



# The carbon footprint and wider life cycle impacts of inhaler devices and asthma exacerbations

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*The business of sustainability*



# Background

- The Sustainable Healthcare Coalition (SHC) – NHS, pharma companies, ERM
- ERM has been working with the SHC for a decade
- Published guidance
  - GHG Protocol Product Standard Sector Guidance
  - Care Pathways Guidance
- Published case studies using the guidance

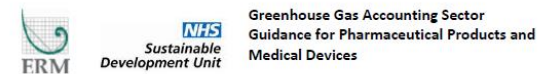
ERM has developed relationships with several individual members of the SHC and our reputation has led to work with non-member pharma companies



Care Pathways: Guidance on Appraising Sustainability

[Main Document](#)

October 2015



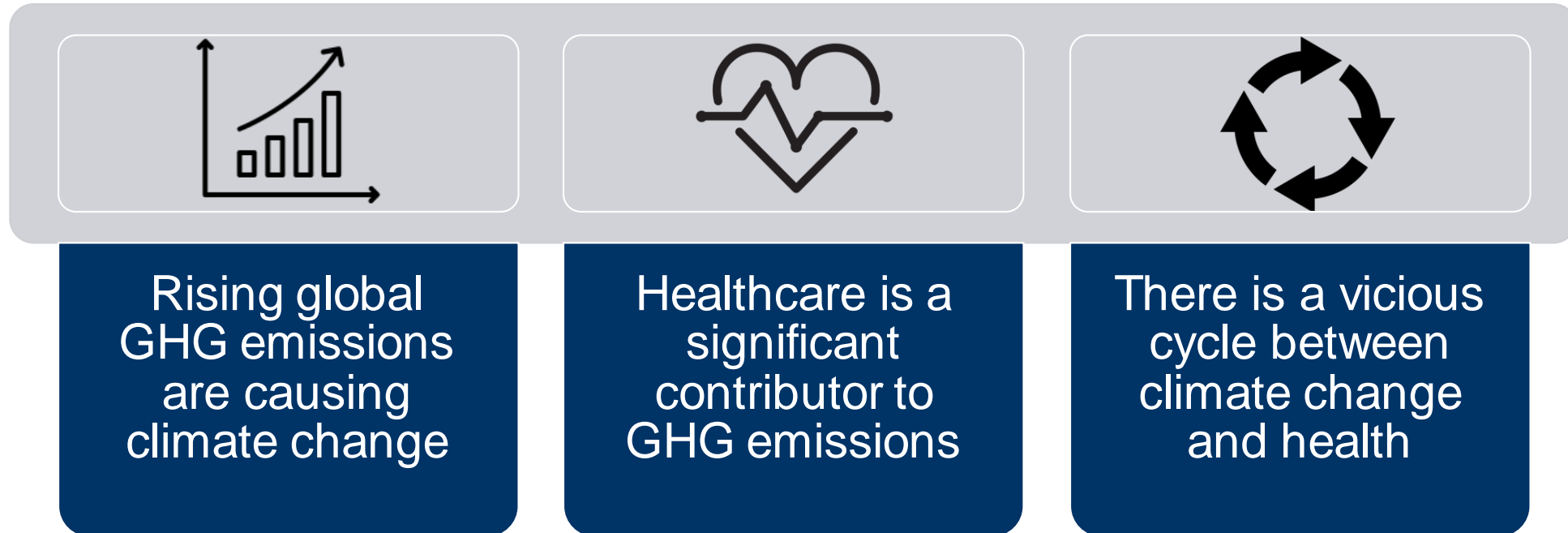
Greenhouse Gas Accounting Sector Guidance for Pharmaceutical Products and Medical Devices

GHG Protocol Product Life Cycle Accounting and Reporting Standard

November 2012



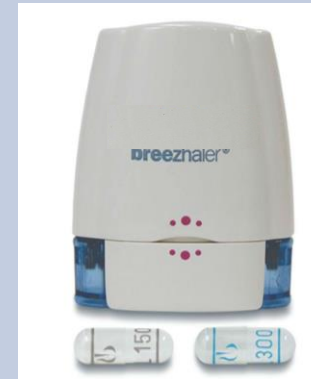
# Background



- Health care sector – 5.5% of national carbon footprints
- Pressurised metered dose inhalers (pMDIs) contribute due to HFA gases (3% of NHS carbon footprint)
- NHS aims to be carbon neutral by 2045

