



Shared decision making for greener healthcare: Guidance on making safe and clinically appropriate changes to inhalers

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Inhalers for the delivery of respiratory medications have transformed the care of patients with respiratory disease, delivering medications exactly where they are needed and, in emergency situations, undoubtedly saving countless lives. However, their contribution to environmental pollution in terms of propellant gases and also as single use plastic devices has made them an important focus for efforts to reduce the environmental impact of the NHS. In this article we discuss how to incorporate environmental considerations when selecting inhaler devices for patients newly diagnosed with respiratory disease. We also consider how to safely change to inhalers with a lower environmental burden when clinically appropriate and how to support patients in making the decision to change.

Pressurised metered dose inhalers (pMDIs) have, since the 1990s used hydrofluoroalkane (HFA) propellant gases to enable the delivery of respiratory medicines to the lungs. However, the use of HFA propellants contributes to global warming, and the two most commonly used HFA propellants, HFA 134a and HFA227a are 1,300 times and 3,300 times, respectively, more potent than CO₂ as global warming agents. The NHS Sustainability Development Unit (SDU) estimates that 4% of NHS greenhouse gas emissions are accounted for by inhaler usage, and 3% of overall greenhouse gas emissions in the UK are accounted for by NHS activity. The Government's Environmental Audit Committee (EAC), in their 2017 scrutiny of F-gases, recommended a 2022 NHS target for 50% of all inhalers to be of 'low global warming impact', as well as an increase in the recycling of used inhalers with residual F-gas propellants to 50% of all those prescribed.¹ The NHS SDU inhaler taskforce has recommended more moderate targets to reduce the carbon footprint of NHS inhalers by 50% by 2030.

Against this background there is a clear argument for moving away from inhalers that utilize HFA propellants with high global warming potential (GWP) to alternatives that use low GWP propellants or no propellant gases at all. Propellant-free inhalers such as dry powder inhalers (DPIs) and soft mist inhalers (SMIs) do not contain HFC propellants, so from this perspective have no global warming potential in comparison to traditional pMDIs. These inhalers still incur environmental costs in relation to their production and disposal.² Current inhalers are designed as single use devices and we lack an effective national recycling scheme.

Strategies to exclude pMDIs or 'blanket switching' of patients from one inhaler type to another in a practice or an area are not patient-centred. There is clear evidence that this is not good practice.³⁻⁵ How then should we support patients in selecting inhalers that will effectively deliver the medication they require while minimising environmental impact?



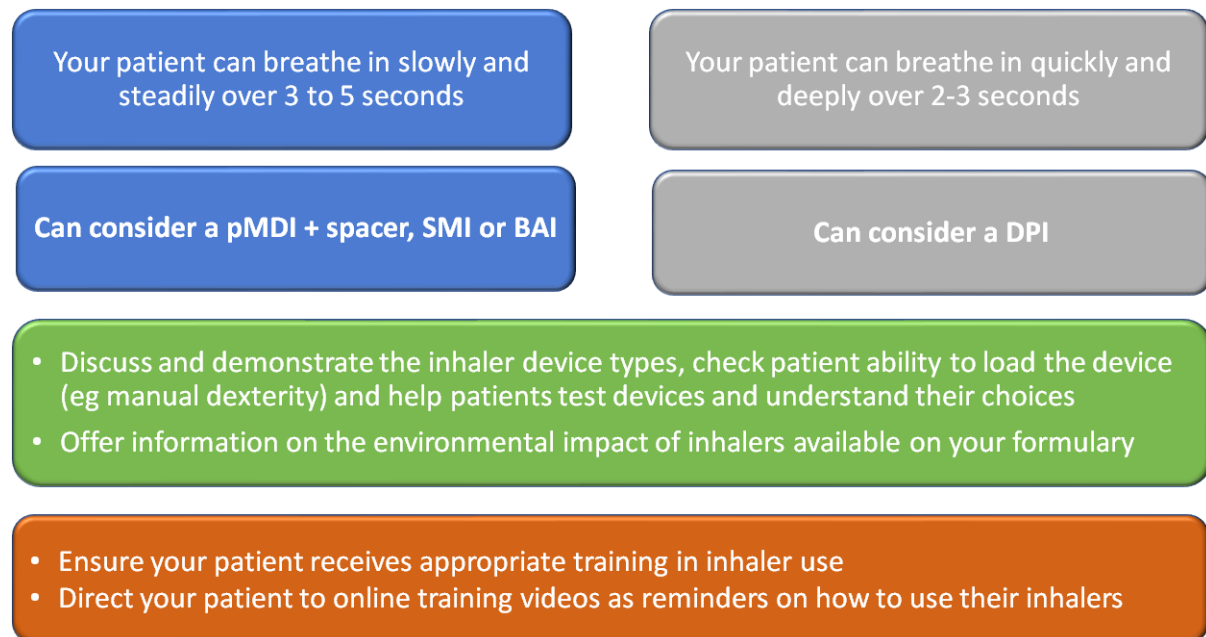
New inhaler prescriptions for maintenance respiratory medications

