**10 minute consultation**

Optimising inhaled therapy in asthma

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**How this article was created**

We drew on the authors' clinical and research experience of quality improvement in asthma care and sought feedback in the development of the article from a respiratory nurse specialist, a general practitioner with an interest in respiratory care, a consultant respiratory physician, and multiple patients with asthma. We referred to the most recent guidelines for asthma care from Global Initiative for Asthma and the Scottish Intercollegiate Guidelines Network / British Thoracic Society. We conducted a literature search in OVID Medline using the MESH terms, "asthma" and "inhaler" for a related systematic review and relevant articles were reviewed.

**Contributorship and the guarantor**

AB and HT conceived the article and are guarantors. All authors wrote and reviewed the article. AB created the boxes and supplied the figures. The authors would like to thank Amanda Roberts of the primary care respiratory society patient reference group for reviewing the article and offering suggestions for improvement.

**Acknowledgements**

The authors would like to thank Carol Stonham, a respiratory specialist nurse and policy lead for primary care respiratory society who was also the contact for patient involvement, Dr Katherine Hickman, general practitioner and executive chair of the primary care respiratory society and Prof. Michael Crooks, consultant in respiratory medicine, for their expert advice and review of this article.

**How patients were involved in the creation of this article**

We asked the patient reference group of the primary care respiratory society to review the article. Suggestions around the language used in relation to activity restriction due to symptoms and the setting of activity goals were incorporated into the final version.

**Conflicts of Interest**

*The BMJ* has judged that the authors have no disqualifying financial ties to commercial companies that are relevant to this paper. The authors declare the following other interests:

*Dr Aarti Bansal is a director of Greener Practice, which is a not-for-profit community interest company which supports primary care to be more environmentally sustainable. Greener Practice has developed a high quality and low carbon asthma care quality improvement toolkit.*

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**10-minute consultation: Optimising inhaled therapy in asthma**

**Case study**

*A 30-year-old woman attends her general practice for her annual asthma review. She tells you her asthma is well-controlled, but you notice that she has been issued two inhaled corticosteroid (ICS) preventer inhalers and six short-acting beta agonist (SABA) reliever inhalers in the last year. On further questioning, she limits her exercise, as this brings on her asthma symptoms, and experiences occasional night-time waking with cough. She describes irregular use of her ICS preventer inhaler, especially during the summer months, and almost daily use of her SABA reliever inhaler. Whilst demonstrating her inhaler technique you notice she uses a quick and deep inhalation with her pressurised metered dose inhaler (pMDI) and does not use her spacer device.*

**Introduction**

Asthma is one of the most common non-communicable diseases and carries significant morbidity and mortality burden worldwide.1 A cross-sectional study of adults from 17 countries, carried out by the Global Asthma Network in 2022, found that 6.6% of this population, were impacted by asthma symptoms that were not well-controlled, resulting in a high burden of preventable symptoms, restrictions on activity, and an increased risk of asthma attacks.2 Sub-optimally controlled asthma is also associated with significantly increased medication and healthcare utilisation costs.3

Many factors may contribute to sub-optimal asthma control, including incorrect diagnosis, co-morbidities such as allergic rhinitis and obesity, smoking, and air pollution, and clinicians should be mindful of these when seeing patients with asthma. However, it is also common for asthma to be inadequately controlled because of sub-optimal inhaled therapy - inadequate use of preventer therapy, overuse of reliever therapy, and poor inhaler technique.4-7 In this article, we focus on optimising inhaled therapy to support clinicians to empower patients to achieve better control of their asthma.

**What you should cover**

Every consultation with a patient with asthma is an opportunity to assess their symptom control and risk of future exacerbations. To support an effective, personalised approach to improving asthma control, structure the consultation to include the following questions:

**“How is your asthma affecting you?”**

* Objective disease control scores, such as the Asthma Control Test 8, can be used to assess symptom burden and track progress over time. However, patients may normalise symptoms and accept their activity restriction as “living with asthma”.9 Therefore we recommend that answers to standardised questionnaires are not taken at face value and an individualised approach is taken to exploring impact on a person’s life.
* Ask people whether they avoid activities to prevent symptoms and whether asthma is having any impact on their sleep, mental health, work, or school life to identify sub-optimal control.
* Ask about their triggers such as pollens, cold air or viral infections. Patients may not be aware that environmental factors, such as air pollution or damp housing conditions, can trigger asthma.

**“How often are you using your inhalers?**

* Where possible, check prescribing records to assess how many inhalers have been issued over the last 12 months. National guidelines from the British Thoracic Society state people with well-controlled asthma should use their reliever inhaler up to twice a week only.10 In patients who are prescribed separate ICS and SABA inhalers, more than two SABA inhalers a year may indicate SABA overuse which is associated with poor asthma control.7
* Enquire if there are any concerns about inhaler use. A common reason that patients do not take their preventer medication is because they perceive asthma to be an episodic condition requiring occasional relief rather than a long-term condition needing prevention. They may lack understanding of the role of airway inflammation in asthma, how their inhalers work, and may be concerned about potential adverse effects from inhaled corticosteroids.11

**“What do you do when your asthma gets worse?”**

* People with asthma should know what to do when their symptoms get worse or if they have an asthma attack. All patients should have a personal asthma management plan (can be digital, printed or pictorial) and a routine review is an opportunity to go through this to and check understanding.

