# Tailoring Inhaler Devices

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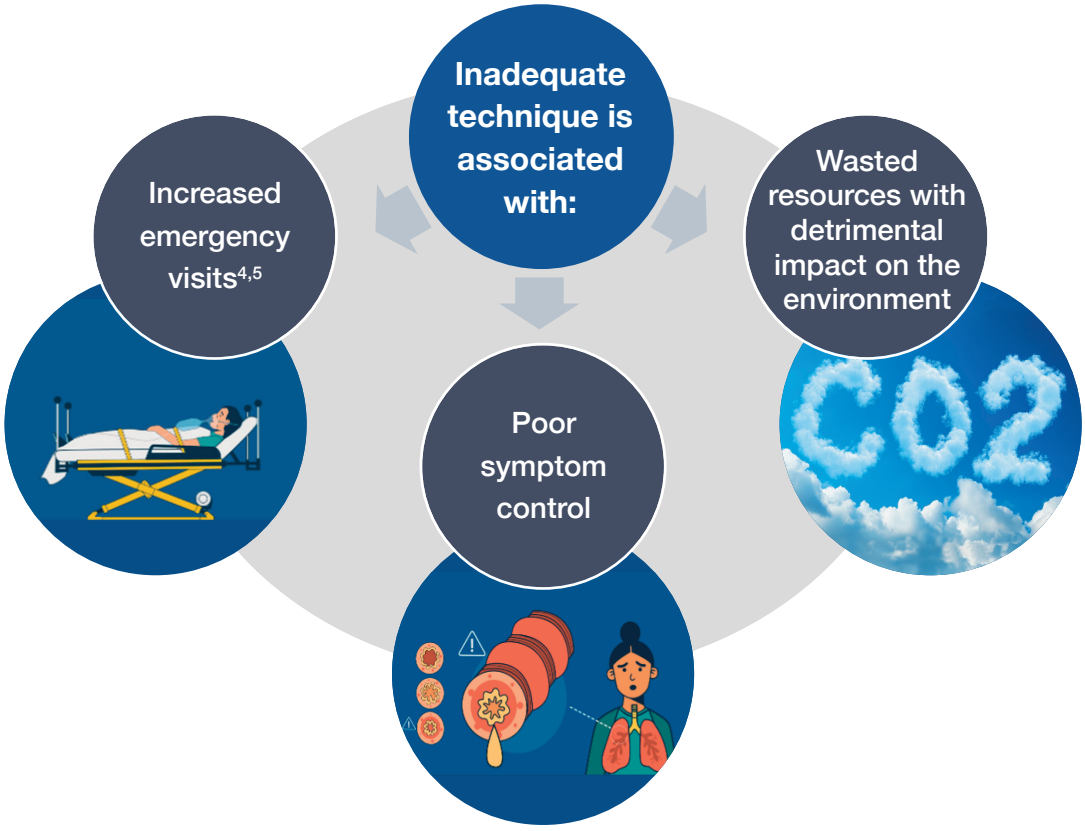
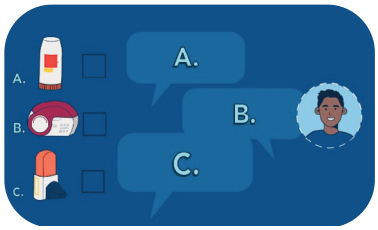
## Introduction

**Inhalation is the main administration route of drugs for conditions such as asthma or chronic obstructive pulmonary disease (COPD). The advantage of administering drugs by inhaler is they are delivered directly to the site of action within the airways. The onset of action is then rapid and systemic adverse effects are minimised.[1] However, for an inhaler to be effective the correct drug must be prescribed, and the device must be used properly. Poor inhaler technique is common in people with obstructive lung diseases.[2,3]**




Choosing a drug and a corresponding device from the large variety available is potentially confusing.[6] National guidance recommends that the people with respiratory conditions should have their ability to use the prescribed inhaler device (particularly for any change in device) assessed by a competent healthcare professional.[7] Unfortunately, inhalation of medicines can be complicated and difficult for many people, leading to suboptimal use and effect. The UK Inhaler Group have produced a set of standards to support healthcare professionals (HCPs).[8]



