Management of Adult Asthma

Current British Guidelines on the Management of Asthma provide the following recommendations for the management of asthma:

General principles of management

- Step up/down treatment according to disease severity to maintain good control and minimise drug-related side-effects.
- Start at the step most fitting to the initial severity of the asthma.
- Treatment plans and goals should be negotiated with the patient but usual aims would be to minimise impact of symptoms on life, reduce reliance on reliever medication and prevent severe exacerbations.
- Self-management education including individualised written asthma action plans should be offered.
- Always check concordance with medication/existing action plan, effective inhaler technique and the presence/absence of trigger factors before initiating new drug therapy.
- It is very important to consider the upper respiratory tract when treating asthma. It is much more difficult to treat asthma successfully if co-existing allergic rhinitis is not adequately controlled.

See also separate Occupational Asthma, Bronchial Asthma and Acute Severe Asthma and Status Asthmaticus articles.

Asthma reviews

Routine asthma care is largely carried out in primary care. Practices must keep a register of patients with asthma to ensure adequate follow-up and audit. All patients with asthma should be reviewed at least annually, more often if disease is less well controlled or recently diagnosed. Reviews should be carried out by a nurse or doctor with appropriate and up-to-date training and should include:

- Current symptoms using objective measures:
  - The ‘three questions’ of the Royal College of Physicians (RCP) are widely used:
    - In the last month/week have you had difficulty sleeping due to your asthma (including cough symptoms)?
    - Have you had your usual asthma symptoms (eg, cough, wheeze, chest tightness, shortness of breath) during the day?
    - Has your asthma interfered with your usual daily activities (eg, school, work, housework)?
  - Note: one ‘yes’ indicates medium morbidity and two or three ‘yes’ answers indicate high morbidity.
  - Alternatives include the Asthma Control Questionnaire, Asthma Control Test and Mini Asthma Quality of Life Questionnaire.
- Record an up-to-date smoking status; offer smoking cessation advice and support where appropriate.
- Record any acute exacerbations since last seen.
- Check medication use - a prescription count can indicate overuse/underuse of medication, inhaler and spacer, problems and side-effects. The use of more than two canisters of short-acting beta\textsubscript{2} agonist per month - or 10-12 puffs per day - is associated with poorly controlled and higher-risk asthma.
- Check immunisation (pneumococcal/influenza) status.
- Review peak flow diaries and record current peak expiratory flow rate (PEFR)/spirometry values.
- Address any educational needs.
- Provide/update a written action plan.
- Consider home monitoring of PEFR - useful particularly in those with severe or brittle asthma and those who have difficulty recognising symptom deterioration.
- Agree duration of subsequent follow-up and ensure the patient is aware of how to seek help if their asthma deteriorates.

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Studies have shown that telephone reviews are effective in improving care delivery and reducing cost. Assessing patients over the phone using the RCP 'three questions' approach (see above), with the addition of two additional risk questions (“Have you been admitted for asthma in the last year?” and “Have you ever needed ITU care for asthma?”), has been trialled. Where a positive answer occurs, a clinic review is arranged. Otherwise, action and duration prior to next follow-up are agreed. Telephone can also be effective in providing ongoing support and advice.

Non-drug treatment

All people with asthma (and/or their carers) should be offered self-management education which should include a written personalised asthma action plan and be supported by regular professional review.

- **Smoking cessation.** Smoking exacerbates asthma symptoms. It increases the risk of persistent asthma in teenagers who smoke. Clear personalised advice should be given to stop smoking and help provided with nicotine replacement therapy, etc, where appropriate.
- **Weight reduction** in obese patients improves asthma symptoms and should be encouraged.
- Breathing exercise programmes can be offered to people with asthma as an adjuvant to pharmacological treatment, to improve quality of life and reduce symptoms.
- **Allergen avoidance.** There is little evidence that reducing allergen exposure reduces morbidity from asthma and it does not appear to be a cost-effective treatment for asthma. Avoiding house dust mite allergen (bed covers, carpet removal, high-temperature washing of bedding, dehumidification and use of acaricides on soft furnishings) requires commitment beyond what is possible in most households. Similarly, cat and dog allergens are potent triggers for many people's asthma. Again, however, observational evidence that removal of the pet from the household improves asthma control, is lacking. Nonetheless, expert consensus usually advocates their removal.
- **Immunotherapy.** This may be considered where there is a clinically significant and identified allergen that cannot be avoided. Patients need to be aware of the risk of anaphylaxis and treatment should only take place within specialist settings.

