

Updating an A&E asthma pathway and discharge bundle to include more sustainable, lower carbon therapies

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Introduction

Inhaled medicines are the cornerstone of asthma treatment. There are two main types of inhaler: propellant-containing devices (also known as pressurised Metered Dose Inhaler pMDI); and non-propellant inhalers (known as Dry Powder Inhalers DPIs).

Most patients are capable of using both types and the medicines within them are equally effective, however, pMDIs contain hydrofluorocarbons that are powerful greenhouse gases, thus contribute to global warming. DPIs meanwhile, do not contain these propellants and have a significantly lower global warming potential.

The NHS accounts for 4-5% of England's greenhouse gases and it is currently estimated that medicines contribute to 25% of the NHS's total carbon footprint. Inhalers specifically account for around 3% of these emissions. The NHS has committed to achieving being net zero by 2045 and therefore KCH wanted to understand how to maintain and improve clinical care to people with an airways disease, but reduce our carbon footprint.¹

Our Trust's Accident and Emergency (A&E) asthma pathway only included pMDI options for inhaled therapy on discharge (i.e salamol® (salbutamol-pMDI) and clenil® (beclomethasone pMDI). We estimate that issuing 10% of these inhalers as the equi-effective DPI alternative would save 58 kt CO₂e.

Methodology and Intervention

- We met with the lead A&E consultant, pharmacist and respiratory teams and pitched a new A&E asthma pathway with the addition of DPI options -encouraging prescribing of them first-line where possible.
- A benefit from switching from beclomethasone 100mcg inhaler (usual dose is: 2 doses twice daily) to beclometasone 200mcg DPI (usual dose is 1 dose twice daily) would be that the patient's inhaler would last twice as long which could be a cost-saving for the patient if they pay for their prescriptions in the community, less opportunity to “run-out” of treatment and less waste going into landfill.
- The pathway's discharge bundle was updated to fit onto one page with a table containing images of different inhaler types and reiterated technique differences between pMDIs and DPIs to ensure appropriate use. It went live in February 2023.
- Labelled packs of inhalers were given to patients and staff updated on changes
- The electronic prescribing system in A&E was amended to make it easy for staff to choose the new inhaler options.

Methodology and Intervention

Discharge Bundle		
All patients requiring treatment in ED should be discharged with a course of oral steroids , short acting beta agonist (SABA) and an inhaled corticosteroid (ICS) : - Oral steroid - Prednisolone 40mg OD for 5 days. - If already on a steroid inhaler and compliant with this consider increasing dose (see BNF for maximum dose). - Pick the combination best suited to the patient depending on technique and preference – check technique before discharge. - Consider initiating a dry powder inhaler, which is a greener alternative to metered dose inhalers (which contain hydrofluorocarbon propellants), where clinically appropriate. - Where a metered dose inhaler (MDI) is the inhaler of choice, encourage use of a spacer device to improve lung deposition of the inhaled medication. Outpatient pharmacy will dispense a spacer if requested on the prescription.		
Technique and Inhaler Type	SABA (Short Acting Beta Agonist)	ICS (Inhaled Corticosteroid)
Inhale QUICK and DEEP Dry Powder Inhaler	Salbutamol 100mcg/dose Easyhaler 1-2 puffs every 4-6 hours PRN	Beclometasone 200mcg/dose Easyhaler 1 puff BD
Inhale SLOW and STEADY Metered Dose Inhaler	Salbutamol (Salamol) 100mcg/dose MDI 1-2 puffs every 4-6 hours PRN Via Spacer	Beclometasone (Clenil) 100mcg/dose MDI 2 puffs BD Via Spacer

