Re-Hale
Inhaler recycling

NHS Kent and Medway

Chiesi

This work is part of a collaborative working project in conjunction with NHS Kent and Medway Integrated Care Board and Chiesi Limited. For further information please see the project executive summary which can found on the Chiesi website https://www.chiesi.uk.com/collaboration.

Abstract

This work is part of a collaborative working project in conjunction with NHS Kent and Medway Integrated Care Board and Chiesi Limited. We established an inhaler recycling model which enables patients to drop off any inhaler at multiple healthcare settings and for these inhalers to be collected and recycled, using a pre-existing logistical model.

Background

Medicines account for 25% of emissions within the NHS, with inhalers accounting for 3% of this total.[1] The propellant most commonly used in pressurised metered dose inhalers (pMDIs) is HFA-134a, with a smaller proportion using HFA-227ea in the UK.[2]

Currently, in the UK, inhalers are disposed of through traditional pharmaceutical waste management systems which exposes the environment to propellants, plastic and aluminium.

Aims

Inhaler return and recycling

- Divert inhalers from domestic waste to reduce the environmental impact of the propellant gas, enabling recovery and recycling.
- Provide accessible locations for all inhaler types of any brand to be recovered and component parts recycled where possible

Develop a replicable framework

- Create a feasibility pilot involving collaboration across the healthcare system within the East Kent footprint, including identified acute trusts, primary care settings and community pharmacies.
- Develop a logistical infrastructure to demonstrate a framework for others to replicate.
- Consolidate learnings from the project to ensure challenges and opportunities are highlighted for further adoption.

Calculate carbon savings

- Calculate the carbon emissions avoided during the timescale of the project, while recovering and recycling other materials from inhalers, where possible.

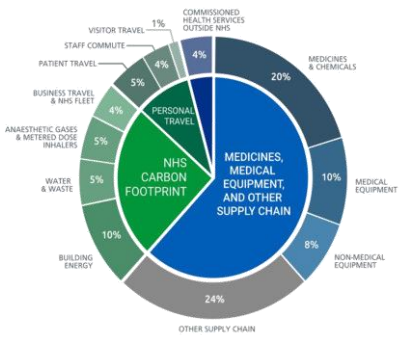

Figure 1: *UK National Health Service Carbon Footprint.*[1]

Methods and Delivery

Prior to launch, a scoping exercise was undertaken to review current processes and the logistical frameworks within Kent and Medway ICB. East Kent was selected as the location with multiple healthcare settings identified which included general practitioners (GP's), Community Pharmacies and Acute Hospital Sites.

Settings were chosen to make the pilot more accessible to patients to 'drop off' used and unwanted inhalers. Furthermore, there exists a UK based wholesaler which already deliver pharmaceutical supplies. For ease, this was sub-contracted for the collection of inhalers, minimising the need for additional transportation. Healthcare settings collected inhalers from patients and retained them safely in containers. Once local containers were full, the medicines wholesaler collected them as part of their typical journey, transporting them to wholesaler's depot for collection by a specialist waste management company.

At the specialist management company inhaler materials are separated and the plastic single polymer is recycled. Metal canisters are crushed and the remining HFA gas is safely captured, this is then repurposed within other industries. Any remaining medicinal product is safely disposed of. Finally, the canisters themselves are smelted down and the aluminium recycled into countless applications of this very versatile metal.

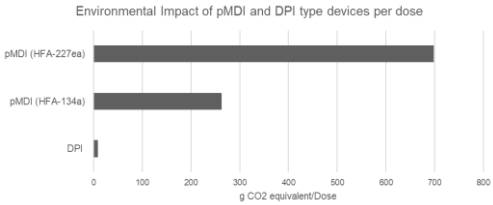

Figure 2: *Environmental Impact of pMDI and DPI type devices per dose adapted and modified from Jeswani et al.*[2]

Plans and Achievements

Delivered an extensive communications plan for healthcare professionals and for patients which utilised typical communication methods and social media channels.

Developed a collection model utilising existing infrastructure, allowing patients to drop off their inhalers at Pharmacy sites, in Acute Hospital sites, GP practices and at Community pharmacy sites.

Developed a platform allowing pharmacy staff to book a next day collection once the collection containers are full.

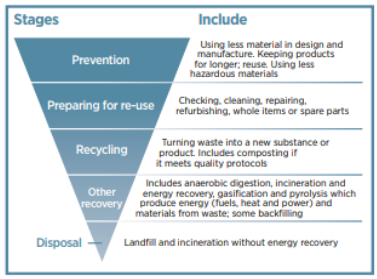

Figure 3: Waste hierarchy adapted from DEFRA model[3]

Discussion

Inhaler recycling is a very complex process for several reasons:

- Used and unwanted inhalers must be treated as medicine so cannot be collected in the same way plastic bottles or batteries are.
- There are multiple components of inhalers, making the process of waste management much more specialized.
- There is currently no UK NHS national drive to implement inhaler recycling and therefore limited resources are available.
- Engagement and communication are an essential element for a project such as this to ensure local level support from healthcare professionals and patients.
- Utilisation of existing infrastructure prevents duplication of resources.

Conclusions

The Re-hale proof of concept project within East Kent, which has included cross functional working between healthcare and industry, has been in operation for several months. Throughout this time extensive collaboration with multiple healthcare settings, achieving and continuing to maintain engagement has been accomplished.
This project is helping to demonstrate that an inhaler recycling project that utilizes existing infrastructure is possible. The outputs from this project will be collated and a post-project toolkit put together to share how others may be able to respectfully replicate this model. The project is due to be complete in September 2024.

The Re-Hale project started in October 2023 and will run for 12 months. This will bring us closer to meeting our target of NET zero by 2040.

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