Diagnosis and Management of Asthma in Adults

Pan-Birmingham Respiratory Clinical Network

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## Revision History

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NICE guidance on the diagnosis, monitoring and management of asthma, November 2017 |

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Enquiries or questions about the policy document should be directed to the APC Secretary: mlcsu.medicines-management@nhs.net
KEY POINTS SUMMARY

1. The diagnosis of asthma is suggested by a history including breathlessness, wheeze, chest tightness and cough but should be confirmed wherever possible by objective testing including spirometry with reversibility, Fraction of exhaled Nitric Oxide (FeNO), Peak Flow monitoring and challenge testing.

2. Once diagnosis is confirmed treatment with regular daily low dose inhaled corticosteroid (ICS) should be commenced.

3. Excessive use of Short Acting Beta Agonist therapy should prompt early review for objective assessment of control and revision of asthma management - addressing adherence, inhaler technique, asthma action plan, triggers, and possible step up of treatment.

4. If control is suboptimal on low dose ICS a short trial of a Leukotriene Receptor Antagonist (LTRA) should be considered, with formal review of efficacy after 4-8 weeks, unless addition of a Long Acting Beta Agonist (LABA) is felt to be more likely to gain control.

5. If control remains suboptimal on ICS + LTRA then add a LABA and review continuation of LTRA, then consider a MART regime.

6. If control is still suboptimal (and adherence and inhaler technique are optimised) then medium-high dose ICS, LAMA and aminophylline/theophylline are the next options. Consider referral to secondary care at this stage.

7. Maintenance Prednisolone treatment is a last resort and all patients requiring this, or regular courses of rescue Prednisolone, should be seen in a secondary care asthma clinic.

8. Patients meeting the criteria for Severe Difficult To Treat Asthma should be referred to the Birmingham Regional Severe Asthma Service (BRSAS).

9. Acute Severe Asthma should be treated in accordance with BTS-SIGN guidelines which includes accurate assessment of severity and early initiation of systemic steroid therapy.

10. A review of asthma should take place annually, after treatment change and following exacerbation or a period of instability and should include the items at point 3. Consideration should be given to stepping down treatment when asthma is stable over a prolonged period of time.
Overview/Introduction

This guideline is intended to support the Respiratory Chapter of the Birmingham, Sandwell, Solihull and environs APC formulary by providing guidance on the diagnosis and management of asthma in adults.

The British Thoracic Society (BTS) guideline on the management of Asthma – produced in conjunction with the Scottish Intercollegiate Guidelines Network (SIGN) since 1999, has been updated several times since its first publication in 1990. The latest version was published in September 2016 and can be accessed at: https://www.brit-thoracic.org.uk/document-library/clinical-information/asthma/btssign-asthma-guideline-2016/.

The National Institute for Health and Care Excellence (NICE) released guidance on the diagnosis, monitoring and treatment of asthma in November 2017. This can be accessed at: https://www.nice.org.uk/guidance/ng80

This guideline draws on both of these publications and shows where these concur and where they differ.

Objectives of Guideline

To encourage consistency in Asthma diagnosis
To encourage rational and consistent prescribing in patients diagnosed with asthma
Chapter 3 (page 13) of the BTS/SIGN guideline covers diagnosis and monitoring of asthma and includes a diagnostic algorithm summarising the recommended approach to the diagnosis of asthma in adults:

![Diagnostic Algorithm](image)

It should be noted that objective tests of airflow obstruction (spirometry, reversibility, peak flow monitoring and challenge testing) and of airway inflammation (exhaled Nitric Oxide – FeNO) are included as “options for investigation” in this BTS/SIGN algorithm.

NICE guidance directs clinicians towards more widespread use of objective testing, stating that a diagnosis of asthma should not be made on history alone (recommendation 1.1.2)
NICE guidance contains a number of algorithms that guide the clinician through a logical sequence of investigation aimed at reaching a secure diagnosis of asthma. The interactive flowchart is particularly useful.\footnote{https://pathways.nice.org.uk/pathways/asthma}

It is, however, acknowledged that implementation of NICE diagnostic guidance will require service re-design:

1.3.1 \textit{Those responsible for planning diagnostic service support to primary care (for example, clinical commissioning groups) should consider establishing asthma diagnostic hubs to achieve economies of scale and improve the practicality of implementing the recommendations in this guideline.}

Work on this has already begun under the STP with support from the Respiratory Clinical Network.

