The correct administration of inhaled therapy is essential for successful, cost-effective and safe therapy. Everyone, including the patient needs to understand the importance of ensuring correct inhaler technique. Patients should be instructed on how to use their inhaler and supervised when they are first prescribed a new inhaler and their inhalation technique should be checked by observation at every opportunity.

To promote a consistent inhaler technique for patients, wherever possible, prescribe drugs in identical devices or, if this is not possible, use the same type of device i.e either aerosols or DPI devices rather than a mixture of the two.
**SHORT ACTING BRONCHODILATORS**

<table>
<thead>
<tr>
<th><strong>Generic Name</strong></th>
<th><strong>Brand Name</strong></th>
<th><strong>Device Options</strong></th>
<th><strong>Cost</strong></th>
<th><strong>Usual Dose</strong></th>
<th><strong>Pharmacological Action</strong></th>
<th><strong>Recommended Place in UK Practice Guidelines</strong></th>
<th><strong>Things to Note</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short Acting Beta-2 agonist (SABA)</strong></td>
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<tr>
<td>Salbutamol</td>
<td></td>
<td><strong>Easyhaler®, MDI</strong></td>
<td>£3.31</td>
<td>100–200 micrograms when required</td>
<td>Mechanism of action: • Bronchodilation through activation of beta-2 receptors on the airway smooth muscle • Reduction of lung hyperinflation, resulting in increased inspiratory capacity</td>
<td>Relief of breathlessness and chest tightness in people with asthma and COPD (according to the British Asthma guideline¹ and NICE COPD guideline).² SABA inhalers should ideally be prescribed “PRN - when required” as this helps to monitor control. Reliance on frequent use, or a sudden increase in dose, indicates poorly controlled or deteriorating disease. People with asthma using their SABA inhaler three times a week or more is a marker of uncontrolled asthma and should have their asthma control assessed.¹ Any person with asthma identified as requesting twelve or more SABA canisters over 12 months should be invited for a structured review of their asthma. People with COPD may require more regular use of SABA, as using prior to movement/exercise may be beneficial. For people using SABA regularly ensure other medicines are prescribed and optimised to reduce breathlessness as per NICE COPD guideline.³ Side effects include: Fine tremor (particularly in hands), muscle cramps and tachycardia. High doses associated with hypokalaemia. Most side effects are dose related.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td><strong>Easi-Breathe®, Accuhaler®, Autohaler, Novolzer®</strong></td>
<td>£6.00</td>
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<tr>
<td></td>
<td></td>
<td><strong>Terbutaline</strong></td>
<td>£6.92</td>
<td>500 micrograms when required</td>
<td>Onset of action: • within 5 minutes Duration of action: • approximately 4 to 6 hours No clinical pharmacological difference between salbutamol and terbutaline</td>
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<tr>
<td></td>
<td></td>
<td><strong>Bricanyl®, Turbohaler®</strong></td>
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</tr>
</tbody>
</table>

¹ British Asthma guideline
² NICE COPD guideline
³ SABA inhalers should ideally be prescribed “PRN - when required” as this helps to monitor control. Reliance on frequent use, or a sudden increase in dose, indicates poorly controlled or deteriorating disease. People with asthma using their SABA inhaler three times a week or more is a marker of uncontrolled asthma and should have their asthma control assessed.¹ Any person with asthma identified as requesting twelve or more SABA canisters over 12 months should be invited for a structured review of their asthma. People with COPD may require more regular use of SABA, as using prior to movement/exercise may be beneficial. For people using SABA regularly ensure other medicines are prescribed and optimised to reduce breathlessness as per NICE COPD guideline.³ Side effects include: Fine tremor (particularly in hands), muscle cramps and tachycardia. High doses associated with hypokalaemia. Most side effects are dose related.
### Ipratropium Bromide (Atrovent®)

**MDI**

- **Cost**: £3.34–£6.67
- **Usual Dose**: 20–40 micrograms three to four times a day (there is no benefit in using >4 times a day, although some patients may need up to 4 puffs at a time to obtain maximum benefit)
- **Mechanism of Action**: 
  - Bronchodilation through antagonism at muscarinic receptors on airway smooth muscle
  - Reduction of lung hyperinflation, resulting in increased respiratory capacity
- **Onset of Action**: within 20 minutes
- **Duration of Action**: approximately 4 hours

#### PHARMACOLOGICAL ACTION

- Relief of breathlessness in people with COPD who have intermittent symptoms.
- Relief of breathlessness, wheeze and chest tightness (in addition to SABA treatment) in acute asthma exacerbations.

#### SIDE EFFECTS

- Dry mouth (most common), dizziness, nausea, gastro-intestinal motility disorder (i.e. constipation or diarrhoea), cough and headache.

