Inhaled therapies are the mainstay of delivering medicines for people with respiratory diseases such as asthma. When compared with systemic administration, if used correctly, inhalers deliver a smaller amount of the drug directly to the site of action in the lungs, with a faster onset of effect and with reduced systemic availability, which minimises adverse effects. Despite this being the preferred method of efficient delivery of medication to the lungs, evidence suggests that many people are unable to use their inhalers effectively.

**Common errors**

In most cases, incorrect inhaler technique can be resolved with simple recommendations that can improve the administration and effectiveness of the drug. This can help to avoid the following common errors:

- **Not shaking the inhaler device before use**
- **When the canister of an aerosol device is pressed, a volume of liquid is released into the inhaler’s nozzle, which then rapidly evaporates to produce the aerosol ‘mist’.**

  - If the contents of the canister – both the propellant and the medication – are not mixed thoroughly, then too much or too little of one component will be released.
  - **Not shaking the canister properly can lead to inconsistent dosing and poorly functioning inhalers.**
  - All aerosol inhalers, such as metered dose inhalers (MDIs), should be shaken before use.

- **Using an aerosol device that isn’t working properly**
  - The patient should check that the spray is functioning correctly before using it for the first time or if they have not used it for a while (usually five to seven days).
  - The protective cap should be removed, the inhaler shaken and sprayed twice into the air.

- **Not breathing out before inhaling**

  - Breathing out fully, or as much as is comfortable, reduces the amount of air in the airways and increases the available space for air from the next breath.
  - The result is a deeper than normal inhalation, maximising the chance to carry all of the medication to the site of action. It is important that people don’t breathe out into the inhaler, as this may introduce moisture into the device or disperse the powder if it’s a dry powder inhaler (DPI), both of which will reduce the clinical effect.

- **Incorrect positioning of the patient and DPI inhaler**

  - Patients should be instructed not to hold a DPI with the mouthpiece pointing downwards during or after the loading of a dose as the drug can escape. It should be kept horizontal or upright.

  - Patients should keep their chin up or head slightly tilted back when using the inhaler.

- **Incorrect co-ordination of MDI actuation and inhalation**

  - To deliver the medication to the lungs, the patient must coordinate breathing in with pressing the canister.
  - Starting to breathe in too early can mean the breath in has finished before the canister has been pressed, particularly if the inhalation is very fast. The result is the medication is deposited into the mouth, with little or none
reaching the lungs. The time between pressing the canister and the final part of the medication leaving the inhaler device is less than half a second, so any delay between pressing the canister and starting to breathe in means that lung deposition is significantly reduced as the aerosol will already have been released.

In both cases, the risk of local side effects is increased. Training aids are available which can be used to encourage slow inhalation with MDI devices. Alternatively, using a spacer device or breath-actuated inhaler will help to overcome this problem.

- **Delay in inhaling the drug through a spacer device**
  Medication stays suspended in the inner surface of the device and dose is deposited onto the spacer, a proportion of the dose immediately after loading the spacer, a proportion of the dose is deposited onto the inner surface of the device and is therefore lost.

- **Inspiratory flow** — breathing too quickly or too slowly
  The total lung deposition of an inhaled drug is strongly affected by the speed of inhalation and the required speed varies depending on the type of inhaler used. Aerosols such as MDIs need a slow and steady inhalation to increase lung deposition. DPIs require a quick and deep inhalation to generate a large internal turbulent force to break up the formulation and optimise the particle size and lung deposition. The inhalation should be forceful from the start of inhalation.

- **Not continuing to breathe in after pressuring the canister**
  Inhaling deeply maximises the opportunity for the drug particles to reach the small airways. If no additional air is inhaled, the drug will remain in the larger airways, limiting its effect. Patients should therefore continue to breathe in after pressing the canister.

- **Not holding the breath after inhalation**
  Holding the breath increases lung deposition through the process of sedimentation, meaning the air is still enough for the drug particles to settle on the surface of the lungs. A 10 second breath is thought to be ideal, but if this is not possible, encourage the patient to hold for as long as is comfortable after inhaling.

- **Multiple actuations without waiting in between**
  Very rapid actuations can reduce the dose delivered per actuation, limiting the drug’s effectiveness. However, salbutamol MDIs can be actuated immediately after the required breath holding for 10 seconds without affecting the dose delivered. Patients should be advised according to the type of inhaler they use.

- **Using an empty inhaler**
  Patients frequently fail to detect when their inhaler is empty, particularly when using reliever MDIs. They should therefore be encouraged to regularly check their inhalers to ensure there is a sufficient amount of the drug remaining to be effective.

### Improving inhaler technique

**Training of patients by health professionals** has been shown to be an effective means of improving inhaler technique and should be repeated at regular intervals. It is essential that those providing the training are themselves able to demonstrate correct technique for each inhaler type. This ensures patients understand the right steps for their own inhaler. Pharmacy technicians can use the checklist of step-by-step instructions outlined in Table 1 to achieve optimal inhaler technique.

**How to engage with patients**

When assisting patients using inhaler treatments, you should:

- Introduce yourself to the patient
- Ask the patient if they have any questions or concerns about their medicine and the steps to deliver optimal dose of the drug to their lungs

Inhaler technique must be re-checked and education reinforced regularly in order to maintain optimal delivery of the drug.

### Education is key

The NICE guideline for people with chronic obstructive pulmonary disease and the British Thoracic Society guideline for asthma both recommend that prior to prescribing a new inhaler, the patient should receive training and education in the use of the device.

Inadequate inhaler technique will lower drug deposition to the lungs, waste medication and may lead to poor disease control, reduced quality of life, increased emergency hospital admissions and higher treatment costs.

Pharmacy technicians can really make a difference in this area by ensuring that every patient with an inhaler knows how to use their device correctly, either by providing training or by referring to a pharmacist.

### Table 1: 7 steps to success: inhaler technique reminder checklist

| Step 1 | Prepare the device. Remove the mouthpiece cover, open the device and hold the inhaler upright |
| Step 2 | Prepare the dose. Shake all aerosols and Easyhaler devices and load dose for DPIs |
| Step 3 | Breathe out gently as far as is comfortable (not into the inhaler) |
| Step 4 | Put the mouthpiece in the mouth and close lips around it |
| Step 5 | Breathe in. Check the coordination of breathing and actuation of MDI. Think about the type of inhaler device – is it an aerosol device or DPI? Breathe in slowly and steadily for all aerosol devices, including through a spacer device. Use a training aid if necessary |
| Step 6 | Breathe in quickly and deeply for all DPIs |
| Step 7 | Repeat dose (if applicable) and replace mouthpiece cover or close device |

### USEFUL RESOURCES:

- 7 steps to success: inhaler device reminder cards are designed for healthcare professionals to use with patients and can be purchased from: simplestepseducation.co.uk
- The Greater Manchester Inhaler Technique Improvement Programme has created a series of videos and podcasts about inhaler technique. See: wires.wessexahsn.org.uk/video-series/inhaler-technique
- Guides on the Electronic Medicines Compendium website: medicines.org.uk/guides/pages/how-to-use-your-inhaler-videos
- More information and resources are available from Asthma UK: asthma.org.uk

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