Dietary modifications (use of probiotics, antioxidants, fish oils/lipid supplements, magnesium) and complementary therapies are not currently supported by the guidelines.

Drug treatment

Step up/down management of chronic asthma:

**Step 1: mild, intermittent asthma**
Prescribe an inhaled short-acting beta\(_2\) agonist as a short-term reliever for all patients with symptomatic asthma.

Good asthma control is associated with little or no need for a short-acting beta\(_2\) agonist. Anyone prescribed more than one short-acting bronchodilator inhaler device a month should be identified and have their asthma assessed urgently and measures taken to improve asthma control if this is poor. Regular use of bronchodilators alone may be linked with worsening asthma and asthma deaths.

**Step 2: introduction of regular preventer therapy**

Inhaled corticosteroids (ICS) are the most effective preventer drug for adults and older children for achieving overall treatment goals. ICS should be considered for patients with any of the following asthma-related features:

- Asthma attack in the last two years.
- Using inhaled beta\(_2\) agonists three times a week or more.
- Symptomatic three times a week or more.
- Waking one night a week.

Titrate the dose of ICS to the lowest dose at which effective control of asthma is maintained.
ICS are the first-choice preventer drug. There are alternative, less effective preventer therapies for patients taking short-acting beta\(_2\) agonists alone:

- Leukotriene receptor antagonists (LTRAs) have some beneficial clinical effect. They may be used as an alternative preventer in children under the age of 5 years who are unable to take ICS.
- Sodium cromoglicate is of some benefit in adults and is effective in children aged 5-12 years. Nedocromil sodium is of benefit in adults and in children aged over 5 years. There is no clear evidence of benefit with sodium cromoglicate in children aged under 5 years.
- Theophyllines have some beneficial effect.
- Antihistamines and ketotifen are ineffective.

**Step 3: add-on therapy**

First choice as add-on therapy to inhaled steroids are inhaled long-acting beta\(_2\) agonists (LABAs) such as salmeterol or formoterol. The addition of an inhaled LABA to ICS alone improves lung function and symptoms and decreases asthma attacks in adults and children. Inhaled LABAs should not be used without ICS.

- Review after a trial of therapy - continue if successful in controlling symptoms well.
- Discontinue after a trial of therapy if no benefit is seen. Then, increase the inhaled steroid dose to 800 micrograms/day beclometasone propionate or equivalent. If control remains suboptimal, consider a trial of another add-on therapy such as leukotriene receptor antagonists or modified-release theophylline.

If asthma control remains suboptimal after the addition of an inhaled LABA then the dose of ICS should be increased from low dose to medium dose in adults or from very low dose to low dose in children (aged 5-12 years), if not already on these doses.

**Step 4: poor control on moderate dose of inhaled steroid plus add-on therapy**

If control remains poor on low-dose ICS plus a LABA, recheck the diagnosis, assess adherence to existing medication and check inhaler technique before increasing therapy. If more intense treatment is appropriate, the following alternatives can be considered.

- If there is an improvement when a LABA is added but control remains inadequate: continue the LABA and increase the dose of ICS, or continue the LABA and the ICS and add an leukotriene receptor antagonist (LTRA) or tiotropium bromide (a long-acting muscarinic - LAMA).
- If there is no improvement when a LABA is added, stop the LABA and try: an increased dose of ICS, an LTRA or LAMA (LAMAs are not licensed for this indication).

**Other approaches**

- Theophyllines may improve lung function and symptoms; however, side-effects occur more often.
- Slow-release beta\(_2\)-agonist tablets may also improve lung function and symptoms but side effects occur more often.
- The addition of short-acting anticholinergics is generally of no value. The addition of nedocromil is of marginal benefit.
- If control remains inadequate after stopping a LABA and increasing the dose of ICS, consider sequential trials of add-on therapy, ie leukotriene receptor antagonists, theophyllines, or slow-release beta\(_2\)-agonist tablets (in adults only).