\textbf{Management}

\textbf{For all patients}

- Take a detailed allergy history – ask about and treat rhinitis symptoms
- Start SABA (Salbutamol or Terbutaline) prn and \textbf{check inhaler technique}
- Consider immediate introduction of preventive therapy (inhaled corticosteroids)
- Ensure that the patient has an \textbf{asthma self-management plan}. The format of the document may vary to meet the needs of the individual patient but it is recommended that it should detail as a minimum:
  - Recognition of exacerbations
  - Response to changes in symptoms or peak flow measurements
  - Where to obtain advice e.g. Asthma nurse, GP
- Offer/refer to smoking cessation if appropriate
- Annual influenza immunisation (unless contraindicated)

\textbf{Occupational asthma}

An occupational history should be taken from all patients to identify both current and past possible sensitisers.

Patients should be asked whether symptoms occur, or are worse, at work and are improved during periods away from work.

When work-related asthma is suspected consider referral to the specialist occupational asthma service at the Birmingham Chest Clinic (Dr Gareth Walters.)
**Pregnancy & asthma**

Some patients with asthma, particularly if severe, become unstable during pregnancy. These patients should be monitored carefully and referred for specialist assessment if control is difficult to maintain.

**Monitoring asthma control**

Asthma control can be assessed by a variety of means:

- Short symptom-based questionnaires such as the RCP 3 questions or the Asthma Control Test (ACT) give a simple numerical readout and can demonstrate serial change.

- Peak Expiratory Flow Rate (PEFR) monitoring is useful when patients demonstrate consistent technique and know their best or usual values. PEFR forms the basis of many individualised asthma action plans.

- Fraction of Exhaled Nitric Oxide (FeNO) is a rapidly emerging tool that assesses the extent of airway inflammation and predicts instability. FeNO is recommended as an option to support asthma management in people who are symptomatic despite using inhaled corticosteroids\(^2\).

- When control is suboptimal assess adherence, inhaler technique and identify trigger factors – including those relating to occupation.

**Pharmacological management**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full name</th>
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<tbody>
<tr>
<td>SABA</td>
<td>Short acting beta agonist</td>
</tr>
<tr>
<td>LABA</td>
<td>Long acting beta agonist</td>
</tr>
<tr>
<td>ICS</td>
<td>Inhaled Corticosteroid</td>
</tr>
<tr>
<td>ICS/LABA</td>
<td>Combination of ICS and LABA</td>
</tr>
<tr>
<td>LAMA</td>
<td>Long acting muscarinic antagonist</td>
</tr>
<tr>
<td>LTRA</td>
<td>Leukotriene Receptor Antagonist</td>
</tr>
<tr>
<td>Theophylline</td>
<td></td>
</tr>
</tbody>
</table>

*Table 1: Drug class abbreviations*

\(^2\) NICE diagnostics guidance [DG12] April 2014

APC Guideline Diagnosis and Management of Asthma in Adults
Step-wise management

Central to the BTS/SIGN guideline is the well-established step-wise approach to the management of asthma. This has been updated for the 2016 guideline to reflect a lower threshold for the initiation of regular inhaled corticosteroid therapy in the aftermath of the 2014 National Review of Asthma Deaths\(^3\).

This updated series of steps has been adapted for this guideline and may be found in Appendix 1.

Successful treatment of asthma with inhaled therapy is dependent on the interaction between patient, drug and device.

An assessment of inhaler technique should take place before the initiation of any new inhaled therapy, at annual review and following exacerbation or period of suboptimal control.

It should be noted that there is a general move toward dry powder inhalers in preference to pMDI for sustainability reasons so where there is no clear preference for an individual patient a dry powder device should be chosen as first line.

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\(^3\) Why asthma still kills: The National Review of Asthma Deaths (NRAD), RCP, August 2015
SABA therapy

All patients should be prescribed a SABA to be taken as required. Choice is limited to Salbutamol and Terbutaline.

Salbutamol is available in a variety of devices and the most suitable device for the patient should be determined by assessing inhaler technique.

Terbutaline is only available as Bricanyl Turbohaler. NICE guidance includes a recommendation for treatment with intermittent SABA alone while BTS/SIGN have moved away from this treatment step as indicated above.

It is recommended that prescribers maintain a low threshold for initiation of preventer treatment when asthma is suspected and that all patients with confirmed asthma should be commenced on regular ICS therapy without delay.

