How to move towards more sustainable asthma care in Europe: an expert opinion paper

Christer Janson [1], Alex Wilkinson [2], Hanna Hisinger-Mölkänen [3,4], Bernardino Alcázar Navarrete [5,6], Kai-Michael Beeh[7], Federico Lavorini[8], Hannu Kankaanranta[9,10,11], John Pritchard[12,13,14], Charlotte Suppli Ulrik [15], Aarti Bansal[16], Satu Lähelmä [17] and Lauri Lehtimäki [10,18]

[1]Department of Medical Sciences: Respiratory, Allergy and Sleep Research, Uppsala University, Uppsala, Sweden. [2]East and North Hertfordshire NHS Trust, Stevenage, UK. [3]University of Helsinki, Helsinki, Finland. [4]Helsinki University Central Hospital, Skin and allergy hospital, Helsinki, Finland. [5]Medicine Department, University of Granada, Granada, Spain. [6]Respiratory Department, Hospital Universitario Virgen de las Nieves, Instituto Biosanitario de Granada (ibs.GRANADA), Granada, Spain. [7]insaf Respiratory Research Institute, Taunusstein, Germany. [8]Department of Experimental and Clinical Medicine, University of Florence, Florence, Italy. [9]Krefting Research Centre, Department of Internal Medicine and Clinical Nutrition, Institute of Medicine, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden. [10]Faculty of Medicine and Health Technology, Tampere University, Tampere, Finland. [11]Department of Respiratory Medicine, Seinäjoki Central Hospital, Seinäjoki, Finland. [12]Acu-Flow, Glasgow, UK. [13]Cardiff Scintigraphics, Cardiff, UK. [14]AeroRx Therapeutics, Delaware, DE, USA. [15]Respiratory Research Unit Hvidovre, Department of Respiratory Medicine, Copenhagen University Hospital-Hvidovre, Hvidovre, Denmark. [16]Clinical Net Zero Lead for Humber and North Yorkshire ICB, Kingston upon Hull, UK. [17]Orion Corporation, Espoo, Finland. [18]Allergy Centre, Tampere University Hospital, Tampere, Finland.

Corresponding author: Christer Janson (christer.janson@medsci.uu.se)

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The healthcare sector is one of the primary emitters of greenhouse gases in the public sector; this viewpoint's distillation of expert opinions emphasises what more sustainable asthma care could look like and presents possible solutions to achieving it https://bit.ly/41fQ364

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Introduction

The healthcare sector is one of the primary emitters of greenhouse gases within the public sector [1]. The propellants used in metered-dose inhalers (MDIs) treating for example asthma are powerful greenhouse gases, and account for ~3% of the carbon footprint of the British National Health Service (NHS) [2, 3]. Therefore, asthma is one of the healthcare areas with real potential to contribute to global sustainability work. The European Commission is working on eliminating the use of the dominant greenhouse gases used in the MDI propellant [4], which accelerates the need to move towards more sustainable asthma care. A safe transition towards this can be achieved by driving two main aspects: choice of medication and choice of inhaler type.

Acute exacerbations of asthma and hospitalisations cause significant greenhouse gas emissions through increased medical interventions [5]. Therefore, the choice of asthma medication to achieve good disease control and to avoid exacerbations is the most important factor from both a patient and an environmental point of view. Instead of short-acting relievers, asthma should be treated with maintenance controller medication (inhaled corticosteroids (ICSs) and secondary controllers) to avoid exacerbations.

Treatment results for asthma patients around Europe are worrisome. A study from 2014 showed that out of 8000 European asthma patients, 45% had uncontrolled asthma (according to the Global Initiative for Asthma (GINA) criteria) and 44% reported having used oral steroids for asthma within the previous 12 months [6]. A study from the UK found that patients with good asthma control, as defined by low use of short-acting β_2-agonists (SABA) and no exacerbations, had a carbon footprint that was one-third of that of patients with poorly controlled asthma [7]. Improving asthma control at a population level and reducing exacerbations should be at the forefront of asthma care. Focusing on disease control with effective maintenance therapy (*via* a dry powder inhaler (DPI) where clinically appropriate) can have the co-benefits of reduced symptom burden, reduced risk of exacerbations and reduced greenhouse gas emissions from SABA pressurised MDIs (pMDIs) [8].

The objective of this opinion viewpoint is to emphasise the importance of environmental considerations and discuss possible solutions to some of the identified European-level challenges in sustainable asthma care. It is important to ensure good asthma control when strict environmental regulatory goals are planned and implemented by authorities and patients are being directed from pMDIs to DPIs with a lower carbon footprint [9]. This viewpoint is a distillation of opinions given by the authors during interviews in seven European countries. Patients have not been involved in the writing of this viewpoint; however, it is known that many patients would be willing to change treatment to reduce their carbon footprint [10]. This, however, requires that the alternative is equally effective in obtaining disease control, which is the highest priority for most patients [11]. In the next sections we discuss the dominant themes that impact the wellbeing of European asthma patients and environmental sustainability.