**What you should do**

Shared decision-making and the promotion of patient self-care are essential aspects to optimising inhaled therapy for people with asthma. Patients and caregivers need to be given the opportunity to express their expectations and concerns, better understand their condition and to participate in decisions about treatment.

**Raise expectations of asthma control**

Ensure people with asthma understand what is meant by well-controlled asthma i.e., that they should have no or very occasional daytime symptoms, no night-time symptoms and no restriction on their physical activity. You may discuss how stopping smoking, breathing techniques, and choosing a physical activity goal to work towards, can improve symptom control.

**Explain what asthma is and how the inhaled medications work**

Adherence to regular ICS preventer therapy is low (30-70%, varying by country, age, gender and ethnicity), and poor adherence is associated with an increased risk of exacerbations.12 A study of inhaler prescription data for >1,000,000 people aged ≥12, with asthma across five European countries found that approximately one third were overusing SABA, defined as using 3 or more SABA cannisters per year.7 Underuse of ICS inhalers is a key driver of this pattern.

Adherence to regular inhaled ICS preventer medication is challenging for multiple reasons, including a lack of understanding of their purpose, concern about side effects and remembering to take a medication that does not offer immediate symptom relief.

To explain what asthma is and how inhaled medications work, consider using an airways diagram or airways models. These illustrate that asthma is a chronic inflammatory condition of the airways, and treating the inflammation will prevent symptoms and asthma attacks (Box 1, Figure 1). This can help reframe doses of reliever treatment as ‘rescue’ medication, which will not be needed if asthma is well controlled and whose regular use is a warning sign of poor control. It can also explain why people with asthma should not be on reliever-only therapy as this does not control underlying inflammation and leaves them at risk of asthma exacerbations.5

**Figure 1: Illustration of normal airways and changes in asthma**



Box 1: An explanation of asthma, as developed by the authors and contributors

Asthma causes inflammation and swelling in the lining of the airways. The swelling reduces the space for air to move in and out. The airway tubes are surrounded by muscle. When the lining of the airway is swollen, the muscles surrounding it become sensitive. When swollen airways come into contact with their triggers, such as cold weather, pollen, pollution (*individualise to patient*), the muscles around the airways tighten. This causes the airways to narrow further and causes symptoms such as cough, wheeze, chest tightness and shortness of breath.

Preventer medication, usually inhaled steroid, reduces the swelling in the airway lining which opens them up and reduces their sensitivity to triggers. Inhaled steroids are the **main treatment for asthma**. They prevent symptoms and asthma attacks. If your asthma is well controlled, you will rarely have symptoms in the day, never have symptoms at night and do not have to limit your physical activity.

Reliever medication relaxes the muscles around the airway, temporarily opening the airways. This can be seen as a **rescue** treatment. It is important to take when you have symptoms and will temporarily make you feel better. However, reliever medication on its own, does not control the underlying swelling in the airways. Frequent use is a warning sign that your asthma may not be well controlled.

Preventer and reliever medication can be combined in a single inhaler or prescribed as separate inhalers. Your personal asthma action plan will advise you about when you should seek medical advice.

**Address concerns and habits around using inhaled medicines**

Patients and carers may have concerns about systemic side effects from steroid use such as growth retardation, respiratory infections and bone health. They can be reassured that systemic side effects are linked to oral steroid use and not inhaled steroids at the standard doses needed to control asthma. Furthermore, oral steroids are more likely to be needed if asthma is sub-optimally controlled due to poor adherence to inhaled ICS medication.13 Local oral side effects such as oral candidiasis and dysphonia, can be prevented by rinsing the mouth out after using the inhaler and using a spacer device where appropriate.

If remembering to take regular preventer medication is a problem, discuss how to incorporate inhaler use into daily activities. People may find it helpful to incorporate taking their inhaler alongside a daily activity such as toothbrushing or using reminders on their phone.

If patients raise concerns about side effects of beta-agonists, such as palpitations or tremor, this is an opportunity to emphasise that achieving good control with adequate preventer therapy, will reduce the need for beta-agonists and therefore, these side effects.

**Consider ICS-Formoterol combination inhaler regimes**

The Global Initiative for Asthma now recommends using ICS-Formoterol combination inhalers, instead of separate preventer and reliever inhalers, as the preferred track for asthma treatment in adolescents and adults.5 Formoterol is long-acting beta-agonist (LABA) that works as quicky as salbutamol and therefore can be used as a reliever medication during an acute exacerbation.14 Patients may also prefer the convenience of having just one inhaler to carry and use.