## CHOICE OF INHALER

The choice of an inhaler device should be based on:-

**The patient's ability to use the device they have been prescribed.** Patients using pressurised metered-dose inhalers (pMDIs) must have excellent coordination of inspiration with inhaler activation to achieve optimum drug delivery.[9]

**The patient's lifestyle and circumstances** such as where and when the inhaler may be used. It is important that the device is compatible with the patient's needs.[8]

**The patient's preference as part of shared decision making** is important. If the patient does not like the device, they will not use it. Blanket switching of inhalers in not recommended.[10,11]

**The age of the patient** – this will influence their physical and cognitive ability.[9] Very young children or elderly patients may have problems using certain devices. Manual dexterity should be considered, and the aids provided, e.g. spacer devices

**Patients' physical abilities** can affect their use of inhalers. Conditions like rheumatoid arthritis can make operating pMDIs difficult due to the need for hand-breath coordination. Spacers can help by separating activation from inhalation, while breath-actuated pMDIs (e.g., Autohaler, Easi-Breathe) activate upon inhalation. For those able to inhale deeply over 2-3 seconds, DPIs may be a better option. Tailoring devices to patients' abilities improves ease of use and treatment outcomes.

**Whether an inhaler indicates when it is running out of medication**. Some inhalers have a dose counter to alert patients to order more medication.[12]

**The cost and environmental impact of inhalers** should also be considered. We need to remember the best inhaler is the one that contains the right drugs/molecules, which the individual patient is willing to, able to and does use correctly.[13,14]

**Whether a combination inhaler is indicated.** Combination inhalers can be helpful for patients who pay for their prescriptions or may not like taking inhaled steroids regularly. It also minimises the number of devices, reducing the risk associated with multiple inhalers and more frequent errors in inhaler technique.[14]

***It is also worth considering if the device can be used in an exacerbation to delivery larger doses.***[12] *A common misconception is that pMDIs are needed during worsening symptoms and exacerbations, whereas DPIs can be effective during exacerbations also.*[15,16,17]


### Types of Inhaler

There are several different types of inhalers which include pressurised metered dose inhalers (pMDIs), breath actuated pMDIs, dry powder inhalers (DPIs) and soft mist inhalers (SMIs).

More information and video guidance on technique is available from the Asthma and Lung UK web page. Instructions are also provided in the Patient Information Leaflet with each device, but this should not be relied on, and training must be given by a qualified and appropriately trained HCP.

ASTHMA+ LUNG UK

**There are 7 STEPS to good inhaler techniques set by the UK Inhaler Group (UKIG)**

**https://www.ukinhalergroup.co.uk**

**Table 1 gives the characteristics which might affect the choice of inhaler device for different patients.**

It is helpful to know what drugs are available in each device – see https://www.rightbreathe.com/.

Right Breathe

DPIs & SMIs do not contain hydrofluoroalkane (HFA) propellants, giving them less global warming potential in comparison to traditional pMDIs and may be a preferred option if a person can use it. However, there are circumstances (e.g. in young children) where DPIs won't be appropriate.[18] Lower carbon pMDI options are being developed and these should be available by 2025.

**Table 1.** Characteristics of types of inhaler device

| Inhaler type | Characteristics |
|---|---|
| Pressurised metered dose inhalers (pMDIs) | pMDIs require:<br>• Good coordination between activating the device and inhaling the drug<br>• Manual dexterity<br>• Slow and steady inhalation over 3-5 seconds |
| Breath actuated pMDIs (BA pMDIs) | • Can help overcome coordination problems as they do not require the patient to coordinate actuation of the device and inhalation of the drug |
| Dry powder inhalers (DPIs) | • Can help overcome coordination problems<br>• Require some manual dexterity depending on the device used<br>• Require quick and deep inhalation over 2-3 seconds for maximum drug deposition |
| Soft mist inhalers (SMIs) | • May be easier for some patients as the aerosol is released over 1.5 seconds, so a slow gentle inhalation technique is important<br>• Still require coordination when inhaling and actuating the device |

## Use of spacer devices

The effectiveness of pMDIs is generally improved if a spacer device is used in children and adults. Spacers (or holding chambers) act as a reservoir and 'hold' the medication. There should still be minimal delay between pMDI actuation and inhalation.

