

Lowering the inhaler carbon footprint – February 2020

Recommendations

- Consider a variety of medicine optimisation projects to lower the inhaler carbon footprint.
- Get or maintain good control of asthma and COPD through reviewing patients regularly and treating in line with [NICE asthma](#) and [COPD](#) treatment pathways.
- Encourage patients to reduce inhaler waste by:
 - Not over-ordering their inhalers
 - Looking after their inhalers
 - Using the correct inhaler technique
 - Returning used or unwanted inhalers to their pharmacy for environmentally safe disposal (except spacers currently).
- Agree local respiratory pathways and formulary which take into account the use of lowest cost lower carbon footprint inhalers (Table 1).
- Children should remain on their inhaled corticosteroid pMDI and spacer combination device. Alternative devices are only recommended where an individual child's adherence to a pMDI and spacer combination is likely to be so poor that it would undermine effective asthma control.¹
- Switch patients using more than one single component pMDI to a combination inhaler where one is available and is suitable for the individual. This will reduce the overall number of inhaler items used and be more convenient for patients.
- When switching to lower carbon inhalers, prioritise the switches which have cost savings or are cost neutral before undertaking the switches which have a cost pressure (Table 2). Inhaler switches should be tailored to the individual.
- Where a new device is used, inhaler technique should be instructed and checked upon commencement.

Background

Hydrofluorocarbons (HFCs) contained in pressurised metered dose inhalers (pMDIs) are powerful greenhouse gases and can contribute to global warming.² Breath-actuated inhalers (BAIs) contain the same propellants as pMDIs and so are assumed to have a similar carbon footprint to pMDIs.² Dry powder inhalers (DPIs) do not contain HFCs and so have a lower carbon footprint than pMDIs and BAIs.² Data on the actual carbon footprint of

individual inhalers is limited. Attachment 1 provides an indicative carbon footprint value for a range of inhalers. The indicative carbon footprint values were produced in accordance with calculations produced by Wilkinson et al.³ Attachment 1 also provides a comparison of inhalers by device type, indications and age range, indicative carbon footprint and costs. The data can be viewed by groupings available under each of the header selectors. This will be of assistance when considering lower carbon footprint inhaler alternatives to pMDIs.

The NHS Long Term Plan outlines environmental commitments in line with the national carbon and air pollution reduction targets⁴. The propellants in pMDIs are responsible for an estimated 3.5% of all NHS emissions and the NHS plans to reduce this by changing to lower carbon inhalers, such as DPIs.²

To support this change, the Primary Care Network (PCN) Directly Enhanced Service (DES) specification for structured medication reviews and medicines optimisation makes a requirement of PCNs to “actively work with their CCG to optimise the quality of prescribing of metered dose inhalers, where a low carbon alternative may be appropriate”.⁵ The specification states that the NHS has committed to reducing the carbon impact of inhalers used in the treatment of respiratory conditions by 50%.⁵ All inhaler prescriptions, Structured Medication Reviews or planned Asthma Reviews taking place in primary care should consider moving or facilitating patients to lower carbon options where it is clinically appropriate to do so.⁵

There is an Impact and Investment Fund indicator (IIF) for pMDI prescriptions as a % of all inhaler prescriptions (excluding salbutamol).⁵ The lower threshold value is 53% pMDIs as a total of all inhaler prescriptions (excluding salbutamol) and the upper threshold value is 45%.³ The current CCG average is 53% (range 41% to 60%) which is the same as the lower threshold value.⁶

NICE has included consideration of the inhaler carbon footprint within the patient decision aid [Inhalers for asthma](#).⁷ Patients can indicate how important it is to them that their inhaler has a low carbon footprint. The aid states that BAIs and pMDI (with or without a spacer used) have a higher carbon footprint than DPIs.⁷ Soft mist inhalers (SMIs) are said to have a lower carbon footprint than a pMDI. Reusing the device with up to 6 refill cartridges further lowers the carbon footprint.⁸ The NICE patient decision aid does not however include SMIs.² This is because the one SMI product currently licensed in asthma Spiriva® Respimat® is an option in only a limited number of people with asthma.²

The “how to use the inhalers” flow chart only directs patients down the pathway to a DPI if they can breathe in through their mouth quickly and deeply within 2 or 3 seconds.⁷ Currently, there is no similar resource for COPD or other respiratory conditions. However, the information on inhaler carbon footprint contained in the asthma patient decision aid could be used with other respiratory patients to explain to them about inhaler carbon footprint.