Achieving asthma control: critical for patients and for environmental sustainability

Improving asthma control and moving towards use of controller medications have an important role in reducing the environmental burden of asthma care. Asthma is a chronic condition for the vast majority of patients, especially those diagnosed as adults [12]. However, most patients can reach good asthma control with the help of appropriate medication and good adherence, and clinical remission is now achievable even in some patients with severe asthma [13]. As noted earlier, good asthma control is important not only for the patients but also for the environment [7].

From the sustainability perspective, there is a clear overuse of rescue medication in many European countries with 30–40% of those with asthma using three or more canisters of SABA per year in countries such as Sweden and the UK [14, 15]. GINA recommends ICS in combination with formoterol as the preferred alternative to SABA, due to its ability to reduce the risk of severe exacerbations [9, 16]. This treatment option means that most patients can manage their asthma with only one inhaler, increasing the likelihood that the patient has an optimal anti-inflammatory treatment [17].

To reduce overuse of rescue medication (SABA), healthcare professionals need to be educated on the necessity of ICS-containing combination medications. A successful example of this comes from Finland, where asthma-related hospitalisations were dramatically reduced through a national asthma programme, which modernised asthma care and consequently minimised severe exacerbations and hospitalisations. The adherence to ICS treatment is high and simultaneously the proportion of patients being high users of SABA or SABA-over-reliant is low [18]. The programme implemented systematic and appropriate patient care, educated healthcare professionals on asthma and highlighted the need for regular ICS usage [19, 20].

Inhaler choice: further reducing the carbon footprint

It is important to increase the understanding of differences in emissions between inhaler devices. pMDIs have high carbon footprints due to their fluorinated propellants, which are strong greenhouse gases, while standard DPIs and soft mist inhalers have significantly lower carbon dioxide equivalent (CO_2e) emissions [21]. Although there are different propellant gases and different amounts of propellants in the pMDI devices, all pMDIs have a much bigger carbon footprint than propellant-free devices, such as DPIs and soft mist inhalers [22, 23]. New propellants with lower carbon footprints are being developed, which may decrease the environmental burden of pMDIs in the future [24]. Table 1 provides a comparative overview of the carbon footprint per actuation for three different current inhaler device types.

Systematic changes in prescribing habits should be viewed on a population level, where starting new patients on DPIs or switching appropriate patients from pMDI to DPI could have a significant impact on the overall carbon footprint at the same time as improving disease control. A switch of inhaler should be done in partnership with the patient as an inhaler switch without consent can have negative consequences [25].

TABLE 1 Comparison of the carbon footprints for different types of inhaler

Device type	Propellant	Carbon footprint per actuation, gCO_2e	
		Minimum value	Maximum value
Pressurised metered-dose inhaler	HFA 134a, HFA 227ea	49.35	295
Dry powder inhaler	None	6.13	27
Soft mist inhaler	None	3.83	12.92

gCO_2e: grammes of carbon dioxide equivalent; HFA: hydrofluoroalkane. Information from [21].

Many asthma patients are unable to breath in slowly and steadily enough to have correct inhaler technique for a pMDI, even after training [26]. The same study showed that only 6.3% of patients could not inhale fast enough to use a high-resistance DPI. Most asthma patients, including elderly patients and patients with decreased lung function, are able to use a DPI, which is why pMDI devices should first and foremost be prescribed only for those unable or unwilling to use a DPI [26–28]. Following the GINA guidelines and prioritising DPIs for most patients should be encouraged by authorities and clinics. This would not only lead to better asthma control for the patient, but also be a more environmentally friendly choice. All patients must be assessed individually, and the prescriber should choose the most appropriate device for the individual patient, including considerations of availability and affordability.

How to drive change towards more sustainable asthma care

Treatment guidelines

Local guidelines are viewed as important steering documents for healthcare professionals. However, many guidelines across Europe lack any discussion on the environmental impact of inhalers. Guidelines should be updated to recommend long-term preventive DPIs as the first-line asthma medication. There are some examples of guidelines with strong recommendations regarding the environmental aspect of inhalers, such as the British guideline on the management of asthma, the Canadian Thoracic Society guidelines and the recently published Swedish treatment recommendations [29–31].

In addition to updating the guidelines, there seems to be a lack of adherence to them. The habit of prescribing only rescue medication and pMDIs needs to be broken to increase disease control and sustainable asthma care. Healthcare professionals should be educated and incentivised by policy makers to follow up-to-date guidelines [32]. Patient education should include understanding of the disease, inhalation technique and the importance of adherence to preventer medication. Pressure to move from reliance on SABA to adherence with ICS is increasing as the European Union Pharmacovigilance Risk Assessment Committee and Coordination Group for Mutual Recognition and Decentralised Procedures have recently agreed that salbutamol-containing reliever medications need to emphasise in their packaging the need to re-evaluate the use of SABA [33]. This includes information such as that the use of SABA more than twice a week indicates poor asthma control and should result in contacting a physician.