When starting inhaled treatments, consideration should be given to the clinical appropriateness of devices without propellant gases.⁶ The decision should always be made in partnership with patients (**Figure 1**). It is they who will be using the device on a daily basis, and for some patients environmental considerations may be an important part of the decision process.^{3,7} We need to ensure that patients can make fully informed choices. Get to know the GWP of inhalers on your local formulary, for example, by using the information compiled by Dr Alex Wilkinson (<https://greeninhaler.org/inhaler-comparison/>) and that provided by RightBreathe (<https://www.rightbreathe.com/>). It is possible to reduce propellant use even when a pMDI is considered to be an appropriate choice. For example, for a patient who requires beclomethasone 200 µg twice daily, select an inhaler that delivers 200 µg as a single dose rather than an inhaler that deliver 100 µg per dose. However, be aware that the 200 mcg dose is not licensed in children. In this way propellant use is halved. Careful consideration to alternative choices should be made before selecting an inhaler that uses HFA227a as the propellant gas.

DPIs and SMIs should be considered where such devices are acceptable to the patient and have the same efficacy and safety profile for an individual patient.³ Patients for whom a DPI could be considered includes all patients with adequate inspiratory capacity. SMIs require minimal inspiratory effort and so could be potentially considered for those patients with poor inspiratory capacity. Patients for whom a pMDI would be more appropriate include those requiring a spacer device, such as children, or those with low inspiratory capacity. A pMDI with a spacer or an SMI may be more appropriate for some elderly patients who may have difficulty with the quick/fast inspiratory effort needed for DPIs. For pMDI alone there may be an inability to co-ordinate (press and breath manoeuvre) for many so alternative choices should be explored.

Different DPIs have different inspiratory flow requirements (Keeley et al 2020).⁶ Inspiratory flow check devices are available and can be used to decide whether a patient has sufficient inspiratory flow to use a DPI. Alternatively, a placebo device that has an indicator such as a whistle can be helpful in making this judgement. If neither of these options are available, remote or face-to-face assessment may be useful. To effectively use a DPI, patients must be able to inhale quickly and deeply so by asking patients to empty their lungs and inhale quickly and deeply over 2–3 seconds a judgement can be made. For a pMDI or SMI, after emptying the lungs a patients should ideally be able to inhale slowly and steadily over 3 to 5 seconds. These assessments should ideally be conducted by a skilled clinician with expertise in teaching/coaching inhaler technique.⁸

Figure 1. Simple algorithm for the selection of inhalers for respiratory medications



Changing inhalers when clinically appropriate

Changing inhalers for the delivery of respiratory medications requires careful review of the patients current condition. Blanket switching of inhalers without patient engagement in the decision process has the potential to worsen disease control and should be avoided.⁹ The decision should always be made within the context of delivering optimal care for the individual patient with the goal of ensuring the right device for the right patient. Ultimately the decision should be that of the patients when clinical choices are equal and they should be supported to make a decision that is appropriate to them and receive support and training on the appropriate use of any new inhaler device.

For patients whose condition is stable, the regular review consultation is an opportunity to consider inhaler choice. Whether the discussion has been initiated by the patient or not, changing inhalers should only be considered where the change is clinically appropriate, safe and acceptable to patients.⁷ Online video resources such as those provided by Asthma Research UK can be used to help patients master the new skills required (<https://www.asthma.org.uk/advice/inhaler-videos/>).

Changing an inhaler may also be considered for patients whose disease control is poor. However, this should only be considered when a full review of the patients inhaler technique has been undertaken. Adherence to maintenance treatment and monitoring uptake and appropriate use of spacer should be assessed. Poor inhaler technique and adherence to the prescribed maintenance medication regimen can result in over reliance on reliever medication in asthma. People with asthma should be using no more than 4 canisters of SABA in a year and ideally no more than 2 canisters. Any more than this is an indicator of poor disease control and an increased risk for potentially life-threatening exacerbations. If improvements have still not been achieved through interventions such as inhaler technique training and you are confident the patient is taking their medication as directed, then an alternative inhaler device can be discussed first exploring a person's ability to use a device and then factoring in GWP of any new inhaler included as part of the decision-making process. It is