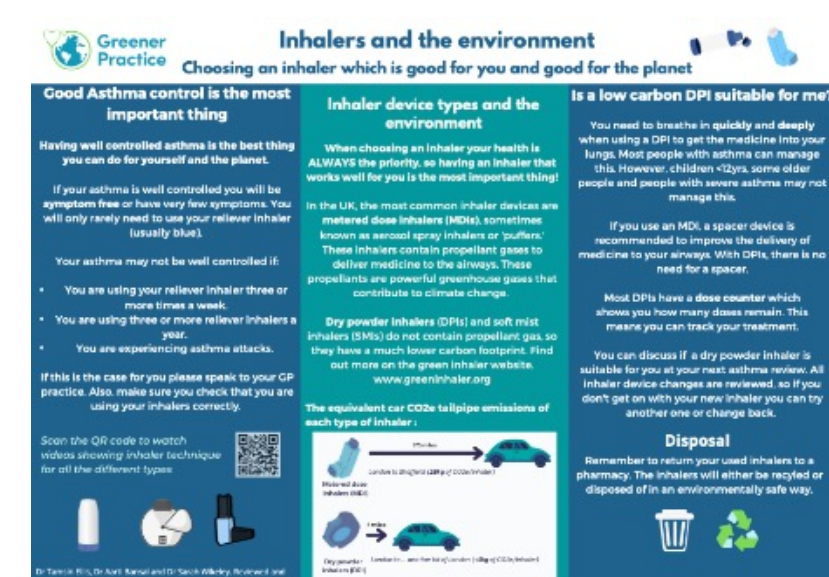
DISCHARGE CHECKLIST

- Prescribe/dispense **inhalers**, aerochamber **spacer** (if none at home), and **Prednisolone** as above
- Ensure the patient has a **PEF meter** (either prescribed/dispensed or already at home) and understands their best/predictive PEF (in hours prescribe this to collect from outpatient pharmacy)
- You must complete a **personalised Asthma Action Plan** for your patient and give it to them on discharge (see separate Kwiki document – also pre-printed copies in Adult Asthma Discharge Cupboard in LASA/Majors B Drug Room)
- Please give the patient an **ED Asthma Patient Information leaflet** which includes this discharge checklist (see separate Kwiki document – also pre-printed copies in Adult Asthma Discharge Cupboard in LASA/Majors B Drug Room)
- Advise patient to arrange **GP follow up** within 2 days
- Respiratory HOT Clinic referral** for all patients with 2nd ED presentation in past year
- IRT Referral** (for phone review post discharge) – “Enter Order” > “Integrated” on EPR for the following:
 - patients who have had 2 or more courses of Prednisolone for asthma in the past year
 - patients that the clinician is concerned is a higher risk discharge or could greatly benefit from IRT education and intervention
 - patients already on a steroid inhaler and adherent to therapy who would benefit from a review to step up therapy

SIGNPOSTING AND ADDITIONAL RESOURCES

- Refer to **RightBreathe.com** or download the **RightBreathe App**
This is a resource which provides detailed information on all UK-licensed inhaler products and links to videos on inhaler technique, which can be shared with the patient
- Asthma & Lung UK - www.asthma.org.uk/advice/
- Local **community pharmacies** can support and advise patients on inhaler technique
- Inform patients to **return** their used inhalers to community pharmacies for **safe disposal**

- We taught nursing and medical staff about the new A&E asthma pathway and provided general education around the importance of sustainable healthcare and inhaler technique.



- An asthma cupboard created in A&E to store:
 - Rescue therapies (prednisolone tablets/inhalers/spacer devices) to facilitate safe supply out of hours along with medical devices to support better self-management (PEF meters)
 - a ledger for recording dispensing of medications to be completed by nursing staff for out of hours
 - a discharge paperwork folder. This contained asthma action plans and useful patient information (including “Inhalers and the environment” leaflet/ “Safe disposal of inhalers” poster/stickers that could be adhered to the inhaler to reinforce optimal use of the device)



Results

Dispensing data between February-August in 2022 was scrutinised. The salbutamol inhalers dispensed by the outpatient pharmacy (principally for patients treated in A&E for asthma showed that just 12% (56) were salbutamol 100mcg DPIs. Graph 1 shows that the percentage of salbutamol DPIs prescribed in 2023 is on average 3% higher than the same time period the year before.

