

## The importance of correct inhaler technique

Incorrect inhaler technique can result in poor treatment outcomes for people with asthma.<sup>1,2</sup> Errors can lead to poor compliance, treatment failure, exacerbations, unnecessary medical interventions and escalation of therapy.<sup>1-4</sup> Correct inhaler technique is essential to maximise the benefits of available treatments and improve treatment outcomes.<sup>5</sup> Healthcare professionals (HCPs) play a vital role in helping patients use their inhalers effectively.<sup>3,6,7</sup> However, guidance on correct technique is often based on local habits, with limited clinical evidence, and many clinicians are unable to demonstrate correct inhaler technique.<sup>1,8,9</sup>

This feature article is based on insights from the Aerosol Drug Management Improvement Team (ADMIT) that evaluated current literature supporting the most common beliefs for correct inhaler use, and addresses the importance of patient education to improve inhaler technique.<sup>1</sup>

### Is there evidence to support some of the most common inhaler techniques?

This table summarises ADMIT's conclusions on several common inhaler beliefs.<sup>1</sup> These conclusions are based on the current clinical evidence; in several cases, more research is needed.<sup>1</sup>

Common belief <sup>1</sup>	Supporting data <sup>1</sup>	Panel conclusion <sup>1</sup>
<b>Claims with SUBSTANTIAL supporting evidence</b>		
<b>Spacer design and construction make a difference</b>	Plastic spacers may accumulate electrostatic charge and make the drug unavailable for inhalation. Metal spacers do not have this problem.	<b>True: Spacers should not be considered interchangeable.</b>  Metal spacers do not need priming and plastic spacers may become more efficient after priming.
<b>Moisture can negatively impact DPI effectiveness</b>	All powder formulations are sensitive to humidity and dispersion of fine particles is impaired by moisture.	<b>True: Patients should not blow into their DPIs and should store them in a dry place.</b>  Future studies should investigate if ambient humidity has clinical consequences in patients using inhaled medications.
<b>Regular and proper use of inhalers improves asthma outcomes</b>	Incorrect technique and irregular use of inhaled medication are common causes of poor asthma control.	<b>True: ADMIT advises that HCPs should regularly check technique and use.</b>  Future studies should investigate if poor inhaler technique and poor adherence coexist in patients and how they interact to influence treatment outcomes. A novel INCA™ device can be an effective tool to help monitor adherence and technique. <sup>10,11</sup>
<b>Claims with a LACK of supporting evidence</b>		
<b>pMDIs should be shaken</b>	Drug formulation determines the importance of shaking the device pre-inhalation.  Most modern pMDIs contain drug particles in a 'true solution' that does not require shaking.	<b>True for some inhalers but NOT ALL: The use of hydrofluoroalkane-propelled drugs in a true solution in pMDIs removes the need to shake the device. However, this is not the case for all drugs.</b>  <b>In the absence of clinical evidence, patients should continue to shake pMDIs, but should not shake/invert DPI devices after priming.</b>
<b>Breath holding after inhalation is clinically beneficial</b>	Breath holding after inhalation from a pMDI may increase drug deposition in the airways by	<b>Insufficient evidence to confirm: No studies have identified any long-term therapeutic effect of breath holding.</b>

	increasing the time during which the drug is in contact with the surface of the bronchial or alveolar epithelium before it is exhaled.	<b><i>Until further evidence becomes available, all patients should be advised to breath-hold for ≥5 seconds.</i></b>
<b>Mouth rinsing after inhalation is clinically beneficial</b>	Patients are advised to ‘rinse and spit’, to reduce residual drug from being deposited in the throat.	<b><i>False: Mouth rinsing can reduce residual drugs from being deposited in the oropharynx but there is no clear evidence that it influences drug bioavailability, or reduces oral thrush or tooth decay.</i></b>
<b>Using a single-inhaler design to deliver different inhaled drugs improves clinical outcomes</b>	As the techniques for using pMDIs and DPIs differ substantially, it is logical to hypothesise that patients who use different devices may be more prone to handling errors.	<b><i>Insufficient evidence to confirm:</i></b> Based on evidence, a single type of device should be used for regular (preventer) inhaled medication, whenever possible.  There is evidence to show that keeping the same design can reduce inhaler errors and improve compliance; however, <b><i>evidence linking this to positive clinical effects is limited.</i></b>
<b>Patients using an inhaler they prefer have better outcomes</b>	Several considerations need to be considered when prescribing inhalers, e.g. patient preference, ability to use the device, availability of the drug in each device and potential costs or reimbursements.	<b><i>Insufficient evidence to confirm:</i></b> Patient satisfaction should be assessed during reviews with HCPs, changing the device if appropriate.  <b><i>Evidence to support whether asthmatic patients’ satisfaction with their inhaler is associated with improved disease control is limited.</i></b>
<b>Dysphonia is caused by particular inhalers and changing the device may relieve it</b>	Dysphonia can be a side effect of using inhaled corticosteroids (ICS), and HCPs may consider changing the device to address this issue.	<b><i>Insufficient evidence to confirm:</i></b> Dysphonia is a recognised side effect of ICS, but its relationship to a particular device is unclear.  <b><i>There is a lack of data to support changing the inhalation device to address this issue.</i></b>