Resource utilisation

Healthcare systems around Europe are facing several challenges as the lack and insufficiency of resources increases. Healthcare professionals have both limited time with patients and pressure to treat as many patients as possible per day. Their motivation to change asthma patients' inhaler devices might be reduced and follow-up meetings are left out due to a lack of time, even if the patients would benefit from them. Asthma control can be jeopardised due to doctors' and nurses' lack of time to discuss the patient's wellbeing and to teach them about their condition, inhaler, inhaling technique or the sustainability aspect of asthma care [34]. Resource allocation to the first phases of the asthma care pathway will reduce resource needs in emergency rooms and specialty care facilities further down the line.

TABLE 2 Methods for decreasing the carbon footprint of asthma care

What to do	How to do it
Reduce inhaler-related carbon footprints	Decrease the use of SABA by switching to ICS–formoterol as a reliever or by promoting ICS-controller therapy Switch from pMDIs to DPIs or soft mist inhalers after adequate tuition Recycle inhalers Develop propellants with lower carbon footprints
Reduce asthma-related ED visits or hospitalisations	Promote ICS–formoterol as a reliever and promote ICS-controller therapy Improve adherence through patient education and development of electronic tools Improve inhalation technique through patient training Promote asthma action plans for the patient Schedule regular follow-ups Use biologics in severe asthma when appropriate

SABA: short acting β_2-agonists; ICS: inhaled corticosteroid; pMDI: pressurised metered-dose inhaler; DPI: dry powder inhaler: ED: emergency department.

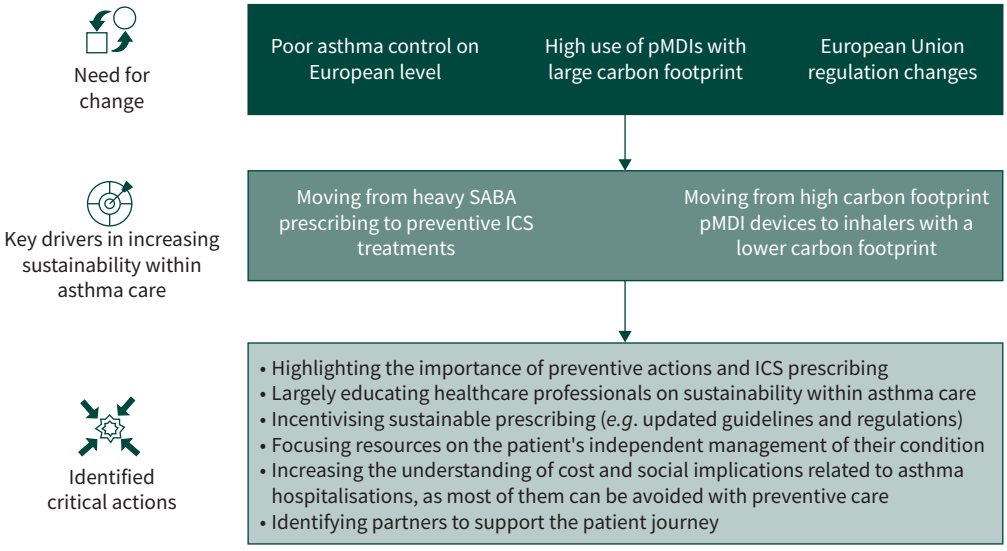

FIGURE 1 Summary of key takeaways. pMDI: pressurised metered-dose inhaler; SABA: short acting β_2-agonists; ICS: inhaled corticosteroid.

There are solutions with low resource demand that could be beneficial overall. First, healthcare professionals and the administration need to understand the cost and social implications related to rescue medication use and exacerbations. Hospitalisations and exacerbations due to overuse of SABA [35, 36] and neglecting use of controller medication result in patient harm, including preventable asthma deaths, in heavy resource use and unnecessary CO_2e emissions [2], which could be largely prevented with resources allocated to the preventive primary healthcare. Well-prepared treatment plans, clear instructions and follow-up visits could allow patients to reduce their risk of exacerbations and find their treatment balance without necessarily contacting their healthcare professional. Electronic tools for asthma monitoring and education may also play a role [37]. Additionally, systematically including other partners in the patient journey could have a big impact on the patients' independent management of their asthma. For example, pharmacists could be asked to check the patients' inhaler technique when dispensing a device prescription, as is performed in Denmark, and patient organisations could host group conversations for patients where they can learn about their condition and coping mechanisms from one another. The different methods for making asthma care more sustainable are summarised in table 2.

Conclusion

Scientists argue that asthma care could be more sustainable both from the patient and environmental perspective. The overall treatment balance is worrisome, and the pMDIs used extensively in many European countries have relatively high CO_2e emissions. There is huge potential to both improve asthma control and reduce CO_2e emissions with existing solutions. However, the change requires educating healthcare professionals on patient and environmental wellbeing (figure 1). On a population scale, more patients need to be treated with a preventive inhaler with a low carbon footprint, to reduce exacerbations and polluting propellant use.

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