



CATALAN SOCIETY OF ENVIRONMENTAL HEALTH POSITION PAPER ON INHALERS



The current scientific debate shows that human actions are changing the global climate, with repercussions on planetary health: air pollution, the increase in allergens, zoonosis pandemics, water-related and food-related diseases. Every year, environmental factors cause around 13 million deaths, representing 20% of the global total Globally, 9 out of 10 people breathe air with high levels of pollutants that exceed the limits set by the World Health Organization (WHO).

The United Nations Climate Change Conference (COP28) has concluded with an agreement that signals the "beginning of the end" of the fossil fuel era. The balance of science indicates that global greenhouse gas emissions must be reduced by 43% by 2030, compared to 2019 levels, in order to limit global warming to 1.5°C.

That is why urgent measures are needed to reduce carbon dioxide emissions (the dominant long-acting greenhouse gas) and it is the responsibility of all of us as a society and individuals to contribute to reducing greenhouse gas emissions and reducing rising temperatures.

In Spain, conventional pressurized cartridge pMDI, Pressurized Metered Dose Inhaler represent around 50% of the total bronchodilators used, this is equivalent to 400,000 tons of CO2 per year. According to the NHS, an pMDI device produces as many greenhouse gases as a 300 km car trip; on the other hand, a non-pressurized device produces as much as a 6 km trip.

The Catalan Society of Environmental Health (SOCSA) recognises the importance of addressing both the medical aspects of respiratory diseases and their environmental impacts. In addition, we support and promote the adoption of inhalers that contribute to reducing the carbon footprint and minimizing negative effects on human health.

The healthcare system, including prescription drugs, can be a major contributor to environmental pollution. All drugs have an impact on the environment: the carbon footprint of production, storage, packaging, transport and waste management (Annex



1). However, inhalers have an additional factor: they release propellants and chemical additives into the atmosphere, contributing to pollution and climate change.

pMDI pressurized inhalers, which use chemical propellants such as chlorofluorocarbons (CFCs) and hydrofluorocarbons (HFCs), have traditionally been associated with a significant carbon footprint due to greenhouse gas emissions, which are very potent during their production and use, and contribute to the depletion of the ozone layer. These propellants can also have direct adverse effects on human health, including irritation of the airways and aggravation of pre-existing respiratory conditions. However, some studies have suggested a possible association between exposure to fluorocarbon gases and an increased risk of cardiovascular, metabolic, bone, and neurological disorders, as they belong to PFAS chemical group.

In contrast, non-pressurized inhalers, such as Dry Powder Inhaler (DPI) and Soft Mist Inhaler (SMI), tend to have a lower carbon footprint and do not release greenhouse gases during use. Likewise, by avoiding the use of chemical propellants, these inhalers can reduce the impact on human health associated with exposure to fluorocarbons. It is recommended that healthcare professionals make an individualized assessment at the time of prescribing an inhaled therapy and opt for dry powder or fine mist devices if clinical characteristics allow it. (Appendix 2)

Therefore, the Catalan Society of Environmental Health SOCSA works to achieve a planetary *one health* approach that considers both human health and the health of the environment. This includes, the promotion of inhalers that minimize their carbon footprint and reduce negative effects on human health, as well as the implementation of practices and policies that promote the rational prescription of medicines, the proper management of medical waste and the reduction of pharmaceutical pollution in the environment. This approach seeks to protect the health of present and future generations, ensuring effective and safe treatment for patients with respiratory conditions and promoting sustainable and healthy practices in the healthcare sector.

Board of the Catalan Society of Environmental Health SOCSA Academy of Medical Sciences of Catalonia and the Balearic Islands.

Barcelona, 12 April 2024



ANNEX 1: THE CARBON FOOTPRINT OF THE DIFFERENT INHALED THERAPY DEVICES.