Use of a SABA more than 2-3 times per week is a marker of poor asthma control and a risk factor for life-threatening exacerbation. Such high volume usage should trigger a review.

Nebulised SABA [Salbutamol (formulary status Green) and Terbutaline (formulary status Amber)] should only be initiated on specialist advice.

Regular preventer therapy

Low dose inhaled corticosteroid (ICS) therapy is the cornerstone of asthma management in most patients and should be commenced as soon as the diagnosis has been confirmed.

There are a number of available preparations and again a choice should be made after a device assessment and the dose selected according to history of symptoms and exacerbations.

First line regular preventer therapy would normally be Beclometasone from a fine particle CFC free inhaler taken through a spacer device e.g. Clenil Modulite 100mcg – 2 puffs twice daily.

Second line ICS are shown in Appendix 1

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4Why asthma still kills: The National Review of Asthma Deaths (NRAD), RCP, August 2015

APC Guideline Diagnosis and Management of Asthma in Adults
Notes:

There is no clear evidence of any difference in efficacy between ICS preparations at equivalent doses and the most suitable drug and device for the individual patient should be selected as appropriate to the severity of the disease. Fluticasone Propionate (Flixotide) is now reserved for paediatric use.

Localised side effects, which are common to most ICS, such as oral candidiasis and dysphonia can be minimised by using correct inhaler technique – particularly utilising a spacer with MDI preparations, followed by rinsing the mouth and throat with water.

Ciclesonide is a fine particle ICS that is delivered from an MDI as a pro-drug and converted into active drug in the lungs. As such it offers an alternative when local side effects prevent use of other ICS. It also has an emerging role in patients with severe asthma requiring additional ICS to adequately control airway inflammation. It is currently included on the formulary with Amber status (initiation on SHC advice only, repeat prescriptions in PHC.) This is supported by a RICaD.

Initial add-on therapy

This step represents the biggest difference between BTS/SIGN and NICE guidance:

For many years BTS/SIGN have recommend the addition of a LABA when asthma is not controlled by regular low dose ICS.

NICE guidance states that a LTRA should be offered in addition to the ICS first with a review of efficacy after 4-8 weeks.

If asthma remains uncontrolled on a low dose of ICS and a LTRA after a 6-week trial period, then NICE recommend adding a LABA and reviewing the LTRA.

Clinicians are advised to use their own clinical experience when choosing which option to take at this step. No patient groups are more likely to benefit from LTRA. If symptoms are severe and spirometry demonstrates significant response to SAB then LABA would be a more logical choice.

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APC Guideline Diagnosis and Management of Asthma in Adults
Leukotriene Receptor Antagonists (LTRA)

Montelukast 10mg daily is now the only option (Green formulary status).

Side effects are unusual but there are reports of a potential increased risk of vasculitis (Churg-Strauss type.)

Long Acting Beta Agonists (LABA)

In most cases the addition of a LABA will involve the change to a combination inhaler. There is a wide choice of preparations and those included on the formulary are shown in Appendix 1.

Notes:

- Choice of preparation should be made based on severity of asthma and device assessment. It is usually possible to achieve consistency of device e.g. Clenil to Fostair, Pulmicort to Symbicort.

- It is vital that patients with asthma are NOT treated with stand-alone LABA therapy – without ICS. Formoterol and Salmeterol (Green formulary status) are both available as individual drugs, but MUST be used in conjunction with an ICS.

- Seretide – this combination is now only on formulary for paediatric patients. There is, however, a large cohort of legacy patients who should only be switched to an alternative preparation after clinical review and device assessment unless part of a “switch” policy.

- Generic prescribing – new products containing established combinations in new devices (such as Sirdupla MDI, Duoresp Spiromax, AirFluSal Forspiro, AirFluSal MDI) have recently been licensed. Care must be taken to prescribe combination products BY BRAND to negate the possibility of inadvertent switching to an unfamiliar device.

Maintenance And Reliever Therapy (MART) is a regime in which a single combination inhaler is used for both maintenance therapy and symptom relief. Fostair 100/6 (pMDI) and Symbicort 100/6 and 200/6 (DPI) (Green formulary status) are licensed for this indication.

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6 Pesola et al. Long Acting Beta agonists and their relation to increased Asthma morbidity and mortality – The FDA meta-analysis. The internet journal of Asthma, Allergy and Immunology. 2008, 7(1)

APC Guideline Diagnosis and Management of Asthma in Adults
NICE guidance recommends a MART regime if control is suboptimal on low dose ICS/LABA +/- LTRA.

