

National Asthma Council Australia update for health professionals – New stickers for inhalers

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Asthma and chronic obstructive pulmonary disease (COPD) are common respiratory conditions with a significant burden of disease. An estimated 2.7 million (11%) people in Australia report having asthma. COPD affects around one in seven adults over the age of 40 years in Australia and rises to 29% among people aged 75 years and older.^{1,2}

Optimal management of asthma and COPD requires non-pharmacological and pharmacological strategies to optimise function through symptom relief and reduce the risk of exacerbations. The mainstay of pharmacological treatment is inhaled therapy with bronchodilators and corticosteroids delivered via pressurised metered dose inhalers (pMDIs), breath-actuated (BA)-pMDIs, soft mist inhalers (SMIs) and dry powder inhalers (DPIs).

Choosing the right device for the individual patient is crucial to ensuring correct technique and improving the likelihood of good adherence to therapy.³ Inhaler devices vary widely with regard to technique, patient suitability and patient preference.³ Optimal inhaler technique is critical to optimal disease outcomes. Up to 94% of patients do not use their inhaler device correctly, resulting in inadequate dosing, suboptimal disease control, worsening of quality of life, and increased hospital admissions and mortality.⁴ Older age, cognitive impairment, multiple devices and lack of previous training are all risk factors for poor inhaler use and adherence.⁵

Inhaler device technique should be assessed and optimised at every opportunity.¹ Inhaler device polypharmacy should be minimised by use of single-inhaler dual and triple therapy, where possible.

Inspiratory flow rate

A number of device-related factors influence aerosol deposition in the airways, including particle size, aerosol velocity and duration, expiration prior to inhalation, inspiratory flow rate and volume, internal resistance of inhaler and duration of breath-hold.⁶

A common error with all inhalers involves incorrect inspiratory flow rate.⁷ The patient's inspiratory volume and flow rate are important patient-related factors influencing aerosol deposition in the airways. Each inhaler device has its own unique optimal peak inspiratory flow rate (PIFR).⁸

For pMDIs, BA-pMDIs and SMIs, inspiratory flow rate should be about 30 L/min to minimise deposition in the oropharyngeal area and enhance delivery to the lungs.⁹ Most people inhale far too quickly using pMDIs. The inspiratory flow rate for pMDIs should be slow, steady and deep over 3-5 seconds for adults and 2-3 seconds for children to minimise deposition in the upper airways and enhance delivery to the lungs.⁹

For DPIs, 60 L/min is generally accepted to be optimal for most DPIs.¹⁰ Children and older adults may have trouble reaching this inspiratory flow rate; however, most patients with COPD are able to generate inspiratory flows necessary for effective DPI use.¹¹

Although the optimal flow rate differs between each DPI device due to differences in inhaler design and internal resistance, the principle remains the same for all – a quick and forceful inhalation over 2-3 seconds is required to deagglomerate the active ingredient powder from carrier powder (usually

lactose) and aerosolise the particles.⁹ It is important that the inspiratory flow rate at the start of the inhalation is forceful, rather than gradually increasing.¹²

The internal resistance of DPIs vary, requiring different inspiratory effort to produce sufficient flow rate.¹³ With low resistance devices, patients must inhale faster to generate the power to separate the active ingredient molecules, which may be difficult in patients with poor lung function.¹⁴ Low resistance DPIs (e.g. Breezhaler) require a minimal inspiratory flow rate of >90 L/min, whereas medium-resistance DPI (e.g. Turbuhaler, Genuair, Spiromax, Easyhaler) require 50-60 L/min, and < 50 L/min for a high-resistance DPI.¹⁵ High resistance devices (e.g. Handihaler) do not require a patient to inhale as fast, so most patients can effectively use these DPIs regardless of age and disease severity.¹⁴

An In-Check Dial is a hand-held device with an adjustable dial to mimic the internal resistance of different inhalers. It can be used to identify suboptimal PIFR and help with inhaler device selection and technique training.⁸

The National Asthma Council Australia in collaboration with PSA has developed supplementary labels to be affixed to inhalers in addition to the dispensing label.

Pharmacists are encouraged to assess and correct inhaler technique at every opportunity. Using these stickers may enable a different starting conversation with the patient. APF26 has a new section on inhalers, detailing the steps for different types of inhalers.