If control remains inadequate on medium dose (adults) or low dose (children) of an ICS plus a LABA, the following interventions can be considered:

- Increase the ICS to high dose (adults) or medium dose (children aged 5-12 years); or
- Add an LTRA; or
- Add a theophylline; or
- Add slow-release beta\(_2\)-agonist tablets, although caution needs to be used in patients already on LABAs; or
- Add tiotropium (adults).

At high doses of ICS via a pressurised metered dose inhaler (MDI), a spacer device should be used.
Step 5: continuous or frequent use of oral steroids

For the small number of patients not controlled on high-dose therapies, use daily steroid tablets in the lowest dose providing adequate control. These patients should always be under the care of a respiratory physician. Patients on long-term steroid tablets (longer than three months) or requiring frequent courses of steroid tablets (three to four per year) will be at risk of systemic side-effects:

- Blood pressure should be monitored.
- Urine or blood sugar and cholesterol should be checked: diabetes mellitus and hyperlipidaemia may occur.
- Bone mineral density should be monitored in adults. When a significant reduction occurs, treatment with a long-acting bisphosphonate should be offered. Bone mineral density should also be monitored in children aged over 5 years.
- Growth (height and weight centile) should be monitored in children.
- Cataracts and glaucoma may be screened for through community optometric services.

Stepping down

Review treatment every three months. Step it down if possible (but consider seasonal variation in symptoms, severity of asthma, risk of adverse effects, patient preference) and use the lowest possible dose of ICS to control the asthma symptoms. When reducing inhaled steroids, cut the dose slowly by 25-50% each time.

Combination products

Increasingly, combination inhalers of LABAs and low-dose inhaled steroids (eg, Symbicort® = formoterol and budesonide, Seretide® = salmeterol and fluticasone) are being marketed and used. These products are convenient since many patients are on a maintenance dose of both types of drugs and should be expected to improve adherence. However, they should only be used if the patient requires both drugs and has previously been stabilised on a dosage regimen that is deliverable by the combination inhaler. Using combined inhalers makes it harder to assess whether a patient still requires both drugs and in what doses and so the LABA or ICS may not be stepped down appropriately.

Omalizumab[^4]

The National Institute for Health and Care Excellence (NICE) recommends omalizumab as an option for treating severe persistent confirmed allergic IgE-mediated asthma as an add-on to optimised standard therapy in people aged 6 years and older who need continuous or frequent treatment with oral corticosteroids (defined as four or more courses in the previous year). Omalizumab should only be initiated by a specialist.

Optimised standard therapy is defined as a full trial of and, if tolerated, documented compliance with high-dose ICS, LABAs, LTRAs, theophyllines, oral corticosteroids, and smoking cessation if clinically appropriate.

Management of acute asthma

See separate [Acute Severe Asthma and Status Asthmaticus](#) article - treat as an emergency.

Current evidence does not support increasing the dose of ICS as part of a self-initiated action plan to treat exacerbations in adults and children with mild-to-moderate asthma. Increased ICS dose is not associated with a statistically significant reduction in the odds of requiring rescue oral corticosteroids for the exacerbation, or of having adverse events, compared with a stable ICS dose[^5].

Asthma in pregnancy[^1, 6]

Asthma's course in pregnancy is very variable. The risk of deterioration is highest in those with severe asthma but, equally approximately, a third of women with asthma improve symptomatically during pregnancy. Up to a fifth of pregnant women with asthma require emergency treatment, of which two thirds require hospitalisation.

Well controlled asthma minimises the risk of fetal and maternal complications. Pre-pregnancy, optimise control and emphasise the importance of continuing medication in pregnancy. Monitor pregnant women with asthma closely so that appropriate changes to their treatment can be quickly implemented in response to changed symptoms.
Treat exacerbations vigorously, in particular ensuring oxygen saturation is maintained above 95%. In general, asthma medications are believed to be safe in pregnancy - women should be reassured regarding treatments. Inhaled short- and long-acting beta\textsubscript{2} antagonists, ICS and oral and intravenous theophyllines can be used as normal during pregnancy.