#### PRECAUTIONS FOR USE

- Prescribe with caution in people with pre-existing bladder outflow obstruction or prostatic hyperplasia, and those susceptible to angle-closure glaucoma. Studies have suggested an increased risk of cardiovascular morbidity and mortality associated with the use of ipratropium bromide. Patients should be reminded not to exceed the recommended dose.

### Things to Note

- Common adverse effects, precautions for use etc.
## Long Acting Beta-2 agonists (LABA)

<table>
<thead>
<tr>
<th>INHALED MEDICINE</th>
<th>DEVICE OPTIONS</th>
<th>COST</th>
<th>USUAL DOSE</th>
<th>PHARMACOLOGICAL ACTION</th>
<th>RECOMMENDED PLACE IN UK PRACTICE GUIDELINES</th>
<th>THINGS TO NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmeterol</td>
<td>MDI</td>
<td>£29.26</td>
<td>30 day treatment / per dose</td>
<td>50 micrograms twice a day (higher doses not recommended as evidence for increased efficacy is limited)</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>MDI*</td>
<td>£23.40</td>
<td></td>
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<tr>
<td></td>
<td>MDI*</td>
<td>£29.26</td>
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<tr>
<td></td>
<td>MDI*</td>
<td>£35.11</td>
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<tr>
<td></td>
<td>MDI*</td>
<td>£29.26</td>
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</tr>
<tr>
<td></td>
<td>MDI*</td>
<td>£19.95</td>
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</tbody>
</table>

### Mechanism of action:
- Bronchodilation through activation of beta-2 receptors on airway smooth muscle
- Reduction of lung hyperinflation, resulting in increased respiratory capacity during exercise and at rest
- Reduction of COPD exacerbations

### Onset of action:
- Salmeterol and formoterol 12 hours
- Indacaterol and olodaterol have a longer duration of action of 24 hours, hence once daily dosing

### Duration of action:
- Salmeterol and formoterol 12 hours
- Indacaterol and olodaterol have a longer duration of action of 24 hours, hence once daily dosing

### Side effects include:
- Fine tremor (particularly in hands), headache, muscle cramps and tachycardia. High doses associated with hypokalaemia. In studies with indacaterol, upper respiratory tract infections, nasopharyngitis, sinusitis and rhinorrhoea were commonly observed.

### Drug interactions:
All LABAs should be used cautiously with drugs that increase the risk of prolongation of the QTc interval (e.g. ketoconazole, tricyclic antidepressants, quinidine, disopyramide, procainamide, erythromycin).
## Long Acting Muscarinic Antagonist (LAMA)

<table>
<thead>
<tr>
<th>Brand Name</th>
<th>Device Options</th>
<th>Usual Dose</th>
<th>Mechanism of action</th>
<th>Maintenance treatment</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tiotropium bromide</strong>&lt;br&gt; Spiriva®&lt;br&gt; Handihaler®</td>
<td>RED = DRY powder device&lt;br&gt; BLUE = AEROSOL device</td>
<td>£23.00&lt;br&gt; £34.87 (refill pack £33.50)&lt;br&gt; £25.80</td>
<td>Bronchodilation through antagonism at muscarinic receptors on airway smooth muscle&lt;br&gt; Reduction of dynamic hyperinflation, resulting in increased respiratory capacity during exercise and at rest&lt;br&gt; Antimuscarinics in theory should help reduce mucus secretion&lt;br&gt; May reduce COPD exacerbations</td>
<td>COPD in those people with persistent symptoms&lt;br&gt; May help to reduce exacerbations of COPD&lt;br&gt; Tiotropium Respimat is also licensed for people with asthma, who are adherent to combined ICS (≥800 micrograms) and LABA with ≥1 severe exacerbations in the previous year. The BTS/SIGN guideline states that ‘LAMA appear to be as effective as salmeterol in the short term and may be superior to doubling the dose of ICS in fixed airways obstruction’. Addition to ICS/LABA may benefit patients who remain symptomatic despite ICS/LABA.</td>
<td>Dry mouth (relatively common), which may in the long term be associated with dental caries. Nasopharyngitis, headache, and diarrhoea commonly reported with both glycopyrronium bromide and aclidinium bromide.</td>
</tr>
<tr>
<td><strong>Acclidinium bromide</strong>&lt;br&gt; Eklira®&lt;br&gt; Genuair®</td>
<td>£28.60</td>
<td>322 micrograms twice a day (equivalent to 400 micrograms of aclidinium bromide)</td>
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<tr>
<td><strong>Glycopyrronium bromide</strong>&lt;br&gt; Seebri®&lt;br&gt; Breezhaler®</td>
<td>£27.50</td>
<td>44 micrograms once a day (equivalent to 55 micrograms of glycopyrronium bromide)</td>
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<tr>
<td><strong>Umeclidinium</strong>&lt;br&gt; Incruse®&lt;br&gt; Ellipta®</td>
<td>£27.50</td>
<td>55 micrograms once a day (equivalent to 65 micrograms of umeclidinium bromide)</td>
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</tbody>
</table>