Aerosol			Dry Powder inhaler (DPI)		
Pressurised metered dose inhaler (pMDI)	Breath-actuated pMDI	Soft Mist Inhaler (SMI)	Single dose DPI – capsule	Single dose DPI – blister	Multidose DPI - reservoir
Aerosphere	Autohaler	Respimat	Breezhaler	Accuhaler	Easyhaler
Metered dose inhaler			HandiHaler	Ciphaler	Genuair
Rapihaler			Zonda	Ellipta	Spiromax
					Turbuhaler
INHALE SLOW and STEADY 130			INHALE QUICK and DEEP 131		

Asthma inhaler information cards are also available to help with appropriate selection of labels. A QR code on the card links to the [NAC videos](#) on inhaler technique.

The stickers and cards are now available from Stirling Fildes at stirlingfildes.com.au:

- [Supplementary label stickers](#)
- [Information cards](#)

Summary

Selection of the right inhaler is important to ensure that patients with respiratory diseases get the most benefit from their treatment. Pharmacists should check and correct inhaler technique at every opportunity. Incorrect inspiratory flow rate is a common and critical error. Pharmacists now have a useful resource to remind patients of the correct inspiration technique when they use their inhalers.



¹ Yang I, Dabscheck E, George J, et al. The COPD-X Plan: Australian and New Zealand Guidelines for the management of chronic obstructive pulmonary disease. Version 2.72, October 2023.

² Toelle BG, Xuan W, Bird TE, et al. Respiratory symptoms and illness in older Australians: The Burden of Obstructive Lung Disease (BOLD) study. *Med J Aust* 2013;198:144-148.

³ Dekhuijzen R, Lavorini F, Usmani OS, van Boven JFM. Addressing the impact and unmet needs of nonadherence in asthma and chronic obstructive pulmonary disease: where do we go from here? *J Allergy Clin Immunol Pract* 2018;6:785-793.

⁴ Lavorini F, Magnan A, Dubus JC, et al. Effect of incorrect use of dry powder inhalers on management of patients with asthma and COPD. *Respir Med* 2008;102:593-604.

⁵ Usmani OS, Lavorini F, Marshall J, et al. Critical inhaler errors in asthma and COPD: a systematic review of impact on health outcomes. *Respir Res* 2018;19:10.

⁶ Capstick TG, Clifton IJ. Inhaler technique and training in people with chronic obstructive pulmonary disease and asthma. *Expert Rev Respir Med* 2012;6:91-103.

⁷ Price DB, Román-Rodríguez M, McQueen RB, et al. Inhaler Errors in the CRITIKAL Study: Type, Frequency, and Association with Asthma Outcomes. *J Allergy Clin Immunol Pract*. 2017;5(4):1071-1081.

⁸ Ghosh S, Pleasants RA, Ohar JA, et al. Prevalence and factors associated with suboptimal peak inspiratory flow rates in COPD. *Int J Chron Obstruct Pulmon Dis* 2019;14:585-595.

⁹ Laube BL, Janssens HM, de Jongh FHC, et al. What the pulmonary specialist should know about the new inhalation therapies. *Eur Respir J* 2011;37:1308-1331.

¹⁰ Mahler DA. Peak inspiratory flow rate as a criterion for dry powder inhaler use in chronic obstructive pulmonary disease. *Ann Am Thorac Soc* 2017;14(7):1103-1107.

¹¹ Clark AR, Weers JG, Dhand R. The Confusing World of Dry Powder Inhalers: It Is All About Inspiratory Pressures, Not Inspiratory Flow Rates. *J Aerosol Med Pulm Drug Deliv* 2020;33(1):1-11.

¹² Chrystyn H. Is inhalation rate important for a dry powder inhaler? Using the In-Check Dial to identify these rates. *Respir Med* 2003;97(2):181-187.

¹³ Ciciliani A, Langguth P, Wachtel H. In vitro dose comparison of RespiMat[®] inhaler with dry powder inhalers for COPD maintenance therapy. *Int J Chron Obstruct Pulmon Dis* 2017;12:1565-1577.

¹⁴ Capstick T, Gudimetla S, Harris D, et al. Demystifying dry powder inhaler resistance with relevance to optimal patient care. *Clin Drug Investig* 2024;44(2):109-114.

¹⁵ Lavorini F, Fontana GA, Usmani OS. New inhaler devices-the good, the bad and the ugly. *Respiration* 2014;88(1):3-15.