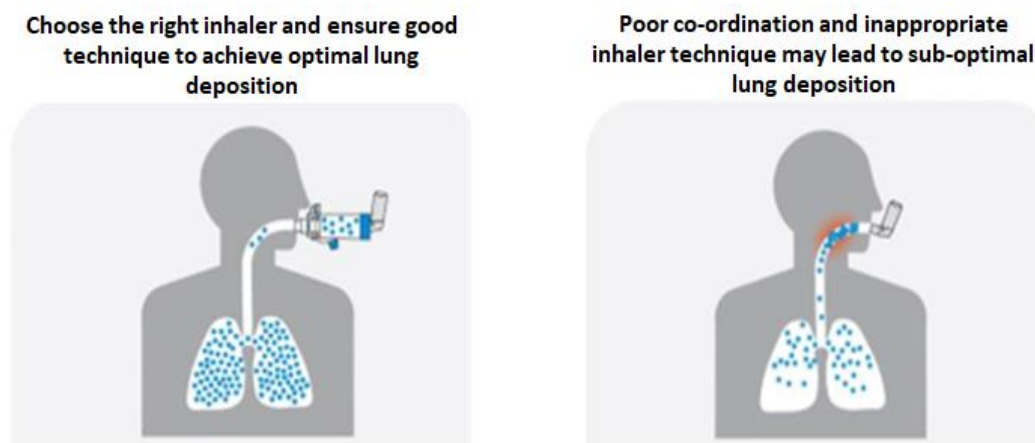
important to be clear for patients with poor disease control, the focus should be on improving the clinical situation for the patient.

Changing inhalers should not be considered for patients where dexterity, cognitive or other physical issues that may increase the risk for poor adherence or poor inhaler technique with an alternative device. Once again, the focus should be on optimising the clinical situation for the patient.

Optimising inhaler use

When an inhaler is prescribed the patient should be fully supported in learning to use the device correctly and effectively. The prescribing clinician should have the skills both to train patients in correct inhaler technique and in reviewing technique and spotting errors. Appropriate inhaler technique ensures delivery of medication to the lungs; poor co-ordination or inappropriate technique may lead to sub-optimal lung deposition (**Figure 2**).

Figure 2. The importance of appropriate inhaler technique
[Image copyright Trudell Medical International]



Considering wider aspects of the care of patients with respiratory disease helps improve outcomes and avoid waste. Early and accurate diagnosis by competent clinicians is vital for the best use of medications and reduces the need for travel to unnecessary appointments.

Correct use of regular preventer treatment in asthma and of long-acting bronchodilators in COPD improves outcomes and greatly reduces the need for short acting bronchodilators.

Ensuring patients have the skills to use their inhaler effectively and appropriately should be a fundamental component of all new prescriptions and an integral part of all regular review consultations.

A holistic approach to care that encourages patients to engage with high value non-pharmacological treatments and more general self-care helps to promote general well-being and symptom control.



Utilising the wider multi-disciplinary team is essential to support patients and optimise the use of respiratory medicine. For example, many community pharmacy teams have the skills required for inhaler technique coaching as part of the New Medicines Service. Community pharmacists are ideally placed to educate patients to ensure their inhalers are empty before they are disposed of and encourage patients to return their empty inhalers for safe disposal.

pMDIs in emergency situations

pMDIs continue to play an important, potentially life-saving, role in respiratory emergencies and this role must be recognised and protected.^{6,10} When patients have deteriorating control of their respiratory condition, they may lack the inspiratory effort required to deliver sufficient quantities of the medicine in a DPI for adequate drug deposition. In this situation, pMDI with spacer helps maximise the delivery of the medicine to the lungs (see our position statement on emergency care packs <https://www.pcrs-uk.org/resource/emergency-mdi-and-spacer-packs-asthma-and-copd>). When and how to use inhaled medications in attacks should be recorded in a self-management plan that has been co-created with the patient.

While use in emergency situations accounts for only a very small proportion of current usage of SABA pMDIs, 83% of the 9.24 million SABA pMDIs prescribed each year are not being used as intended in people with asthma – i.e. for emergency use only.¹¹

For the future

Respiratory medicines delivered via inhaler devices and spacers where appropriate will continue to be a fundamental part of the care for patients with a range of respiratory diseases. Minimising the environmental impact of inhalers is an important part of ensuring a sustainable future for us all. For patients who are using a pMDI and express a concern or guilt about the impact they may be having on the environment, it is important clinicians put their minds at ease, highlight that about 4% of NHS greenhouse gas emissions are accounted for by inhaler usage and the device that has been chosen is the right one for them. Current low levels of return of inhalers to pharmacies for safe disposal continues to result in a considerable amount of plastic and metal going into landfill and in the environmentally harmful release of HFA propellants. Effective, national-level recycling (rather than safe disposal) schemes are needed. Patients and clinicians should encourage and advocate for inhaler recycling. Increased utilisation of reusable inhalers, such as Respimat, or inhaler components presents a further opportunity for decreasing the environmental impact of inhaled medications. For the longer term, low GWP propellants for pMDIs are in development and these will hopefully reduce the environmental impact of treatment while meeting the needs of patients who need or prefer to use these devices.

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