**Notes:**
- Long-acting bronchodilators can be used as monotherapy or in combination with other treatments for COPD.
- The choice of LAMA should be based on patient characteristics, including medication adherence and the need for once daily dosing.
- Tiotropium Respimat is also licensed for people with asthma who are adherent to combined ICS (≥800 micrograms) and LABA with ≥1 severe exacerbations in the previous year.
- Tiotropium bromide should only be used if the expected benefit outweighs the risk in people with moderate to severe renal impairment (creatinine clearance ≤50 ml/min).
- Glycopyrronium bromide has similar concerns but if creatinine clearance is <30 ml/min.
- Adalimumbromide can be prescribed in renal impairment as it is rapidly and extensively hydrolysed to pharmacologically inactive metabolites. Umeclidinium can be prescribed in renal impairment.

**Important Points:**
- Dry mouth (relatively common), which may in the long term be associated with dental caries.
- Nasopharyngitis, headache, and diarrhoea commonly reported with both glycopyrronium bromide and aclidinium bromide.
- Use with caution in people with prostatic hyperplasia, bladder outflow obstruction, those susceptible to angle-closure glaucoma, previous history of cardiovascular disease and renal impairment (see notes below).
- Tiotropium Respimat is also licensed for people with asthma, who are adherent to combined ICS (≥800 micrograms) and LABA with ≥1 severe exacerbations in the previous year. The BTS/SIGN guideline states that ‘LAMA appear to be as effective as salmeterol in the short term and may be superior to doubling the dose of ICS in fixed airways obstruction’. Addition to ICS/LABA may benefit patients who remain symptomatic despite ICS/LABA.
<table>
<thead>
<tr>
<th>INHALED MEDICINE</th>
<th>DEVICE OPTIONS</th>
<th>COST</th>
<th>USUAL DOSE</th>
<th>PHARMACOLOGICAL ACTION</th>
<th>RECOMMENDED PLACE IN UK PRACTICE GUIDELINES</th>
<th>THINGS TO NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic Name</td>
<td>RED = DRY powder device</td>
<td>30 day treatment / per dose</td>
<td><a href="http://www.medicines.org.uk">www.medicines.org.uk</a> or BNF for more details</td>
<td>and key pharmacokinetic profiles</td>
<td>Common adverse effects, precautions for use etc.</td>
<td></td>
</tr>
<tr>
<td>Brand Name</td>
<td>BLUE = AEROSOL device</td>
<td>based on BNF September 2014</td>
<td>For children please confirm licensed indication and dose before prescribing</td>
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<tr>
<td><strong>DEVICE OPTIONS</strong></td>
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<tr>
<td><strong>RED</strong></td>
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<tr>
<td><strong>BLUE</strong></td>
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<td><strong>COST</strong></td>
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<tr>
<td><strong>30 day treatment / per dose</strong></td>
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<tr>
<td><strong>based on BNF September 2014</strong></td>
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<tr>
<td><strong>USUAL DOSE</strong></td>
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<tr>
<td><strong>PHARMACOLOGICAL ACTION</strong></td>
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<td><strong>and key pharmacokinetic profiles</strong></td>
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<tr>
<td><strong>RECOMMENDED PLACE IN UK PRACTICE GUIDELINES</strong></td>
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<tr>
<td><strong>THINGS TO NOTE</strong></td>
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<tr>
<td><strong>Combination Long-Acting Muscarinic Antagonist and Long-Acting Beta-2 Agonist (LAMA/LABA)</strong></td>
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**Umeclidinium (LAMA) / Vilanterol (LABA)**

- **Anoro**
  - **Ellipta**
  - **£32.50**
  - **55/22 micrograms once a day at the same time of the day each day**

**Mechanism of action:**
- Bronchodilation through both activation of beta-2 receptors and antagonism at muscarinic receptors on airway smooth muscle
- Reduction of dynamic hyperinflation, resulting in increased respiratory capacity during exercise and at rest

**Maintenance treatment of COPD for people with persistent breathlessness.**

**Ensure patient has a correct diagnosis of COPD.**

**Side effects include:**
- Urinary tract infection, sinusitis, nasopharyngitis, pharyngitis, upper respiratory tract infection, headache, cough, dry mouth and constipation
- An increased incidence of cardiovascular and cerebrovascular events may occur with long-term use (robust >1 year safety data is not yet available)

