**
  - 150mg tablets
  - (NHSE commissioned as per **NICE TA398**)

- **Mannitol**
  - 40mg capsule for inhalation
  - (NHSE commissioned as per **NICE TA266**)

Joint Formulary – Respiratory
Approved by Area Prescribing Committee: N/A
Review by: July 2021
3.9 COUGH PREPARATIONS

Use of cough suppressants is not recommended long-term, address other causes e.g., asthma, gastro-oesophageal reflux, chest infection and limit use where possible.

- **Simple linctus**
  - Demulcent
  - Sugar free preparation also available

- **Pholcodine**
  - 5mg/5mL linctus sugar free
  - Cough suppressant

- **Codeine**
  - 15mg/5mL linctus sugar free
  - Cough suppressant

- **Methadone**
  - 2mg/5mL linctus **CD**
  - For intractable cough in patients with lung cancer – secondary care and hospice use only

3.11 Antifibrotics

- **Nintedanib**
  - 100mg, 150mg capsules
  - (NHSE commissioned as per [NICE TA379](#))

- **Pirfenidone**
  - 267mg capsules
  - (NHSE commissioned as per [NICE TA282](#))