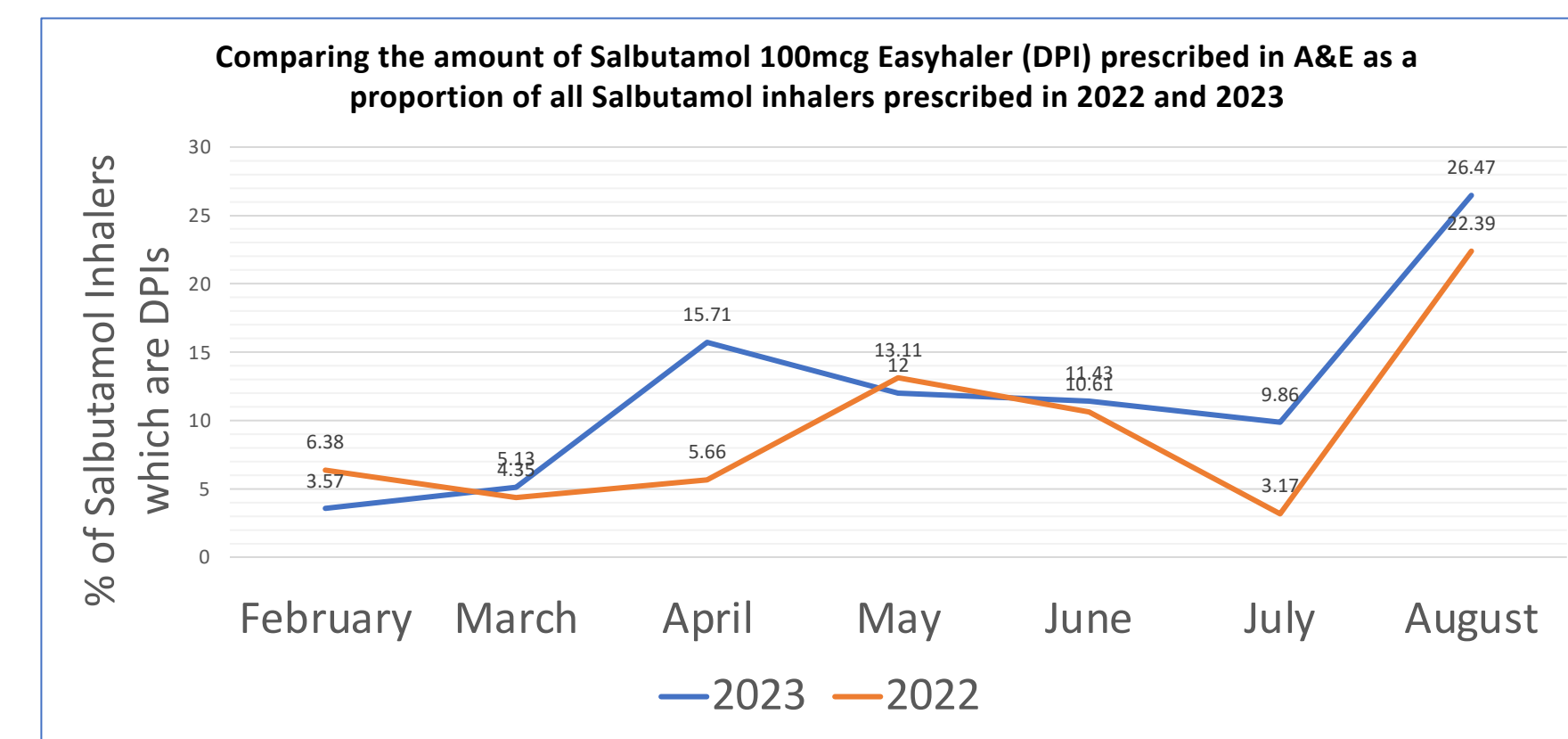


Figure 1

Unfortunately our data set did not distinguish between paediatrics and adults, so this could somewhat explain the significantly higher proportion of salbutamol MDI usage as the salbutamol DPI is not licensed in children < 4 years old and our guideline was aimed at adults.