**Precautions for use:**
- Contra-indicated if patient has a severe hypersensitivity to milk proteins
- Do not use in combination with an additional medicine containing LABA because of risk of overdose
- Use with caution in people with prostatic hyperplasia, bladder outflow obstruction, those susceptible to angle-closure glaucoma, and previous history of cardiovascular disease

**Drug interactions:**
- All LABAs should be used cautiously with drugs that increase the risk of prolongation of the QTc interval (e.g. ketoconazole, clarithromycin, erythromycin, itraconazole, tricyclic antidepressants, quinidine, disopyramide, proacaminamide)
- Co-administration of LAMA/LABA combinations with other LAMA, LABA or products containing either of these agents has not been studied and is not recommended
- Once Anoro’s foil packaging is open the in-use shelf life is 6 weeks

**Glycopyrronium (LAMA) / Indacaterol (LABA)**

- **Ultibro**
  - **Breezhaler**
  - **£32.50**
  - **85/43 micrograms once a day**

**Acclidinium (LAMA) / Formoterol (LABA)**

- **DuaKlir**
  - **£32.50**
  - **340/12 micrograms twice a day**

**Olodaterol (LABA) / Tiotropium (LAMA)**

- **Spiolto**
  - **Respimat**
  - **£32.50**
  - **2.5/2.5 micrograms once a day**
### INHALED MEDICINE

<table>
<thead>
<tr>
<th>DEVICE OPTIONS</th>
<th>COST</th>
<th>USUAL DOSE</th>
<th>PHARMACOLOGICAL ACTION</th>
<th>RECOMMENDED PLACE IN UK PRACTICE GUIDELINES</th>
<th>THINGS TO NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED = DRY powder device</td>
<td>30 day treatment / per dose</td>
<td><a href="http://www.medicines.org.uk">www.medicines.org.uk</a> or BNF for more details</td>
<td>and key pharmacokinetic profiles</td>
<td><strong>MAST CELL STABILISERS</strong></td>
<td>Common adverse effects, precautions for use etc.</td>
</tr>
<tr>
<td>BLUE = AEROSOL device</td>
<td>based on BNF September 2014</td>
<td>For children please confirm licensed indication and dose before prescribing</td>
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</tbody>
</table>

### MAST CELL STABILISERS

<table>
<thead>
<tr>
<th>Name</th>
<th>Device</th>
<th>Cost</th>
<th>Usual Dose</th>
<th>Mechanism of action:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nedocromil</td>
<td>Tilade®</td>
<td>MDI®</td>
<td>£85.58 (initial) £42.79 (maintenance)</td>
<td>• not completely understood • non-steroidal agent, which has anti-inflammatory properties • inhibits the activation of many of the cell types involved in the development and progression of asthma – inhibiting the release of inflammatory mediators from mast cells</td>
</tr>
<tr>
<td>Sodium Cromoglycate</td>
<td>Intal®</td>
<td>MDI®</td>
<td>£39.28 (initial) £19.64 (maintenance)</td>
<td>Prophylaxis of asthma where regular preventative anti-inflammatory therapy is indicated.</td>
</tr>
</tbody>
</table>

#### Mechanism of action:
- Prophylaxis of asthma where regular preventative anti-inflammatory therapy is indicated.
- Not currently recommended in the British Asthma Guideline for Adults.

#### Side effects include:
- Abdominal pain, vomiting, nausea, cough, bronchospasm, headache, dyspepsia and dysgeusia.

#### Must be used regularly.
### INHALED MEDICINE

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
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</thead>
<tbody>
<tr>
<td>Budesonide</td>
<td>Pulmicort®, Budelin®</td>
</tr>
<tr>
<td>Beclometasone</td>
<td>Clenil Modulite®, Qvar®, Qvar®, Qvar®</td>
</tr>
</tbody>
</table>

### DEVICE OPTIONS

- **RED** = DRY powder device
- **BLUE** = AEROSOL device

### COST

- **30 day treatment / per dose**
  - www.medicines.org.uk or BNF for more details
  - For children please confirm licensed indication and dose before prescribing

- **RED** (DRY powder device)
  - Adults and children >12 years: 200 micrograms twice a day (low dose), 400 micrograms twice a day (medium dose), and severe asthma (high dose) up to 1600 micrograms/day
  - Children ≤ 12 years (check BNF for licensing and dosing)

- **BLUE** (AEROSOL device)
  - Only licensed for adults and children >12 years: 100 micrograms twice a day (low dose), 200 micrograms twice a day (medium dose), and severe asthma (high dose) up to 400 micrograms twice a day