Acute severe asthma in pregnancy is an emergency and should be treated vigorously in hospital.

Smoking cessation and breast-feeding should be particularly encouraged in women with asthma. Asthma drugs can be used as normal in breast-feeding women.

Inhaler and spacer devices\textsuperscript{[1]}

See also separate Which Device in Asthma? and Nebulisers in General Practice articles.

Asthma management can be confusing given the array of devices, masks and spacers used to deliver inhaled drugs. When considering which inhaler device, consider manual dexterity and other necessary abilities to activate a particular device, factors such as portability and convenience and the patient’s willingness to use a particular device.

Whenever an inhaler is prescribed, training should be given and technique checked regularly to ensure that it is being used correctly.

**Instructions for the correct use of a pressurised metered-dose inhaler (pMDI)**

- Remove the cap from the mouthpiece and shake hard.
- If you have not used it for >1 week or it is the first time it has been used, spray into the air to check it works.
- Stand/sit up straight and lift the chin to open the airway.
- Take a few deep breaths and then breathe out gently. Put the mouthpiece in your mouth with teeth around it (not biting) and seal with your lips.
- Start to breathe in and out through the mouthpiece. As you start to breathe in, simultaneously press on the inhaler canister to release one puff of medicine. Continue to breathe in deeply to make sure it gets to the lungs.
- Hold your breath for 10 seconds or as long as you can comfortably manage before breathing out slowly.
- If you need another puff, wait for 30 seconds and shake the inhaler and repeat the process.
- Replace the cap on the mouthpiece.

The first-line choice for delivery of ICS and bronchodilators in the treatment of stable asthma is the pMDI +/- a spacer device. Other alternative inhaler devices have not been shown to be more effective than pMDI and are more expensive. They are also considered first-line for the delivery of treatment for mild-to-moderate asthma exacerbations and are at least as effective as a nebuliser in these situations.

Large-volume spacer devices are useful for increasing drug delivery to the lungs and may be used for all patients but are strongly indicated for those who have difficulty co-ordinating pMDI activation with inhalation and those on high doses of ICS (>800 micrograms/day). Portability of spacers can be an issue. In the very young, a face mask should be used with the pMDI and spacer combination, until the spacer mouthpiece can be reliably used. If this is ineffective, a nebuliser should be considered.

**Referral\textsuperscript{[7]}**

The decision to refer is influenced by local referral pathways, the individual and the experience of the primary healthcare provider. In addition to respiratory physicians and paediatricians with a specialised interest in respiratory medicine, other specialists such as dieticians, physiotherapists, occupational therapists and respiratory nurse specialists may be involved in the management of asthma.
Admit or refer adults for specialist assessment or further investigation in the following situations:

- Severe acute asthma.
- The diagnosis is unclear or in doubt:
  - Unexpected clinical findings (for example, crackles, clubbing, cyanosis, cardiac disease).
  - Persistent non-variable breathlessness.
  - Monophonic, unilateral or fixed wheeze or stridor.
  - Persistent chest pain or atypical features.
  - Prominent systemic features (for example, weight loss, myalgia, fever).
  - Persistent cough or sputum production.
  - Spirometric or PEFR measurements that do not fit the clinical picture (for example, unexplained restrictive spirometry).
- Suspected occupational asthma.
- Non-resolving pneumonia.
- Inadequate response to maximum guideline treatment.

Further reading & references

- Primary Care Respiratory Society UK
- Global Initiative for Asthma (GINA)
- Using your inhalers (videos); Asthma UK
- British Guideline on the management of asthma; Scottish Intercollegiate Guidelines Network - SIGN (2016)
- Allergic Rhinitis and its Impact on Asthma (ARIA) - 2010 Revision
- Omalizumab for treating severe persistent allergic asthma (review of technology appraisal guidance 133 and 201); NICE Technology Appraisal Guidance, April 2013
- Asthma; NICE CKS, Dec 2013 (UK access only)

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