The practical steps towards lowering the inhaler carbon footprint suggestions below aim to facilitate a reduction in the inhaler carbon footprint taking medicine optimisation principles into account.

Practical steps towards lowering the inhaler carbon footprint

Whilst switching from pMDIs and BAIs to DPIs will reduce the inhaler carbon footprint, there are other measures that can be taken to reduce the volume or environmental impact of pMDIs and BAIs. These include:

- Get or maintain good control of asthma and COPD through:
 - Reviewing patients regularly and treating in line with [NICE asthma](#) and [COPD](#) treatment pathways.
- Switch patients using more than one single component pMDI to a combination inhaler where one is available and is suitable for the individual. This will reduce the overall number of inhaler items used and be more convenient for patients.
- Encourage patients to reduce waste by:
 - Not over-ordering their inhalers
 - Looking after their inhalers
 - Use the correct inhaler technique
 - Return used or unwanted inhalers to their pharmacy for environmentally safe disposal (except spacers currently).
- Agree local respiratory pathways and formulary which take into account the use of lowest cost lower carbon footprint inhalers. Attachment 1 can be used to support decision making. Table 1 lists the current lowest cost lower carbon footprint inhalers within each therapeutic group. These could be considered for medicine formulary inclusion, for new patients or when reviewing current patients.

Table 1 Lowest cost lower carbon footprint inhalers by therapeutic group

Indication ⁹⁻¹¹	Therapeutic group ⁹	Preparation	Indicative carbon footprint per year ³	Indicative cost per year ^{9,11}
Asthma	SABA	Easyhaler Salbutamol 100 microgram DPI	3,900	£19.86
COPD	SAMA	Only ipratropium 20 microgram pMDI available	78,078	£30.42
Asthma/ COPD	LABA	Easyhaler Formoterol 12 microgram DPI	13,650	£144.04
Asthma/ COPD	LAMA	Spiriva Respimat 2.5 microgram SMI	9,464	£279.11
Asthma	ICS	Easyhaler Budesonide DPI 100 micrograms 200 micrograms 400 micrograms	13,650 13,650 6,825	£32.24 £64.48 £64.48
Asthma/ COPD	ICS/LABA	Fobumix Easyhaler DPI 160/4.5 micrograms 320/9 micrograms	13,650	£130.39 £260.91
COPD	LABA/LAMA	Anoro Ellipta 55 micrograms/22 micrograms inhalation powder, pre-dispensed DPI Ultibro Breezhaler 85micrograms/43micrograms inhalation powder hard capsules DPI Spiolto Respimat 2.5 microgram/2.5 microgram, inhalation solution SMI	6,825 6,825 9,464	£394.29
COPD	ICS/LABA/LAMA	Trelegy Ellipta 92 micrograms/55 micrograms/22 micrograms inhalation powder, pre-dispensed DPI	6,825	£539.89

Switch to lower carbon inhaler footprint DPIs or SMI

Any inhaler switches need to be tailored to the individual. Where a new device is used, inhaler technique should be instructed and checked upon commencement. [PrescQIPP inhaler technique videos and leaflets](#) can be used to support this. The inhaler technique instruction could be undertaken by the PCN or other primary care pharmacist or other member of the primary care team. If the patient is going to be prescribed a new medicine as part of the switch, they can also be referred to their community pharmacist for further support utilising the [New Medicine Service](#).

A pMDI plus a spacer is the first line device recommended for children aged five to 15 years requiring an inhaled corticosteroid for chronic asthma.¹ Alternative devices are only recommended where an individual child's adherence to a pMDI and spacer combination is likely to be so poor that it would undermine effective asthma control.¹ Where alternative devices are used, the following factors should be taken into account when choosing inhaler devices for individual children with chronic asthma¹:

- the ability of the child to develop and maintain an effective technique with the specific device
- the suitability of a device for the child's and carer's lifestyles, considering factors such as portability and convenience
- the child's preference for and willingness to use a particular device
- the need to minimise the risks of systemic absorption of corticosteroids

Table 2 provides a summary of potential inhaler switches in adults to reduce the use of pMDIs. The switches listed are for the most frequently used pMDIs or where there are simple cost saving switches available. Salbutamol pMDIs have been excluded as these are excluded from the PCN DES. The table lists whether the switch would involve a change in drug, device, licensed indication or age range and the cost and carbon impact of the switch per year.