Carbon Footprint	Inhaled Cortico	steroid (ICS) containing	g inhalers		Non-ICS containing inhalers		
(kgCO2e per inhaler)	ICS	ICS/LABA	ICS/LABA/LAMA	SABA OR SAMA	LABA	LAMA	LAMA/
Highest (>35 kgCO2e) Avoid unless no appropriate alternative		Flutiform pMDI & K-haler Symbicort pMDI		Ventolin Evohaler			a a
High (10-20 kgCO2e) Use only if low carbon footprint alternative not clinically appropriate	Clenii Modulite Kelhale Qvar Autohaler Qvar EasiBreathe Soprobec Alvesco Flixotide Evohaler	Fostair pMDI Seretide Evohaler Combisal AirFluSal pMDI Sirdupla Aloflute Sereflo	Trimbow pMDI Trixeo	Airomir AirSal Salamol Airomir Autohaler Salamol Easibreathe Atrovent	Serevent Evohaler Soltel Neovent Vertine Atimos Modulite		Bevespi
Low	eclometasone Easyhaler Budesonide Easyhaler Pulmicort Turbohaler Budelin Novolizer Flixotide Accuhaler Asmanex Twisthaler	Fostair Nexthaler Duoresp Spiromax Fobumix Easyhaler Symbicort Turbohaler Seretide Accuhaler Fusacomb Easyhaler Aerivio Spiromax AirFluSal Forspiro Stalpex Orbicel Fixkoh Airmaster Relvar Ellipta	Trelegy Trimbow Nexthaler	Salbutamol Easyhaler Salbulin Novolizer Ventolin Accuhaler Bricanyl	Foradil Formoterol Easyhaler Oxis Onbrez Striverdi Serevent Accuhaler	Spiriva Handihaler Spiriva Respimat Braltus Zonda Tiogiva Acopair NeumoHaler Incruse	Spiolto Ultibro Duaklir Anoro

Excerpt from the *National Health Service, clinical networks* from London.



ANNEX 2: CHOICE OF INHALED THERAPY DEVICE

- GEMA guideline specifies that the use of dry powder or mist devices could be preferable in new patients > 6 years of age or with inspiratory flow > 30l/min.
- GEMA guideline states that the use of an inhaled SABA on demand more than 2 times a month to treat symptoms (not counting when used preventively before exercise), or the fact of having suffered exacerbations in the previous year or an FEV1< 80%, indicates inadequate asthma control and requires the establishment of maintenance therapy.
- COPD GOLD 2024 guide recommends increasing the dose and/or frequencies of SAMA and/or SABA in the management of exacerbations; combine SAMA with SABA (Short treatments usually go with pressurized pMDI devices). Also recommends considering the use of long-acting bronchodilators LAMA / LABA when the patient is stabilized (Long treatments usually go with DPI devices). That is, in the stability of COPD and chronic treatment, better DPI dry powder devices.
- It is necessary to detect the abuse of rescue therapy with pMDI and to consider increasing the long-acting base treatment with non-pressurized devices when the patient needs it.
- The calculation of the maximum inspiratory flow of 30 ml/min would be comparable to absorbing water with a Straw, an energic inspiration during 2-3 seconds.
- In patients with flow < 30 ml/min or poor coordination of the inhalation technique, pressurized device + inhalation chamber or nebulizer is recommended.





Sust aina ble and healthy

inhaler prescription



DEVICE

INHALATION

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SELECTION

INSPIRATORY FLOW

<30 L/min ~

REQUIRED ON EACH DRY POWDER INHALER 1	Inspiratory flow (L/min)	>90	>60
REQUIRED OI	IAO	Aerolizer	Breezhaler

>30 L/min //

Genuair Nexthaler Spiromax	nuair	Novolizer	Easyhaler	Twisthaler	Turbuhaler	ota	Spiro	eniro	Accuhaler	Disknaler	Lholor	Handihaler	Breezhaler	Aerolizer	5
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Genuair Nexthale	Genu	Novol	Easyl	Twist	Turbu	Ellipta	de lo L	Foreniro	Accul	DISKI	Diskh	Hand	Breez	Aeroli	•

'Adapted from: García Cases S. Caro Aragonés I. Aguinagalde Toya A. Dispositivos y guila de administración via inhalatoria. Grupo de Productos Suritainos de las EHH. 2017.



SMI Soft Mist DPI Dry Powder Inhaler 🏄 🔑 Nebulizer 👢 pMDI Pressurized metered-dose inhalers 🔫 🔰 pMDI with holding chamber 🧗

pMDIs use hydrofluorocarbon (HFC) propellants that contribute to global warming.

in patients >6 years or with inspiratory flow >30 L/min, <u>DPI or nebulizers may be used if clinically appropriate.</u>

Greener alternatives with up to 90% lower carbon footprint are in development but not yet available. Meanwhile,

Adapted from: AEMPS, La AEMPS informa sobre los prope Available: https://www.aemps.gob.es/informalnofasinformal

COORDINATION



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The EU needs to protect its environment from perfluoroalkyl and polyfluoroalkyl toxic substances

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