### PHARMACOLOGICAL ACTION and key pharmacokinetic profiles

#### Mechanism of action in asthma:
- Anti-inflammatory effect on bronchial mucosa (and hence reduce oedema and secretion of mucus into the airway)
- Reduces hyperresponsiveness of the bronchial tract to exogenic challenges

#### Onset of action:
- Improvement in lung function has been shown to occur within 2 days after initiation of treatment, although maximum benefit may not be achieved for up to 6 weeks (full reduction in airway hyperresponsiveness may take 12 months)

#### Mechanism of action in COPD:
- No inhaler containing only ICS is currently licensed for COPD in the UK. ICS

### RECOMMENDED PLACE IN UK PRACTICE GUIDELINES

#### Prophylactic management of mild, moderate and severe persistent asthma (≥ Step 2 British Asthma Guideline).
- Please note, one inhaler containing both ICS and LABA is preferred rather than individual inhalers, an approach that aims to improve medicine adherence and reduce the potential risks associated with people only using a LABA with no ICS.
- No inhaler containing only ICS is recommended for managing COPD.

Inhaled corticosteroid must be used regularly for maximum benefit. For most ICS this is twice a day, though ciclesonide and mometasone are daily doses, and guidelines recommend that once daily may be appropriate in some patients with milder disease and good control of their asthma.

Current and previous smoking reduces the effectiveness of inhaled corticosteroids and higher doses may be necessary.

For people with asthma the maintenance dose of ICS should be individualised and titrated to the lowest dose at which effective control of asthma is maintained.

Side effects include:
- Common local side-effects include oropharyngeal candidiasis (fungal), hoarseness, cough and headache.
- To reduce incidence of oral fungal infections patients should be advised to rinse their mouth out with water after use. Ciclesonide is metabolised to its biologically active metabolite by enzymes in the lung and therefore is not associated with oral fungal infections.
- Prolonged treatment with high dose inhaled corticosteroids (equivalence of >800 micrograms beclometasone per a day) may result in clinically significant adrenal suppression.
**INHALED CORticosteroids (ICS) continued**

<table>
<thead>
<tr>
<th>INHALED MEDICINE</th>
<th>DEVICE OPTIONS</th>
<th>COST</th>
<th>USUAL DOSE</th>
<th>PHARMACOLOGICAL ACTION</th>
<th>RECOMMENDED PLACE IN UK PRACTICE GUIDELINES</th>
<th>THINGS TO NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ciclesonide</strong></td>
<td><strong>Alvesco®</strong> MDI</td>
<td><strong>£8.21–£9.66 max £58.62</strong></td>
<td>Only licensed for adults and children ≥12 years: 80 to 160 microgram once a day preferably in the evening (severe asthma maximum dose 32 micrograms twice a day)</td>
<td>(in combination with LABA) may reduce COPD exacerbations but do not improve symptoms</td>
<td>suppression, growth retardation in children and adolescents (regularly monitor height), decrease in bone mineral density, cataract, glaucoma, increased susceptibility to infection, including pneumonia. For people prescribed high dose ICS give a “steroid card” (usually blue).</td>
<td>Common adverse effects, precautions for use etc.</td>
</tr>
<tr>
<td><strong>Fluticasone Proprionate</strong></td>
<td><strong>Flixotide®: Accuhaler® MDF</strong></td>
<td><strong>£7.66–£43.37</strong></td>
<td>Adults and children &gt;12 years: 100 micrograms twice a day (low dose), 250 micrograms twice a day (medium dose), and severe asthma (high dose) up to 500 micrograms twice a day Children ≤12 years (check BNF for licensing and dosing)</td>
<td>Drug interactions: All current ICS are metabolised by the liver. Concomitant administration of potent inhibitors of cytochrome enzymes (e.g. ketoconazole, itraconazole) should be avoided unless the benefit outweighs the increased risk of potential systemic side effects of corticosteroids. All ICS appear to be equally clinically effective at equivalent doses. Care should be taken when switching people between different ICS. The available ICS vary in potency (e.g. fluticasone propionate is double the potency of beclometasone) and efficiency of lung deposition (e.g. beclometasone extrafine delivers twice the amount to the lung) influencing their comparative doses. See PCRS ICS Table on Equivalent Doses and relevant information. Qvar® and Clenil® are not interchangeable and should be prescribed by brand name.</td>
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</tr>
<tr>
<td><strong>Mometasone furoate</strong></td>
<td><strong>Asmanex®: Twisthaler®</strong></td>
<td><strong>£21.78–£43.56</strong></td>
<td>Only licensed for adults and children ≥12 years: 400 micrograms once a day (low dose). Maximum dose 400 micrograms twice a day (medium dose)</td>
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</table>