Attachment 1 provides an indicative carbon footprint value for a range of inhalers and this may be used to consider switch options for inhalers not listed in table 2. The data can be viewed by groupings available under each of the header selectors.

Table 2 Summary of product switches in adults to reduce the use of pMDIs (excluding salbutamol)

Switch from pMDI	Switch to DPI	Different drug(s)? ⁹ -11	Different device? ⁹ 9-11	Estimated cost impact per year ^{9,11}	Indicative carbon footprint reduction per year (gCO ₂ e) ³	Difference in licensed indication or age range? ⁹⁻¹¹
Switches with a cost saving						
Atimos Modulite 12micrograms/dose inhaler	Formoterol Easyhaler 12micrograms/dose dry powder inhaler	No	Yes	-£74.75	80,990	Formoterol Easyhaler age 6+, Atimos Modulite age 12+
Clenil Modulite 200micrograms /dose	Easyhaler Budesonide 200micrograms/dose inhalation powder	Yes	Yes	-£5.59	60,424	Easyhaler Budesonide age 6+. Clenil Modulite 200micrograms is adults only.
Qvar 100 inhaler	Easyhaler Beclometasone 200micrograms	No	Yes	-£8.32	60,424	Qvar for age 12+, Easyhaler Beclometasone age 18+.
Seretide 125 Evohaler	Seretide 250 accuhaler	No	Yes	-£140.14	224,406	Accuhaler licensed for asthma and COPD. Evohaler licensed for asthma only.
Seretide 250 Evohaler	Seretide 500 accuhaler	No	Yes	-£86.19	224,406	Accuhaler licensed for asthma and COPD. Evohaler licensed for asthma only.
Seretide 250 Evohaler	Airflusal Forspiro 500/50	No	Yes	-£119.86	224,406	Seretide 250 Evohaler licensed for asthma only. Airflusal Forspiro licensed for asthma and COPD.
Seretide 250 Evohaler	DuoResp Spiromax 320/9	Yes	Yes	-£119.86	224,406	Seretide 250 Evohaler licensed for asthma only. DuoResp Spiromax 320/9 licensed for asthma and COPD.
Seretide 250 Evohaler	Relvar Ellipta 184/22	Yes	Yes	-£125.58	231,231	No

Switch from pMDI	Switch To DPI	Different drug(s)? ⁹ -11	Different device? 9-11	Estimated cost impact per year ^{9,11}	Indicative carbon footprint reduction per year (gCO ₂ e) ³	Difference in licensed indication or age range? ⁹⁻¹¹
Cost neutral switches						
Fostair® 100/6 microgram	Fostair NEXThaler® 100/6	No	Yes	£0.00	210,756	No
Fostair® 200/6 microgram	Fostair NEXThaler® 200/6	No	Yes	£0.00	210,756	No
Seretide 50 Evohaler	Seretide 100 accuhaler	No	Yes	£0.00	224,406	No
Switches with a small cost pressure						
Clenil Modulite 50micrograms/dose	Easyhaler Budesonide 100 mcg	Yes	Yes	£1.82	134,498	No lower age limit stated for Clenil Modulite in SPC, BNF states use from 2+. Easyhaler Budesonide is age 6+.
Clenil Modulite 100micrograms /dose	Easyhaler Budesonide 100 mcg	Yes	Yes	£5.20	60,424	No lower age limit stated for Clenil Modulite in SPC, BNF states use from 2+. Easyhaler Budesonide is age 6+.
Qvar 50 inhaler	Easyhaler Budesonide 100micrograms	Yes	Yes	£3.64	60,424	Qvar for age 5+, Easyhaler Budesonide age 6+.
Qvar 100 inhaler	Easyhaler Budesonide 200micrograms	Yes	Yes	£1.82	60,424	Qvar for age 12+, Easyhaler Budesonide age 6+.

Switch from pMDI	Switch To DPI	Different drug(s)? ⁹ -11	Different device? 9-11	Estimated cost impact per year ^{9,11}	Indicative carbon footprint reduction per year (gCO ₂ e) ³	Difference in licensed indication or age range? ⁹⁻¹¹
Other						
Separate ICS, LABA and LAMA inhalers	Trimbow 87 micrograms/5 micrograms/9 micrograms pressurised inhalation, solution, pMDI Trelegy Ellipta 92 micrograms/55 micrograms/22 micrograms inhalation powder, pre-dispensed DPI	Depends on starting inhalers	Depends on starting inhalers	Cost saving Reduces number of pMDIs used	Depends on starting inhalers	Depends on starting inhalers

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