**Additional add-on therapies**

*Long-acting muscarinic antagonist (LAMA)*

Tiotropium taken via the respimat device in a dose of 5 micrograms (2 puffs) once daily is the only LAMA available for the treatment of asthma. It is licensed as an add-on maintenance bronchodilator in adults with asthma who are receiving maintenance treatment with a combination of ICS (at least 800 micrograms of Budesonide per day or equivalent) and LABA and who have experienced 1 or more severe exacerbations in the previous year.7

**Theophyllines**

Methylxanthines have been used as bronchodilators for many years. All have a low therapeutic ratio meaning that side effects (nausea, palpitations) are fairly common even at therapeutic doses.

Available formulary preparations (Green formulary status) include aminophylline as Phyllocontin Continus (225mg tablets) and Phyllocontin Forte Continus (350mg) and theophylline as Uniphyllin Continus (200mg, 300mg and 400mg slow release tablets.) Other non-formulary brands are available (such as Slo-phyllin and Nuelin SA) but as absorption from modified-release preparations can vary between brands, patients should be maintained on the same brand that they were initiated and stabilised on.

Patients should be initiated on low doses which can be titrated up as tolerated. Therapeutic drug monitoring is possible but is only clinically useful in assessing concordance.

**Oral beta agonists**

These are not recommended as routine treatment in adults and should only be initiated on specialist advice.

Salbutamol (2mg and 4mg tablets and 2mg/5ml liquid, Green formulary status) and terbutaline (Bricanyl 5mg) are available in oral preparations as is Bambuterol (Bambec 10mg and 20mg, Amber formulary status).

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7 NICE ESNM55 March 2015

APC Guideline Diagnosis and Management of Asthma in Adults
When asthma is well controlled it may be possible to “step-down” treatment to the lowest level that maintains control. Advice on achieving this goal is included in Appendix 2.

**High dose therapies**

This treatment step covers patients treated with high dose ICS and additional add-on therapies as above.

All patients requiring high dose or multiple additional therapies should be referred to a specialist asthma clinic in secondary care.

**Continuous or frequent use of oral steroids**

When asthma is not controlled and frequent exacerbations continue to occur despite optimal high dose treatment, then use of oral corticosteroid maintenance treatment should be considered.

Treatment should be kept at the lowest dose possible and side effects minimised through careful monitoring of BP and blood glucose.

Daily oral corticosteroid therapy should not be discontinued abruptly and assessment of the HPA axis by Short Synacthen Test should be considered if therapy is to be withdrawn after a prolonged period.

Consideration should be given to bone protection in patients having regular or frequent courses of oral steroids. The RCP produced a guide for the management of glucocorticoid-induced osteoporosis which can be accessed via the link:


Patients on continuous oral steroids should be under the care of a secondary care clinic run by a consultant with an interest in asthma.

**Severe Difficult to Treat Asthma**

Patients with Severe Difficult to Treat Asthma (SDTA) remain symptomatic and have exacerbations despite adherence to treatment at guideline limits.
Such patients should be referred to the Birmingham Regional Severe Asthma Service (BRSAS) which is centred on Birmingham Heartlands Hospital (Dr Adel Mansur and Dr Anilkumar Pillai) and has sites at the Queen Elizabeth Hospital Birmingham (Dr Duncan Wilson & Dr Ben Sutton) and Sandwell and West Birmingham Hospital (Dr Arvind Rajasekaran & Dr Adeel Sahal.)

BRSAS offers comprehensive structured assessment and access to high cost therapies such as Omalizumab, Mepolizumab, other emerging monoclonal antibody therapies and Bronchial Thermoplasty as well as attention to other physical and psychological co-morbidities including Vocal Cord Dysfunction, dysfunctional breathing and gastro-oesophageal reflux disease amenable to surgery.

**Referral criteria for the BRSAS are:**
- Patients who are still symptomatic despite high dose therapy
- Those with previous near fatal/ITU episodes
- Oral Corticosteroid dependency
- Diagnostic uncertainty with difficult to control symptoms e.g. psychological, dysfunctional breathing, hyperventilation syndromes and vocal cord dysfunction
- Those who may be suitable for biological agent treatments or Bronchial Thermoplasty treatment (uncontrolled on combination treatment with 3rd/4th controller, no significant bronchiectasis and evident bronchial reversibility, and patient wishes to be considered for treatment)
- Other presentations that may benefit from BRSAS include ABPA, and those who are interested in clinical trials for severe asthma.