DPI = dry powder inhaler; INCA = Inhaler Compliance Assessment; pMDIs = pressurised metered-dose inhaler

### ADMIT concluded that inhaler technique is important

In controlled settings, studies have shown that all inhalers are equally capable of delivering an appropriate medication dose.<sup>12</sup> However, in daily use, many patients make multiple inhalation errors.<sup>3,12–15</sup> Several errors in inhaler technique are critical and have been shown to directly impact asthma outcomes.<sup>14</sup> Training in correct inhaler technique to reduce key critical errors should be a focus for improved asthma management.<sup>14</sup>

Although evidence of the short-term benefits of training interventions has been shown in clinical studies, improvements can decline over time.<sup>5,12</sup> An association between technique and asthma control has been shown, with increasing numbers of errors in technique decreasing the likelihood of achieving asthma control.<sup>16</sup> It is recommended that inhaler technique and use should be regularly reviewed by HCPs during patient consultations.<sup>16</sup>

### The importance of regularly reviewing inhaler technique with patients

Most people who have incorrect technique are unaware they have a problem.<sup>3</sup> A Cochrane review found face-to-face training was the most beneficial method for improving quality of life and asthma control.<sup>17</sup> GINA guidelines recommend that inhaler technique should be checked at every opportunity and observed in person rather than relying on feedback alone.<sup>3</sup>

Improving technique is essential to help optimise the quality of care for people with asthma.

## References

1. Levy ML, et al. Inhaler technique: facts and fantasies. A view from the Aerosol Drug Management Improvement Team (ADMIT). *NPJ Prim Care Respir Med* 2016;26:10617.
2. Darbà J, et al. Identification of factors involved in medication compliance: incorrect inhaler technique of asthma treatment leads to poor compliance. *Patient Prefer Adherence* 2016;10:135–145.
3. GINA. 2017 GINA Report, Global Strategy for Asthma Management and Prevention. 2017. Available from: <http://ginasthma.org/2017-gina-report-global-strategy-for-asthma-management-and-prevention/>. (accessed May 2017).
4. Melani AS, et al. Inhaler mishandling remains common in real life and is associated with reduced disease control. *Respir Med* 2011;105:930–938.
5. Murphy A. How to help patients optimise their inhaler technique. *The Pharmaceutical Journal*. 2016. Available from: <http://www.pharmaceutical-journal.com/learning/learning-article/how-to-help-patients-optimize-their-inhaler-technique/20201442.article> (accessed May 2017).
6. Manfrin A, et al. A cluster randomised control trial to evaluate the effectiveness and cost-effectiveness of the Italian medicines use review (I-MUR) for asthma patients. *BMC Health Serv Res* 2017;17:300.
7. Cain WT, et al. The ability of the community pharmacist to learn the proper actuation techniques of inhaler devices. *J Allergy Clin Immunol* 2001;108:918–920.
8. European Academy of Allergy and Clinical Immunology (EAACI). Global atlas of asthma. 2013. Available from: <http://www.eaaci.org/GlobalAtlas/Global Atlas of Asthma.pdf> (accessed May 2017).
9. Hanania NA, et al. Medical personnel's knowledge of and ability to use inhaling devices. Metered-dose inhalers, spacing chambers, and breath-actuated dry powder inhalers. *Chest* 1994;105:111–116.
10. Sulaiman I, et al. A new clinically relevant method of calculating adherence. *Eur Respir J* 2015;46:PA3932.
11. Sulaiman I, et al. Irregular and ineffective: a quantitative observational study of the time and technique of inhaler use. *J Allergy Clin Immunol Pract* 2016;4:900–909.
12. Klijn SL, et al. Effectiveness and success factors of educational inhaler technique interventions in asthma & COPD patients: a systematic review. *NPJ Prim Care Respir Med* 2017;27:24.
13. Bartolo K, et al. Predictors of correct technique in patients using pressurized metered dose inhalers. *BMC Pulm Med* 2017;17:47.
14. Price DB, et al. Inhaler errors in the CRITIKAL study: type, frequency, and association with asthma outcomes. *J Allergy Clin Immunol Pract* 2017; [ePub ahead of print].
15. Molimard M, et al. Assessment of handling of inhaler devices in real life: an observational study in 3811 patients in primary care. *J Aerosol Med* 2003;16:249–254.
16. Giraud V & Roche N. Misuse of corticosteroid metered-dose inhaler is associated with decreased asthma stability. *Eur Respir J* 2002;19:246–251.
17. Normansell R, et al. Interventions to improve inhaler technique for people with asthma. *Cochrane Database Syst Rev* 2017;3:CD012286.