Spacer devices are useful when:

- The patient has poor coordination
- Inhaled corticosteroids are needed

**Deposition of the drug in the mouth and throat can cause local side effects such as candidiasis or dysphonia from inhaled steroids. Spacers reduce the deposition in the mouth and oropharynx during inhalation and hence reduce these side effects.**

In children 0-5 years, pMDI + a spacer is the preferred method of delivery. A facemask is required usually until the age of 3 until the child can breathe reproducibly using the spacer mouthpiece.[7] The BTS/SIGN guidelines suggest the following when using and caring for spacers:-

- Using a spacer compatible with the pMDI being used.
- The drug should be delivered using a single actuation of the pMDI into the spacer, followed by inhalation. If another dose is required, this is usually 60 seconds later.
- Tidal breathing is as effective as single deep breaths.
- Spacers should be cleaned monthly (not weekly) by washing in detergent and allowing to dry. The mouthpiece should be wiped clean of detergent before use.
- Static charge may reduce drug delivery via plastic spacers, other antistatic spacers are not affected in this way.
- Plastic spacers should be replaced at least every 12 months, but some may need changing more frequently.

**The importance of appropriate inhaler technique** *[Image copyright Trudell Medical International].*

### Reviewing inhaler technique

- Inhaler devices may seem simple to use but are often used incorrectly by patients and HCPs alike.
- It is important to check that the patients can (and continue to) use their inhaler correctly because inadequate technique can be mistaken for lack of response to the drug.
- Video or Face to Face consultations are essential to watch a person using their inhalers and spacers.
- Inhalers should only be prescribed after a patient has received adequate training in the use of the device and has demonstrated a satisfactory technique.
- Ordering placebos from the manufacturer is recommended. These can be ordered from individual manufacturers.
- A number of training devices are available to assess inhaler technique. The clip-tone or flo-tone teaches patients to breathe in at the correct speed when using a pMDI. The in-check dial can do this for all device types.
- Many pharmacists undertake medicine review services and are trained in assessing inhaler technique. It is important to follow up patients if their inhaler device has been changed.

### Organisational issues

It is essential that knowledge about treatment and inhalers is reinforced, and this should be incorporated into routine reviews undertaken by trained members of the practice team.

Please see our document, Fit to Care for information and advice on the key knowledge, skills and training required for healthcare professionals delivering respiratory care in primary care.

**Table 2.** Patient Education

**Patients should not only be coached on their inhaler(s) additional information should be provided including:-**

- **Safe storage of the device.**
- **Knowing when inhaler is empty (ideally finding an inhaler with a dose counter) and returning it for safe disposal at the community pharmacy.[13]**
- **How to clean the device.**
- **Some inhaler devices once removed from their packaging have a limited shelf life. Please check the Summary of Products and Characteristics (SPC) for each medication.**
- **The importance of rinsing the mouth and throat after using a steroid inhaler to minimise side effects such as oral candidiasis or dysphonia.**
- **When to use it. (Frequency and use of medication should be included in an action plan).**
- **Possible side effects, and any concerns the patient may have.**

### Conclusion

There are many different inhaler devices available and it is an important element of shared decision making to discuss and agree inhaler options with the patient. It is important that inhaler technique assessment forms a regular part of respiratory consultations and reviews. The importance of education and training in inhaler device technique cannot be over-emphasised. The availability of unbiased, evidence-based training should be a pre-requisite of undertaking or delegating this task. Refer to a specialist professional for more advice if needed.

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## Useful resources

- **IPCRG Question and Challenge Cards**

  https://www.ipcrg.org/sites/ipcrg/files/content/attachments/2024-06-27/COPD%20Right%20Care%20Question%20%26%20Challenge%20Cards%20SCREEN.pdf

  Accessed 11 September 224

- **Myth 3 – I only need my blue inhaler. Primary Care Respiratory Society**

  https://www.pcrs-uk.org/resource/asthma-myths-i-only-really-need-my-blue-inhaler

  Accessed 11 September 224

- **Inhaler technique optimisation and adherence through patient partnership: use of technology, coaching of soft skills and how medicine reviews can help this.** *Darush Attar Zadeh. Primary Care Respiratory Society*

  https://www.pcrs-uk.org/resource/current/demand-arc-webinar-inhaler-technique-optimisation-and-adherence-through-patient

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