Further information, including contact details, are available at [www.severeasthma-birmingham.co.uk](http://www.severeasthma-birmingham.co.uk)

**Management of Acute Severe Asthma**

The BTS-SIGN guideline contains clear guidance on the management of Acute Severe Asthma in adults which can be found at Annexes 2-4 of the September 2016 guideline (pages 163-165) and at appendix 3 of this guideline.

Particular attention is drawn to the need for accurate assessment of severity (utilising symptoms, respiratory rate, heart rate and PEFR) which drives decisions regarding safe location for ongoing treatment, and the importance of **early** administration of systemic steroids.
Requirements for follow up after acute exacerbation are clearly articulated and include an appointment in primary care within 48 hours of initial treatment. This consultation presents an opportunity for a systematic review including recognition of triggers, smoking cessation advice, assessment of treatment level and concordance, review of the personalised action plan and consideration of standby therapy or secondary care referral.

**Adherence**

The biggest reason for failure of asthma treatment is lack of compliance with therapy.

Attention should be paid to this at all stages of treatment – inhaler technique should be checked and corrected and monitoring of drug levels considered when non-compliance is suspected.

Most inhaler devices have dose counters built in and more sophisticated remote monitoring technologies are emerging to support the assessment of compliance e.g. the smartinhaler.

**Overlap between COPD and asthma**

A significant number of patients with longstanding asthma develop fixed airflow obstruction, whether or not they are smokers. There is, therefore, a grey area between “pure asthma” at one end of a spectrum and “pure COPD” at the other end. The term asthma-COPD overlap syndrome (ACOS) has been applied to this group and this is explored in more detail in the sister guideline to this one for COPD.

Treatment decisions are increasingly being tailored to the individual, based on the phenotype of their airways disease. In general, we would advocate use of the guideline for the condition most prominent in the patient (i.e. patients with COPD who exhibit reversibility to bronchodilators should be treated using the COPD guideline and those with lifelong asthma, with fixed airflow obstruction, should be treated using the asthma guideline.)

All smokers should be strongly encouraged to quit and supported robustly in their quit attempts.

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8 NICE. Medtech innovation briefing [MIB90]. January 2017

APC Guideline Diagnosis and Management of Asthma in Adults
### Methodology

This guideline was developed by the UHBFT asthma lead (Dr Duncan Wilson) in conjunction with the Pan-Birmingham Respiratory Clinical Network and refined after discussion with colleagues representing the Birmingham Regional Severe Asthma Service (BRSAS) at HEFT and UHB, and Sandwell and West Birmingham Hospitals and Birmingham Community HealthCare (BCHC).

### Implementation

This guidance is intended for general use by all staff and will be linked to the APC website. The guideline will be actively promoted in primary care. Within secondary care, Trusts will each have their own mechanism for promotion, which may include departmental teaching sessions to junior doctors, emails to medical consultants, promotion via grand rounds and discussion with staff in other key departments (such as acute medicine). Inhaler technique education sessions run in local CCGs for non-medical staff will also be used as an opportunity to distribute and promote the guideline.

### Application of the Guideline

The guideline applies to patients with asthma at all HEFT, Sandwell and UHBFT secondary care sites, BCHC, and to Birmingham and Solihull CCG and Sandwell and West Birmingham CCG. Key beneficiaries will be patients, local CCGs and respiratory departments, as this is where cost savings and efficiency gains will be most apparent. Implementation should be by all staff seeing patients with asthma.
**Regular Patient Review and Follow-up**

Monitor through routine clinical review at least annually.
Use validated tools such as the Asthma Control Test (ACT) or the Royal College of Physicians (RCP) 3 questions
In the last week (RCP 3 questions) or month (ACT)*:

1. Have you had difficulty sleeping because of your asthma symptoms? (including cough)
2. Have you had your usual asthma symptoms during the day? (breathlessness, wheeze, cough, chest tightness)
3. Has your asthma interfered with your usual activities? (housework, work/school, etc)

*A response of ‘No’ to all three questions is consistent with well-controlled asthma

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**Asthma Prescribing Guidelines**

**SPACER DEVICES**

PRESCRIBE A SPACER FOR ALL PATIENTS RECEIVING HIGH DOSE ICS VIA MDI AND REPLACE AT LEAST EVERY 12 MONTHS (or 6 months if required)