ICS-Formoterol inhalers can either be used in an ‘as needed’ regimen for mild asthma (anti-inflammatory reliever therapy (AIR)) or as maintenance and reliever therapy (MART) in moderate and severe asthma. AIR therapy ensures that patients receive ICS on days they use their reliever and so are never just receiving SABA monotherapy. In MART regimes, patients take their inhaler regularly, usually twice a day, and use the same inhaler as a reliever. As patients take additional puffs to relieve symptoms, they receive the additional steroid they need, preventing worsening of symptoms and exacerbations.

MART regimes have been shown to reduce severe exacerbations whilst achieving similar symptom control and lower overall doses of ICS, than treatment with either ICS alone, or ICS-LABA, plus SABA reliever.15-16

**Fit the inhaler to the patient**

Inhaler use errors are common including incorrect preparation of device, incorrect type of inhalation for the inhaler device prescribed, and lack of breath holding after inhalation.17

When assessing inhaler technique, start by observing the patient using their inhaler. Pressurised metered dose inhalers (pMDIs) require a slow and steady inhalation, ideally with a spacer device. However, in real-world studies, spacer device use is low, and it is important to ask patients if they are using them.17 Dry powder inhalers (DPIs) require a quick and deep inhalation and do not require spacers.

If a patient is using an inhalation technique that is not effective for their current inhaler, but effective for a different inhaler device, consider prescribing the inhaler that best fits the patient’s current inhaler technique. For example, if a patient is taking a quick and deep breath in with a pMDI or if they are not using a spacer, they may be better suited to a DPI. A small proportion of patients who cannot take a quick and deep breath in may not be suited to a DPI. DPIs are not licensed for children under 6 years old.

Ask patients if they would find a dose counter helpful to help keep track of their medication and to know when their inhaler device is empty. Dose counters reduce the risk of patients discarding inhalers with medication remaining or using inhalers that do not contain any medication.18

In situations where there is no clear clinical indication for a particular inhaler device, all adolescent and adult patients should be offered the option of lower carbon inhalers (Box 2) and, if they are interested, be assessed to see if they can use them correctly. DPIs are the most common low carbon inhaler device in asthma.

Placebo devices and inhaler training devices can be valuable tools to support individualised decisions on device choice. Ensure that if inhaler devices are changed, patients have a review within 6 weeks to check they are using their device correctly. If possible, re-inforce inhaler technique through links to approved on-line video resources, e.g., <https://www.asthmaandlung.org.uk/living-with/inhaler-videos>.

**Support self-management**

Ensure patients have an updated written asthma action plan, with guidance on how to use their inhalers and what to do if they get worse. If appropriate, check if the patient has a peak flow (PEF) meter and if they know how to use it to monitor their asthma. Clinicians and patients can agree PEF values to include in written asthma management plans, which alongside symptoms, can help patients know when to step up treatment or call for emergency help.

Based on your individualised discussion, link patients to resources that can optimise their control such as physical activity, breathing exercises and avoiding indoor and outdoor air pollution.

**Referral to secondary care**

Most patients’ asthma control will improve with optimisation of inhaled therapy and addressing modifiable risk factors and comorbidities. However, if a patient’s asthma is not controlled having followed the recommended national guidelines, or Step 4 if following GINA guidelines, consider referral to secondary care for clarification of the diagnosis and/or consideration for therapies such as biologics which can be effective for patients with severe asthma.19

**Box 2: Environmental Sustainability.** Well-controlled asthma has 1/3rd of the carbon footprint of asthma that is not controlled, due to lower pMDI SABA inhaler use and reduced healthcare utilisation from asthma exacerbations.20 pMDIs have a very high carbon footprint because the canisters contain hydrofluoroalkanes (HFA) propellants which are potent greenhouse gases;1530-3600 times more potent than carbon dioxide.21 As a result, pMDIs make an outsized contribution to healthcare emissions. For example, in England they account for 13% of the emissions related to delivery of care.22 Where clinically appropriate, lower carbon dry powder inhalers can be safely and effectively used by many patients with asthma.10 You can learn more at www.greenerpractice.co.uk/asthma-toolkit

**What you need to know**

* Sub-optimally controlled asthma is common due to normalisation of symptoms, underuse of preventer therapy, overuse of reliever therapy and poor inhaler technique.
* Adherence to inhaled corticosteroid preventer therapy can be encouraged by explaining the role of inflammation in causing asthma symptoms and use of ICS-formoterol combination inhaler regimes.
* Ensuring patients have the most appropriate inhaler device type for them, based on their inhaler technique and preferences, maximises the chances that medication reaches their airways.

**Education into practice**

* Use airways diagrams or models to explain the nature of asthma to patients and the importance of inhaled corticosteroids as the main treatment.
* Familiarise yourself with ICS-formoterol regimes as a strategy for improving adherence and control.
* Observe how patients are using their inhalers to determine the best inhaler device for each patient.

**Figure 1:** Visual aid for optimising asthma reviews in adults and children over 12 years old.

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