*BNF = British National Formulary*
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<thead>
<tr>
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<th>COST</th>
<th>USUAL DOSE</th>
<th>PHARMACOLOGICAL ACTION</th>
<th>RECOMMENDED PLACE IN UK PRACTICE GUIDELINES</th>
<th>THINGS TO NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic Name</td>
<td>RED = DRY powder device</td>
<td>30 day treatment / per dose</td>
<td><a href="http://www.medicines.org.uk">www.medicines.org.uk</a> or BNF for more details</td>
<td>and key pharmacokinetic profiles</td>
<td></td>
<td>Common adverse effects, precautions for use etc.</td>
</tr>
<tr>
<td>Brand Name</td>
<td>BLUE = AEROSOL device</td>
<td>based on BNF September 2014</td>
<td>For children please confirm licensed indication and dose before prescribing</td>
<td></td>
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</tr>
</tbody>
</table>

**COMBINATION INHALED CORTICOSTEROID AND LONG-ACTING BETA-2 AGONIST (ICS/LABA)**

<table>
<thead>
<tr>
<th>Fluticasone propionate/ salmeterol</th>
<th>Seretide®</th>
<th>Accuhaler®</th>
<th>£18.00–£40.92 (COPD £40.92)</th>
<th>Asthma</th>
<th>£59.48</th>
<th>£26.25–£44.61</th>
<th>£32.74</th>
<th>£23.50–£39.95</th>
<th>£29.97</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seretide®</td>
<td>MDI®</td>
<td>Forspiro</td>
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<tr>
<td>Sirdupla</td>
<td>MDI®</td>
<td>Spiromax</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AirFluSal</td>
<td>MDI*</td>
<td></td>
<td>£18.00–£59.48</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sereflo®</td>
<td></td>
<td></td>
<td>£26.25–£44.61</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aerivio®</td>
<td></td>
<td></td>
<td>£32.74</td>
<td></td>
<td></td>
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<td></td>
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<td>£29.97</td>
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</tbody>
</table>

**Mechanism of action:**

- Anti-inflammatory effect on bronchial mucosa (and hence reduce oedema and secretion of mucus into the airway)
- Reduces hyperresponsiveness of the bronchial tract to exogenic challenges
- Bronchodilation through activation of beta-2 receptors on airway smooth muscle
- Reduction of lung hyperinflation, resulting in increased respiratory capacity during exercise and at rest
- Reduction of COPD exacerbations

**Onset of action (inhalers containing):**

- Formoterol within 3 minutes

**Prophylactic management of moderate and severe persistent asthma (≥ Step 3 British Asthma Guideline).**

Symptomatic treatment of people with COPD with a FEV1 ≤50% predicted normal (post-bronchodilator) with an exacerbations history despite regular therapy with long-acting bronchodilators.

Patients should be made aware that ICS/LABA inhalers must be used daily for optimum benefit, even when asymptomatic.

**Side effects:**

As these are combination inhalers containing ICS and LABA the type and severity of side effects associated with each of the compounds may be expected. There are no additional adverse effects following concurrent administration of the two compounds. See notes above for each drug class.

**Precautions for use:**

The precautions for use are related to both the ICS and the LABA component of the inhaler. See notes above for each drug class.

**Drug Interactions:**

The drug interactions are related to both the ICS component and the LABA component of the inhaler. See notes above for each drug class.
## COMBINATION INHALED CORTICOSTEROID AND LONG-ACTING BETA-2 AGONIST (ICS/LABA) continued

<table>
<thead>
<tr>
<th>INHALED MEDICINE</th>
<th>DEVICE OPTIONS</th>
<th>COST</th>
<th>USUAL DOSE</th>
<th>PHARMACOLOGICAL ACTION</th>
<th>RECOMMENDED PLACE IN UK PRACTICE GUIDELINES</th>
<th>THINGS TO NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic Name</td>
<td>RED = DRY powder device</td>
<td>30 day treatment / per dose</td>
<td><a href="http://www.medicines.org.uk">www.medicines.org.uk</a> or BNF for more details</td>
<td>and key pharmacokinetic profiles</td>
<td>Common adverse effects, precautions for use etc.</td>
<td></td>
</tr>
<tr>
<td>Brand Name</td>
<td>BLUE = AEROSOL device</td>
<td>based on BNF September 2014</td>
<td>For children please confirm licensed indication and dose before prescribing</td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Budesonide / formoterol</strong></td>
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</tr>
<tr>
<td>Symbicort®</td>
<td>Turbohaler</td>
<td>£19.00–£76.00 (COPD £38.00)</td>
<td>Asthma</td>
<td>• salmeterol approximately 20 minutes</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>MDI®</td>
<td>£14.99–£59.94 (COPD £29.97)</td>
<td>Usual starting dose in adults at step 3</td>
<td>• vilanterol approximately 15 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spiromax</td>
<td></td>
<td>Symbicort Turbhaler 200/6 micrograms twice a day, increasing to 400/12 micrograms twice a day (few patients require maximum dose 800/24 micrograms twice a day)†</td>
<td>The ICS component of the inhaler will take longer to work (see notes above ICS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DuoResp®</td>
<td></td>
<td></td>
<td>DuoResp (over 18 years only) 160/4.5 to maximum 640/18 micrograms twice a day</td>
<td>Duration of action: • approximately 12 hours</td>
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</tr>
<tr>
<td></td>
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<td></td>
<td>Symbicort Turbhaler 400/12 micrograms twice a day</td>
<td>See above for the different potency of ICS and the equivalent dosage schedules.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spiromax</td>
<td></td>
<td>Symbicort MDI 200/6 micrograms 2 puffs twice a day</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>DuoResp 320/9 micrograms twice a day</td>
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</tbody>
</table>