- Spacer should be compatible with the MDI
- Single actuations of MDI into the spacer, each followed by inhalation, repeated if necessary
- Tidal breathing is as effective as single breaths
- Minimal delay between MDI actuation and inhalation
- Spacer should be cleaned monthly
- Washed in warm soapy water and allowed to air dry

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**INHALER TECHNIQUE**

* Check adherence with therapy at every opportunity
* Check patients can demonstrate satisfactory inhaler technique before initiating new therapy or moving up therapy
* Use inhaler training tool (in-Check®) to check inspiratory flow rate (assists with checking inhaler technique and teaching optimal inhaler use)
* Use MDI + spacer or dry powder inhalers before moving up therapy
* Use asthma.org.uk training videos

MDI + spacer is more effective than MDI alone and as effective as any DPI

Typically 10–20% of the emitted dose via an MDI is deposited in the lungs

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**Inhaled corticosteroid (ICS) safety issues**

- The safety of ICS is of crucial importance and a balance between benefits and risks for each individual needs to be assessed. Take account of other topical steroid therapy when assessing systemic risk.
- Local side effects: dryness and oral candidiasis. Mouth should be rinsed after inhalation. Using a MDI + spacer improves lung deposition, aids co-ordination, reduces oropharyngeal deposition and local side effects
- Can occur and may be severe. This reduces the effect of ICS. Higher doses may be required in patients with asthmatic exacerbations.
- Systemic side effects may include adrenal suppression at high doses of ICS. Steroid warning cards should be given to patients on high doses of ICS.
- Some mineral density may be reduced with long-term ICS, predisposing to osteoporosis. The ICS dose should be titrated to the lowest dose at which effective control of asthma is maintained. Adult patients on long-term steroid tablets (e.g. greater than three months) or requiring frequent courses of oral steroids (e.g. three to four per year) should use a fracture risk assessment tool e.g. FRAX® to assess for fragility fractures. When a significant reduction in BMD occurs, treatment with a long-acting bisphosphonate should be offered (see British Osteoporosis Society guidelines).
- Patients treated with high dose ICS (fluticasone propionate 1000 microgram/day or more) had a relative risk increase of 64% for new diabetes onset over 5.5 years (95% CI 1.52–7.70). Prescribers should be vigilant of risks and review regularly.

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**Personalised Action Plans**

- Provide ALL patients with asthma a written personalised action plan available at: https://www.asthma.org.uk/globalassets/health_advice/adult_asthma_action_plan.pdf or on clinical systems
- Patients admitted with severe asthma should receive a personalised action plan on discharge from a clinician with expertise in asthma management

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**Ensure annual influenza vaccination**
Appendix 2 - Step Down

Guidance to support stepping-down combination inhaler therapy in asthma

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Completely Controlled</th>
<th>Partially Controlled</th>
<th>Uncontrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom Control over 4 weeks</td>
<td>None</td>
<td>One or two of these symptoms</td>
<td>Three or more of these symptoms</td>
</tr>
<tr>
<td>Nighttime symptoms</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Limitation on activities</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Need for rescue treatment</td>
<td>None (twice or less/week)</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

ASThma step-down guide: ICS/LABA combination metered dose Inhalers

Key:
- Code: 10-day course without a spacer
- If patient is taking add-on therapies (e.g., montelukast, oral prednisolone), consider reducing these before reducing the ICS
- All patients with asthma should be provided with a short-acting beta, (salbutamol or salmeterol), to use in the event of an asthma exacerbation.
- It is important that patients with asthma are not treated with stand-alone LABA therapy without ICS

ASThma step-down guide: Symbicort Inhaler

Note: All doses are for asthma maintenance therapy, not asthma maintenance and rescue therapy (e.g., not the SMART® regime)

Appendix 3 – Severe - Acute

Management of acute severe asthma in adults in the emergency department

**Measure peak expiratory flow and arterial saturations**

<table>
<thead>
<tr>
<th>Time</th>
<th>Moderate asthma</th>
<th>Acute severe asthma</th>
<th>Life-threatening asthma</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEFR &gt; 50%</td>
<td>Sputum present or altered tone</td>
<td>PEFR &lt; 30%</td>
<td>SpO₂ &lt; 90%</td>
</tr>
<tr>
<td>PEFR &lt; 50%</td>
<td>No sputum present</td>
<td>PEFR &lt; 30%</td>
<td>Silent chest, cyanosis, poor respiratory effort</td>
</tr>
<tr>
<td>PEFR &lt; 30%</td>
<td>Sputum present</td>
<td>PEFR &lt; 30%</td>
<td>Arterial hypotension</td>
</tr>
<tr>
<td>No features of acute severe asthma</td>
<td>PEFR &lt; 30%</td>
<td>PEFR &lt; 30%</td>
<td>Exhaustion, altered consciousness</td>
</tr>
</tbody>
</table>