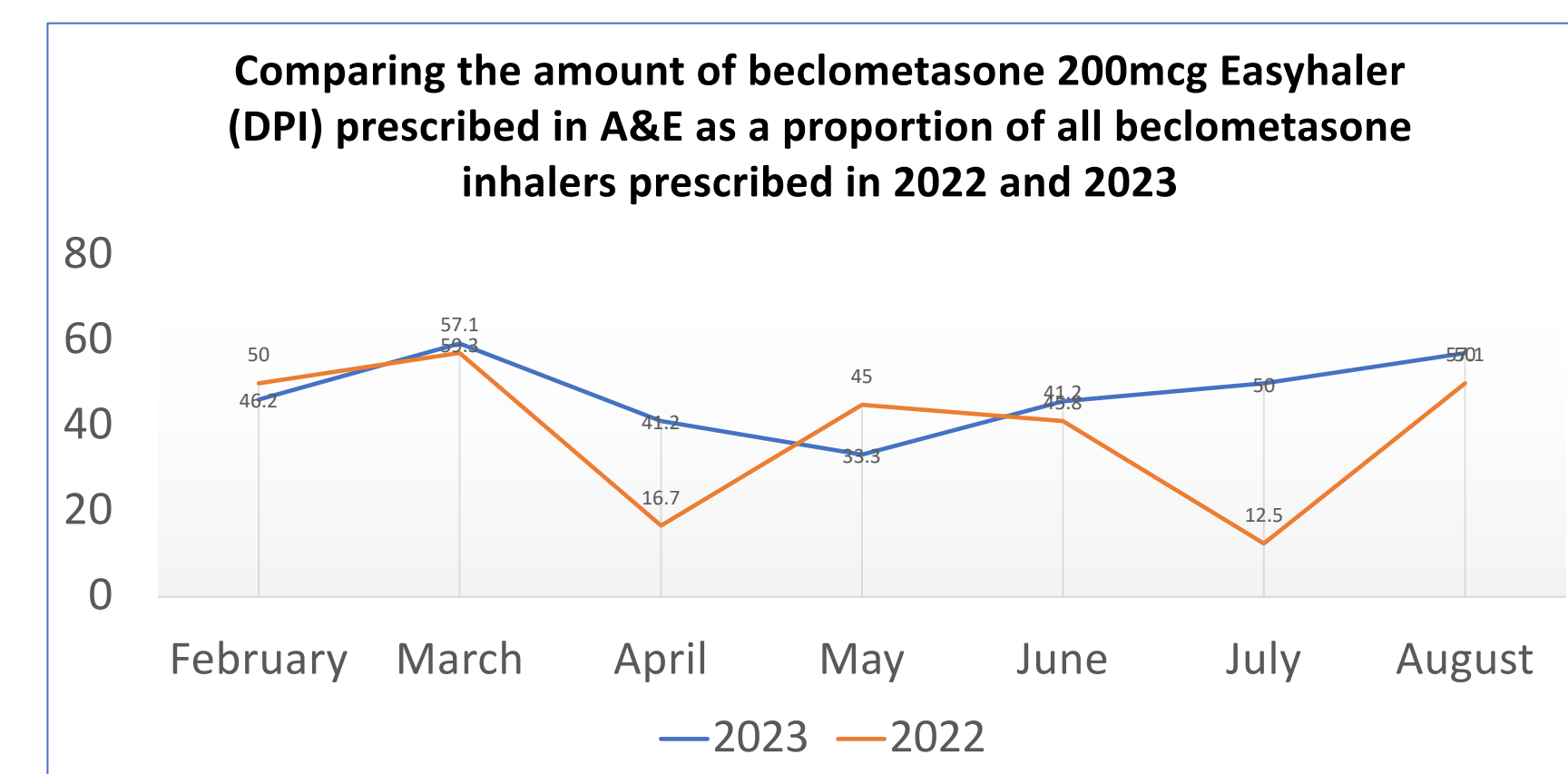


Figure 2

When considering beclometasone, 43% (34) of beclometasone prescriptions from A&E were for the DPI compared to the Clenil® 100mcg pMDI equivalent in 2022. This increased on average by 6% in 2023, post-guideline update – which alone is a rough saving of **200 KgCO₂e**.

Conclusion

- Overall, there was a small increase in the percentage of salbutamol and beclometasone DPIs prescribed over MDIs in 2023 compared to the same period in 2022. However, due to several confounding variable e.g paediatric data, it's not clear whether implementation of this guideline contributed to this. Further research looking specifically at adult asthma A&E admissions and prescribing habits would be required
- This intervention was innovative for our trust. It established better links amongst departments, helped educate staff about important environmental concerns and reassured teams that high-quality/low-carbon asthma care can be achieved simultaneously using a comprehensive approach to optimising asthma management that brings together quality improvement in education, inhaler device choice and safe inhaler disposal.
- Collaboration amongst the respiratory and A&E medical and pharmacy teams worked well. It provided an opportunity to understand the pressures of a busy A&E department and the need to make an asthma pathway as concise as possible, without compromising on clinical effectiveness. It helped us show that better care can also be more sustainable.
- **We calculated that if half of the overall outpatient prescribing of salbutamol and beclometasone pMDIs were switched to the corresponding DPIs, this would save at least 3500 KgCO₂e each year at King's College Hospital (KCH).**

References

- 1) <https://www.england.nhs.uk/greenernhs/wp-content/uploads/sites/51/2022/07/B1728-delivering-a-net-zero-nhs-july-2022.pdf>

Acknowledgements

- 1) Dr Tara Smith (Emergency Medicine Consultant, KCH)
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