**COMBINATION INHALED CORTICOSTEROID AND LONG-ACTING BETA-2 AGONIST (ICS/LABA) continued overleaf**

- To avoid inadvertent switching between different devices it is advised to prescribe inhalers by brand name.

- Symbicort (100/6 and 200/6) and DuoResp (160/4.5) are licensed for Maintenance and reliever therapy.

- DuoResp Spiromax is dispensed foiled wrapped. After opening the foil wrap the shelf life is 6 months.

- Aerivio Spiromax is dispensed foiled wrapped. After opening the foil wrap the shelf life is 3 months.

- To avoid inadvertent switching between different devices it is advised to prescribe inhalers by brand name.
<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
<th>DEVICE OPTIONS</th>
<th>COST</th>
<th>USUAL DOSE</th>
<th>PHARMACOLOGICAL ACTION</th>
<th>RECOMMENDED PLACE IN UK PRACTICE GUIDELINES</th>
<th>THINGS TO NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Combination Inhaled Corticosteroid and Long-Acting Beta-2 Agonist (ICS/LABA)</strong> continued</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fobumix®</td>
<td>Easyhaler</td>
<td>Unknown</td>
<td><strong>NOT LICENSED IN THE UK</strong> (expected to be licensed for the management of asthma)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluticasone Furoate / Vilanterol</td>
<td>Relvar®</td>
<td>Ellipta</td>
<td>Fluticasone Furoate / Vilanterol</td>
<td>Asthma 92/22 micrograms once a day, increased to 184/22 micrograms once a day. It is anticipated that few patients will require the higher dose. Not licensed in children under 12 years.</td>
<td>Asthma 92/22 micrograms once a day at the same time of the day. If a dose is missed the next dose should be taken at the usual time the next day (the higher dose is not licensed and should not be prescribed).</td>
<td>As above.</td>
<td>See notes above. The exact bioequivalence of fluticasone furoate to belcometasone (CFC or Clenil®) is not known. The SPC suggests that 92/22 microgram Relvar® is equivalent to 250/50 Seretide twice a day (equivalent to Step 4 BTS/SIGN asthma guideline). Further studies are being undertaken. Once the foil packaging is open the in-use shelf life is 6 weeks.</td>
</tr>
<tr>
<td>Relvar®</td>
<td>Easyhaler</td>
<td>Unknown</td>
<td><strong>COST</strong> 30 day treatment / per dose based on BNF September 2014</td>
<td>For children please confirm licensed indication and dose before prescribing.</td>
<td><strong>COMBINATION INHALED CORTICOSTEROID AND LONG-ACTING BETA-2 AGONIST (ICS/LABA) continued opposite</strong></td>
<td><strong>COMBINATION INHALED CORTICOSTEROID AND LONG-ACTING BETA-2 AGONIST (ICS/LABA) continued opposite</strong></td>
<td><strong>COMBINATION INHALED CORTICOSTEROID AND LONG-ACTING BETA-2 AGONIST (ICS/LABA) continued opposite</strong></td>
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</tbody>
</table>
### INHALED MEDICINE

<table>
<thead>
<tr>
<th><strong>Generic Name</strong></th>
<th><strong>Brand Name</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Beclomethasone extra-fine/formoterol</td>
<td><strong>Fostair®</strong></td>
</tr>
</tbody>
</table>

