Asthma symptoms are cough, wheeze, chest tightness and breathlessness.

Asthma medication is very effective and treatment should follow the British Asthma Management Guidelines.

For mild symptoms short-acting bronchodilators are sufficient but persistent symptoms and mucus production (phlegm) indicate inflammatory changes within the airways. This requires the addition of regular inhaled corticosteroids.

If asthma control not achieved on regular inhaled steroids check: inhaler technique; adherence to medication regime, then consider addition of other therapies as per asthma guidelines.

There are a number of drugs that have a bronchodilator effect:

**Short-acting bronchodilators**
- Short-acting bronchodilators (SABAs) are widely used in the treatment of asthma. Examples of SABAs are: salbutamol and terbutaline.
- SABAs stimulate the beta-2 receptor sites in the airways via the autonomic nervous system and, as a result, relax bronchial smooth muscle.
- They also stabilise mast cells, and block the early asthmatic response.
- They have an almost immediate effect, which is maximal at 15-20 minutes and lasts for 4-6 hours.
- Common side-effects are tachycardia and tremor and are usually related to higher doses.

**Long-acting bronchodilators**
- Effects of long-acting bronchodilators, e.g. formoterol and salmeterol, on the airways are similar to SABAs but longer lasting i.e. up to 12 hours. Onset of action is similar with formoterol but slower with salmeterol.
- When asthma symptoms are not controlled despite regular inhaled corticosteroids, LABAs are added either separately or combined with an inhaled steroid in a single inhaler device e.g. Seretide or Symbicort. They are especially helpful where exercise symptoms persist.
- LABAs are introduced at Step 3 of the Asthma Guidelines and should not be used without inhaled corticosteroids therapy. If they are not effective they should be stopped and alternative treatment tried.
Anti-inflammatory drugs

**Inhaled corticosteroids**
- Corticosteroids are the most effective medication used to treat airway inflammation. They include: beclometasone, budesonide, ciclesonide, fluticasone and mometasone.
- Inhaled corticosteroids block the effects of the late asthmatic response by reducing airways hyperresponsiveness. They also reduce the chronic inflammatory effects of microvascular leakage, oedema, inflammatory infiltrates and mucus production which occur in poorly controlled asthma.
- They should be administered once or twice daily, according to the drug used, and need to be taken regularly to be effective.
- Inhaled steroids are indicated at Step 2 of the Asthma Guidelines.
- Patients should be educated in how to use their inhaler effectively, to ensure that inhaled corticosteroids are delivered directly to the site of action in the lungs.
- Local side-effects include dysphonia and candidiasis (but not with ciclesonide).

**Leukotriene receptor antagonists**
- Leukotriene receptor antagonists (LTRAs) are oral drugs which block the leukotriene receptor sites in the airways and inhibit cystokine release which causes both inflammation and bronchoconstriction.
- They are licensed for the treatment of allergic rhinitis where there is concomitant allergic asthma.
- LTRAs may be useful where exercise symptoms persist despite addition of LABAs. They are introduced at Step 3 of the Asthma Guidelines, but should be stopped if ineffective and an alternative treatment tried.
- Montelukast is taken once daily and is the most widely used LTRA. Zafirlukast is taken twice daily.

**Cromones - sodium cromoglicate and nedocromil sodium**
- These drugs are now used less often because more effective anti-inflammatory drugs are available.
- Cromones stabilise mast cells, preventing the release of inflammatory mediators.
- They are of some use in exercise-induced symptoms but these symptoms are often an indication of under-treated and poorly controlled asthma.
- Cromones need to be taken 2-4 times a day. There are no significant side-effects.

**Systemic corticosteroids**
- Short courses of oral corticosteroids are indicated for the treatment of acute asthma and where regular asthma treatment fails to gain control of symptoms.
- Side-effects from short-term oral corticosteroid use are minimal. Serious side-effects from regular oral steroids include: Cushing's syndrome, diabetes, hypertension, osteoporosis and adrenal crisis.

**Anticholinergic bronchodilators**
- Ipratropium bromide is an anticholinergic drug and is now only used in the management of acute severe asthma, i.e. not for routine asthma management.
- Bronchodilator effects are via the parasympathetic pathway and the vagus nerve. Bronchoconstriction is inhibited by blocking the muscarinic receptors.
- Anticholinergic bronchodilators also reduce mucus secretions.
- Onset of action is 30-40 minutes but bronchodilator effects last for 4-6 hours.
- Anticholinergic drugs (both short- and long-acting) are widely used in the treatment of Chronic Obstructive Pulmonary Disease (COPD).

**Methylxanthines**
- Precisely how these drugs work is unclear but they relax smooth muscle and inhibit the release of mediators from mast cells. They also have a mild anti-inflammatory effect.
- Absorption rates are variable and, therefore, methylxanthines should always be prescribed by brand name. Slow release formulations are generally used.
- They are not first-line bronchodilators but may be helpful for patients with more severe asthma as add-on bronchodilator therapy.
- Side-effects such as nausea, vomiting and headache are common and there is potential for more serious side-effects. They should always be used cautiously and monitored carefully.