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Environmental impact of inhalers for asthma and chronic obstructive pulmonary disease in Spain

Adopting inhalers with a lower carbon footprint, such as DPIs, can help reduce emissions in Spanish healthcare, particularly in regions with high MDI usage.

Digital poster

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Background

- The carbon footprint is an environmental indicator that aims to reflect the total amount of greenhouse gases emitted directly or indirectly by an individual, organisation, event or product. In order to implement an emission reduction strategy, it is essential to understand this footprint[1].
- The health sector plays a fundamental role, accounting for 4.5% of the total climate footprint in Spain. Inhalers contribute to 5% of the health sector footprint[2].
- There are already programs in progress to measure the carbon footprint of the healthcare sector[3]. In addition, numerous official institutions, scientific societies and treatment guidelines have taken positions on the use of inhalers[4-6].

Objective

- The aim of this study was to estimate the carbon footprint of inhalers used for asthma and chronic obstructive pulmonary disease (COPD) inhalers in Spain.

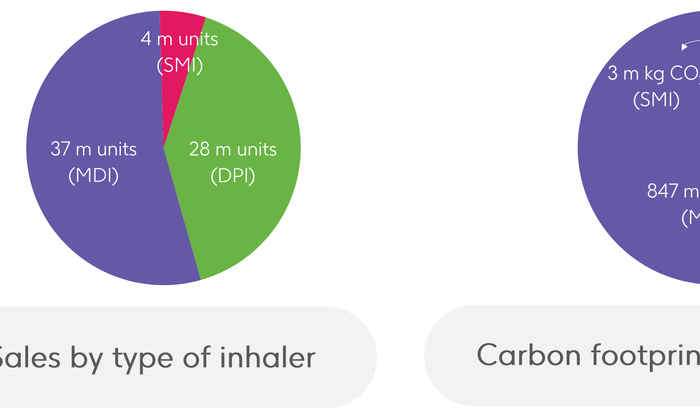
Methods

- The total carbon footprint of asthma and COPD inhalers in Spain was estimated using pharmacy dispensing sales data and the carbon footprint of each device.
- The sales data were provided by IQVIA[7] and were reported on a monthly basis over a two-years period (from May 2022 to April 2024)
- The CO_2 emissions generated by each inhaler were obtained from PrescQipp[8] (a not-for-profit organisation of the UK National Health System)
- Inhaler type, region and time period were considered.
- The carbon footprint rate per 1,000 habitants was estimated based on the population in January 2024[9].

Results

- A total carbon footprint of **869,592,590 kg CO_2** was estimated for **68,692,347** inhalers over a two-years period. This represents a carbon footprint of **17,882 kg CO_2 per 1,000 inhabitants**.
- According to the type of inhaler, metered dose inhalers (MDI, 54.0% of sales) and dry-powder inhalers (DPI, 40.6% of sales) were responsible for 97.4% and 2.3% of the carbon footprint, respectively (Figure 1). Soft Mist Inhaler (SMI) accounts for the remaining 5.4% of sales with a 0.3% contribution to the carbon footprint. Switch from MDI to DPI results in more than 90% reduction in carbon footprint.