### DEVICE OPTIONS
- **RED = DRY powder device**
- **BLUE = AEROSOL device**

### COST
- 30 day treatment / per dose
- **£14.66 – £29.32** (COPD £29.32)

### USUAL DOSE
- **Asthma**
  - Usual starting dose 100/6 one puff twice a day,
  - increased to two puffs twice a day (few patients require 400/12 twice a day)
  - Licensed in adults 18 years and older (licensed for MART therapy)<sup>7</sup>
  - **COPD**
    - 100/6 two puffs twice a day
    - Adults 18 years and older:
      - One or two inhalations twice daily
      - The maximum daily dose is 4 inhalations daily

### PHARMACOLOGICAL ACTION
- **As above.**

### RECOMMENDED PLACE IN UK PRACTICE GUIDELINES
- **As above.**

### THINGS TO NOTE
- Common adverse effects, precautions for use etc.

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### COMBINATION INHALED CORTICOSTEROID AND LONG-ACTING BETA-2 AGONIST (ICS/LABA) continued

#### Beclomethasone extra-fine/formoterol

<table>
<thead>
<tr>
<th><strong>Brand Name</strong></th>
<th><strong>Device</strong></th>
<th><strong>Cost</strong></th>
<th><strong>Usual Starting Dose</strong></th>
</tr>
</thead>
</table>
| **Fostair®** | MDI® | **£14.66 – £29.32** (COPD £29.32) | Asthma
  - Usual starting dose 100/6 one puff twice a day,
  - increased to two puffs twice a day (few patients require 400/12 twice a day)
  - Licensed in adults 18 years and older (licensed for MART therapy)<sup>7</sup>
  - **COPD**
    - 100/6 two puffs twice a day
    - Adults 18 years and older:
      - One or two inhalations twice daily
      - The maximum daily dose is 4 inhalations daily

| **NEXThaler®** | MDI® | **£14.66 – £29.32** (COPD £29.32) | Asthma
  - Usual starting dose 100/6 one puff twice a day,
  - increased to two puffs twice a day (few patients require 400/12 twice a day)
  - Licensed in adults 18 years and older (licensed for MART therapy)<sup>7</sup>
  - **COPD**
    - 100/6 two puffs twice a day
    - Adults 18 years and older:
      - One or two inhalations twice daily
      - The maximum daily dose is 4 inhalations daily

### COMBINATION INHALED CORTICOSTEROID AND LONG-ACTING BETA-2 AGONIST (ICS/LABA) continued overleaf
INHALED MEDICINE

Generic Name
Brand Name

DEVICE OPTIONS

RED = DRY powder device
BLUE = AEROSOL device

COST

30 day treatment / per dose
based on BNF September 2014

USUAL DOSE

www.medicines.org.uk or BNF for more details
For children please confirm licensed indication and dose before prescribing

PHARMACOLOGICAL ACTION

and key pharmacokinetic profiles

RECOMMENDED PLACE IN UK PRACTICE GUIDELINES

THINGS TO NOTE

Common adverse effects, precautions for use etc.

COMBINATION INHALED CORTICOSTEROID AND LONG-ACTING BETA-2 AGONIST (ICS/LABA) continued

Fluticasone propionate/formoterol
Flutiform® MDI® £14.40–£14.56

Usual adult/adolescent (≥12yrs) starting dose 50/5 microgram two puffs twice a day, increasing to 125/5 micrograms two puffs twice a day. Maximum dose 250/10 micrograms two puffs twice a day only for adults who remain symptomatic.

Prophylactic management of moderate and severe persistent asthma (≥ Step 3 British Asthma Guideline). It is not licensed for people with COPD.

See notes above.

MART stands for Maintenance and Reliever Therapy. Combination of ICS and LABA in a single inhaler prescribed as a twice a day maintenance treatment but can be used when required for symptoms relief.

Maximum doses apply – see BNF

KEY

Spacer compatibility: o MDI with mouthpiece shape round (not compatible with Volumatic spacer device)
□ MDI with mouthpiece shape compatible with all spacer devices

This medicine is subject to additional monitoring. Please report any suspected adverse reactions to the Yellow Card scheme, including any possible side effects not listed in the Summary of Product Characteristics (SPC).

Please remember to report suspected adverse reactions on a Yellow Card at www.yellowcard.gov.uk

The delivered dose is equivalent to a metered dose of 200 or 400 micrograms budesonide and 6 or 12 micrograms of formoterol fumarate dihydrate

MART stands for Maintenance and Reliever Therapy. Combination of ICS and LABA in a single inhaler prescribed as a twice a day maintenance treatment but can be used when required for symptoms relief.

Maximum doses apply – see BNF

Cost based on 100 actuations of 200 micrograms

References

1. The British Thoracic Society (BTS) and the Scottish Intercollegiate Guidelines Network (SIGN) British guideline on the management of asthma (Sept 2016); available at www.brit-thoracic.org.uk