- **5 min**
  - Give salbutamol (give 4 puffs initially and give a further 2 puffs, every 2 minutes according to response up to a maximum of 10 puffs) preferably via spacer
  - No response to salbutamol 5 mg by oxygen-driven nebuliser

- **15-20 min**
  - Yes
    - **Repeat salbutamol 5 mg nebuliser**
    - Give prednisolone 40-50 mg orally
    - **Observe and monitor**
      - SpO₂
      - Heart rate
      - Respiratory rate

  - **NO**
    - **Patient improving AND PEFR > 75%**
    - **Patient receiving AND PEFR > 75%**

- **60 min**
  - **No signs of severe asthma AND PEFR 50-75%**
  - **Signs of severe asthma OR PEFR < 50%**

- **120 min**
  - **Patient stable AND PEFR > 50%**
  - **Signs of severe asthma OR PEFR < 50%**

**IMMEDIATE MANAGEMENT**

- Oxygen to maintain SpO₂ 94-100%
- Salbutamol 5 mg plus ipratropium 0.5 mg via oxygen-driven nebuliser
- Prednisolone 40-50 mg orally or IV hydrocortisone 100 mg

**Measure arterial blood gases**

- ‘Normal’ or raised PaCO₂ (PaCO₂ < 4.6 kPa; 35 mm Hg)
- Severe hypoxia (PaO₂ < 8 kPa; 60 mm Hg)
- Low pH (or high H+)

- **Give/repeat salbutamol 5 mg with ipratropium 0.5 mg by oxygen-driven nebuliser after 15 minutes**
- Consider continuous salbutamol nebuliser ≤ 10 mg/hr
- Consider in magnesium sulphate 1.2-2 g over 20 minutes
- Correct fluid/electrolyte, especially K⁺ disturbances
- Chest X-ray
- Repeat ABG

**ADMIT**

- Patient accompanied by a nurse or doctor at all times

**Peak Expiratory Flow Rate - Normal Values**

Adapted by Chronic Cond for use wtih EH 19588 / EU acute peak flow meter von Siebel Uhde GmbH & Co. Med. / 1988 39857 20
Severe – In Secondary Care

### Management of acute severe asthma in adults in hospital

#### Features of acute severe asthma
- Peak expiratory flow (PEF) 31–50% of best (use % predicted if recent best unknown)
- Can’t complete sentences in one breath
- Respiration ≥ 21 breaths/min
- Pulse ≥ 110 beats/min

#### Life-threatening features
- PEF < 31% of best or predicted
- SpO₂ < 92%
- Silent chest, cyanosis, or tachycardia
- Respiratory effort
- Arrhythmia or hypotension
- Exhaustion, altered consciousness

#### Immediate Treatment
- Oxygen to maintain SpO₂ 94–98%
- Salbutamol 5 mg via in an oxygen-driven nebuliser
- Ipratropium bromide 0.5 mg via an oxygen-driven nebuliser
- Prednisone tablets 40–50 mg or IV hydrocortisone 100 mg
- No sedatives of any kind
- Chest X-ray pneumothorax or consolidation are suspected or patient requires mechanical ventilation

#### IF LIFE-THREATENING FEATURES ARE PRESENT:
- Discuss with senior clinician and ICU team
- Consider IV magnesium sulphate 1.2–2 g infusion over 30 minutes (unless already given)
- Give nebulised β₂ agonist more frequently eg salbutamol 5 mg up to every 15–30 minutes or 10 mg per hour via continuous nebulisation (requires special nebuliser)

#### Subsequent Management

#### IF PATIENT IS IMPROVING:
- Continue oxygen and steroids
- Use continuous nebulisation of salbutamol at 5–10 mg/hour if an appropriate nebuliser is available. Otherwise give nebulised salbutamol 5 mg every 15–30 minutes
- Continue Ipratropium 0.5 mg 4–6 hour until patient is improving

#### IF PATIENT NOT IMPROVING AFTER 1–2 HOURS:
- Increase oxygen and steroids
- Use high-dose nebulised salbutamol at 10–20 mg/hour (unless already given)
- Senior clinician may consider use of IV β₂ agonist or IV immunoglobulin or progression to mechanical ventilation