Figure 1: **Sales and carbon footprint by inhaler type**

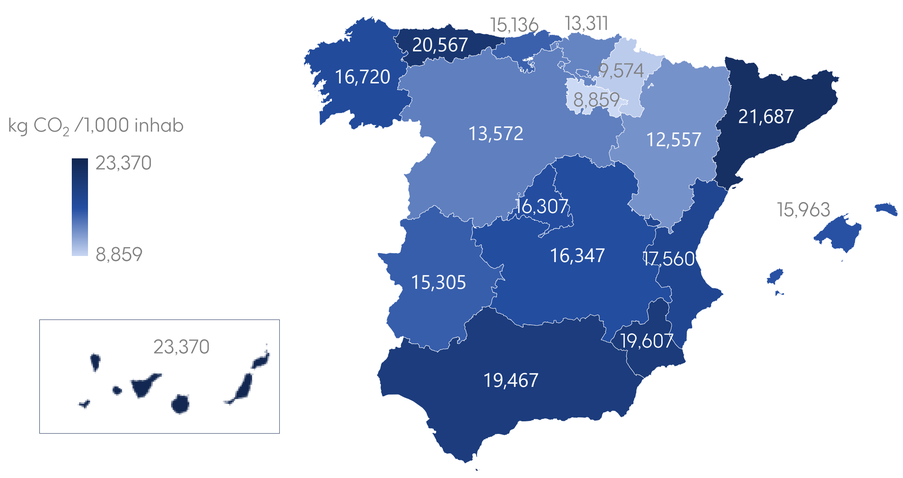


Sales by type of inhaler

Carbon footprint by type of inhaler

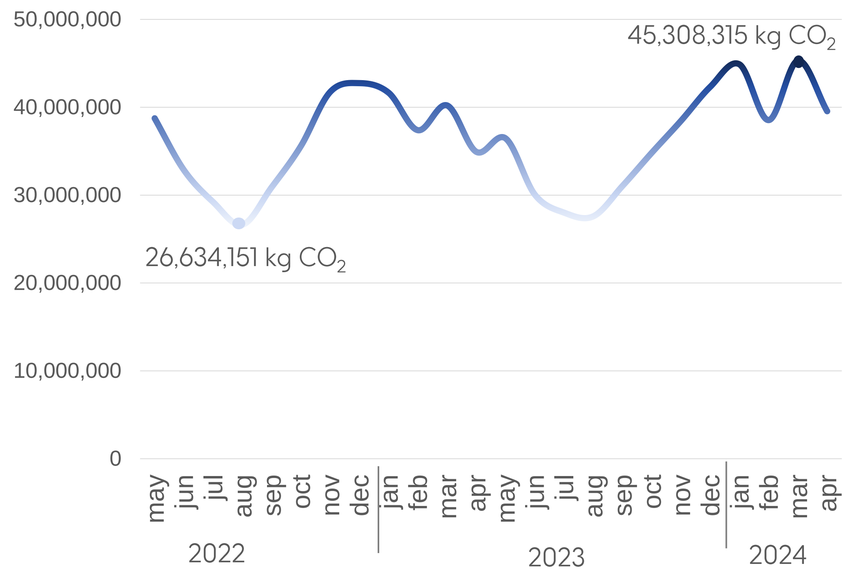
- Catalonia was the region with the largest carbon footprint impact (17.2% of sales; 20.0% of the carbon footprint), while Andalusia was the region with the highest number of units sold (19.5% of sales; 19.3% of carbon footprint).
- When considering the population in each region, the Canary Islands had the highest carbon footprint rate (23,370 kg CO_2 /1,000 inhab), while La Rioja had the lowest rate (8,859 kg CO_2 /1,000 inhab) (Figure 2).

Figure 2: **Carbon footprint rate by region**



- Sales and carbon footprint were lower during summer months (Figure 3). The month with the largest carbon footprint was March 2024 (45,308,315 kg CO_2, increasing by 12.7% over the previous year (March 2023)).
- Mean carbon footprint per month was 36,233,025 kg CO_2, A slight upward trend could be observed over the months.

Figure 3: **Carbon footprint by month**



Conclusion

- Inhalation devices contribute notably to the healthcare related carbon footprint.
- Encouraging the use of inhalers with a lower carbon footprint (such as DPIs) can help to **reduce emissions**.
- Efforts should be more intensive in those regions with a higher MDI sales percent.

Limitations

- The main limitation of this study lies in the diversity of methodologies used to estimate the carbon footprint of each device, as well as the different parts of the product life cycle considered.
- In the absence of unified information, the chosen source (PrescQipp[8]) provides a compilation of the different inhalers, including methodological details and original sources, which, in most cases, have quality certification. In addition, this compilation is supported and recognised by the UK health system.
- The estimates presented here represent a conservative scenario, as they only include dispensing in community pharmacies.

Abbreviations

COPD: Chronic Obstructive Pulmonary Disease
DPI: Dry-Powder Inhaler
MDI: Metered Dose Inhaler
SMI: Soft Mist Inhaler

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Disclosures

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