#### Monitoring
- Repeat measurement of PEF 15–30 minutes after starting treatment
- Oxyhemoglobin saturation (SpO₂): > 94–98%
- Repeat blood gas measurements within 1 hour of starting treatment if:
  - PEF 50% of best or predicted and PEF < 25% of baseline variability (even if discharge is agreed with respiratory physician)
  - Treatment with oral and/or inhaled steroids in addition to bronchodilators

#### When discharged from hospital, patients should have:
- Been on discharge medication for 12–24 hours and have had inhaler technique checked and recorded
- PEF > 75% of best or predicted and PEF > 25% of baseline variability is agreed with respiratory physician
- Treatment with oral and/or inhaled steroids in addition to bronchodilators
- Own PEF meter and written asthma action plan
- GP follow up arranged within 2 working days
- Follow-up appointment in respiratory clinic within 4 weeks

#### Patients with severe asthma (admitted for need for admission) and adverse behavioral or psychosocial features are at risk of further severe or fatal attacks:
- Determine reasons for exacerbation and admission
- Send details of admission, discharge and potential best PEF to GP

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APC Guideline Diagnosis and Management of Asthma in Adults
Severe – Primary and Community Care

Management of acute severe asthma in adults in general practice

Many deaths from asthma are preventable. Delay can be fatal. Factors leading to poor outcome include:
- Circumstances failing to assess severity by objective measurement
- Patients or relatives failing to appreciate severity
- Under use of oral corticosteroids

Refer each emergency asthma consultation as for acute severe asthma until shown otherwise.

Assess and record:
- Peak expiratory flow (PEF)
- Symptoms and response to self treatment
- Heart and respiratory rate
- Oxygen saturation (by pulse oximeter)

Caution: Patients with severe or life-threatening attacks may not be distressed and may not have all the abnormalities listed below. The presence of any should alert the doctor.

Initial assessment

<table>
<thead>
<tr>
<th>Severe asthma</th>
<th>Moderate asthma</th>
<th>Life-threatening asthma</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEF &lt; 60–75% of predicted</td>
<td>PEF &gt; 80–90% of predicted</td>
<td>PEF &lt; 33–50% of predicted</td>
</tr>
</tbody>
</table>

Further assessment

<table>
<thead>
<tr>
<th>SpO2 &lt; 94%</th>
<th>SpO2 &gt; 94%</th>
<th>SpO2 &gt; 97%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speech normal</td>
<td>Can’t complete sentences</td>
<td>Silent chest, cyanosis or poor respiratory effort</td>
</tr>
<tr>
<td>Respiration ≤ 20 breaths/min</td>
<td>Respiration ≥ 25 breaths/min</td>
<td>Arrhythmia or hypertension</td>
</tr>
<tr>
<td>Pulse ≤ 100 beats/min</td>
<td>Pulse ≥ 100 beats/min</td>
<td>Exhaustion, altered consciousness</td>
</tr>
</tbody>
</table>

Management

Treat at home, arrhythmia or shock, or infection and assess response to treatment.

Consider admission

Arrange immediate admission

Treatment

- Oxygen to maintain SpO2 ≥ 94% if available
- 
- 2nd bronchodilator: nebuliser (preferably oxygen driven), salbutamol 5 mg
- or via spacer (give 2 puffs initially and give a further 2 puffs every 1 minute). Screening on response up to maximum of 6 puffs
- Prednisolone 40–60 mg or IV hydrocortisone 100 mg
- F no response in acute severe asthma: ADMIT

Admit to hospital if any:
- Life-threatening features
- Features of acute severe asthma present after initial treatment
- Presence of exacerbation

Lower threshold for admission if asthma is poorly controlled or recent nocturnal symptoms or hospital admission, previous severe attacks, patient unable to assess own condition, or concerns over social circumstances

If admitted to the patient:
- Stay with patient until ambulance arrives
- Send written assessment and medical details to hospital
- 
- 2nd bronchodilator via oxygen-driven nebuliser in ambulance

Follow up after treatment or discharge from hospital:
- GP review within 2 working days
- Monitor symptoms and PEF
- Check inhalation techniques
- Write asthma action plan
- Modify treatment according to guidelines for chronic persistent asthma
- Address potentially preventable contributors to admission

APC Guideline Diagnosis and Management of Asthma in Adults