# Project

- Novartis' new Breezhaler® device
- Novartis wished to examine the carbon footprint benefits of its technology and compare Breezhaler® against competitor devices with a similar function
- Potential advantages in marketing and sales globally
  - Low impact products are easier to market in a new environmentally-conscious world
  - Provide a competitive advantage over similar products with higher impacts
  - Win large contracts with healthcare providers
- Insight into a product's environmental hotspots, showing areas where work on product design can be focused further to reduce the impact



Breezhaler®

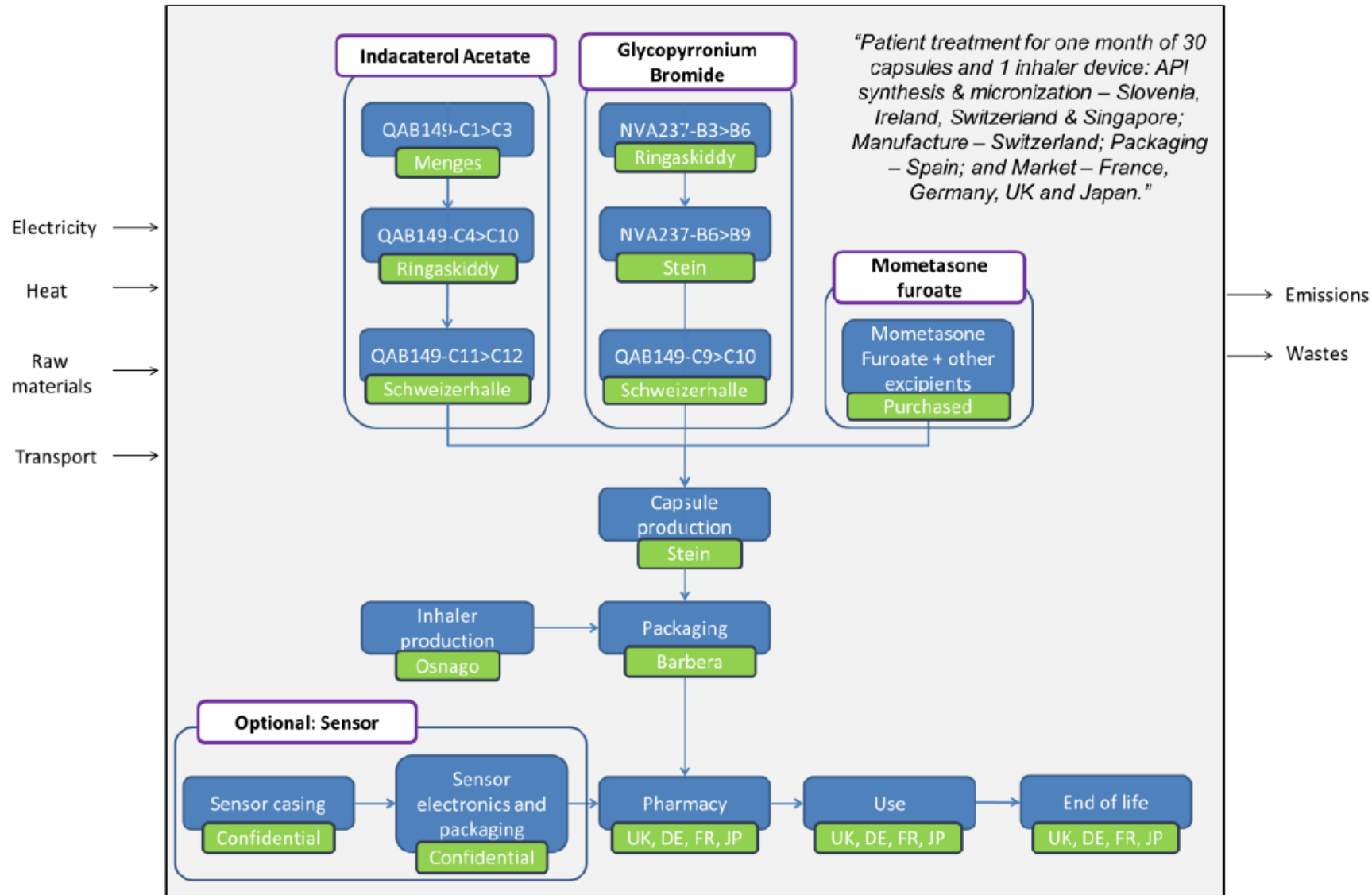


pMDI

- No HFA gas used
- Refillable
- Mainly plastic

- HFA gas used
- Single-use
- Plastic casing and aluminium canister

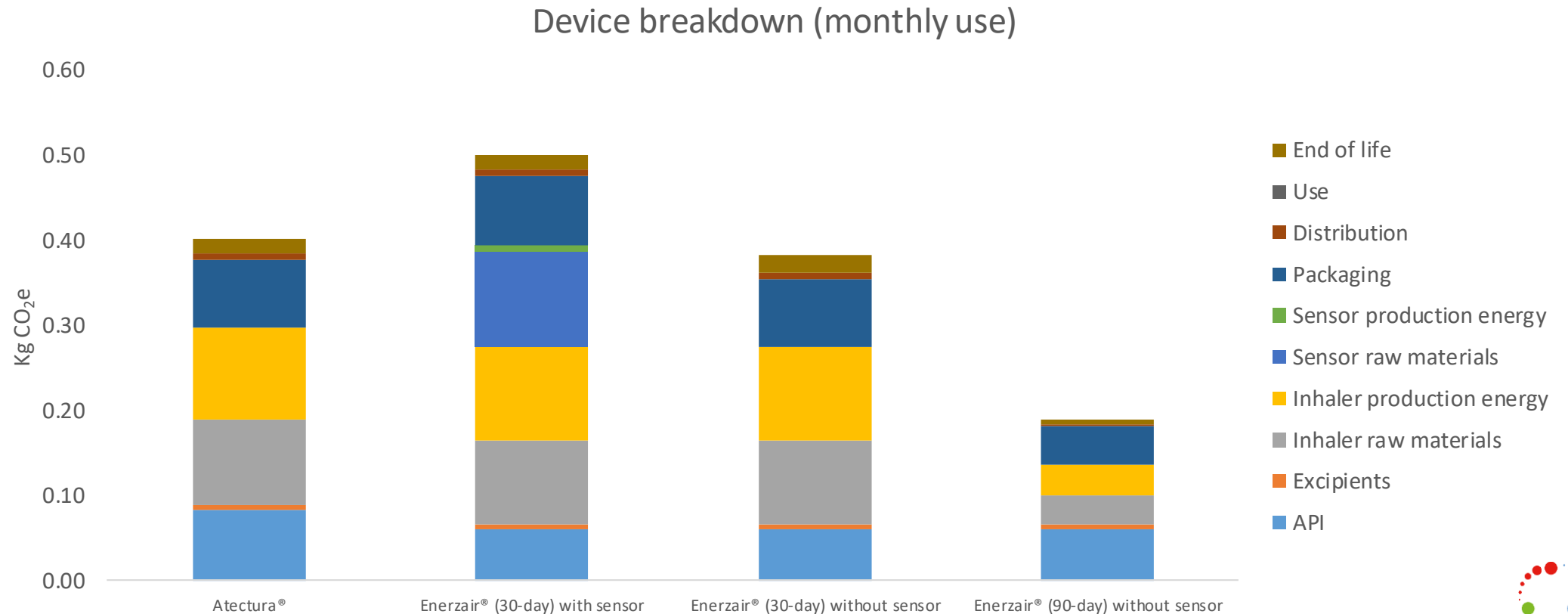
# The Breezhaler® Life Cycle



- Data collected for all inputs and outputs from each stage of the production life cycle
- This enables us to build a holistic view of the entire product life cycle
- Data included information on materials, energy use, locations and waste streams

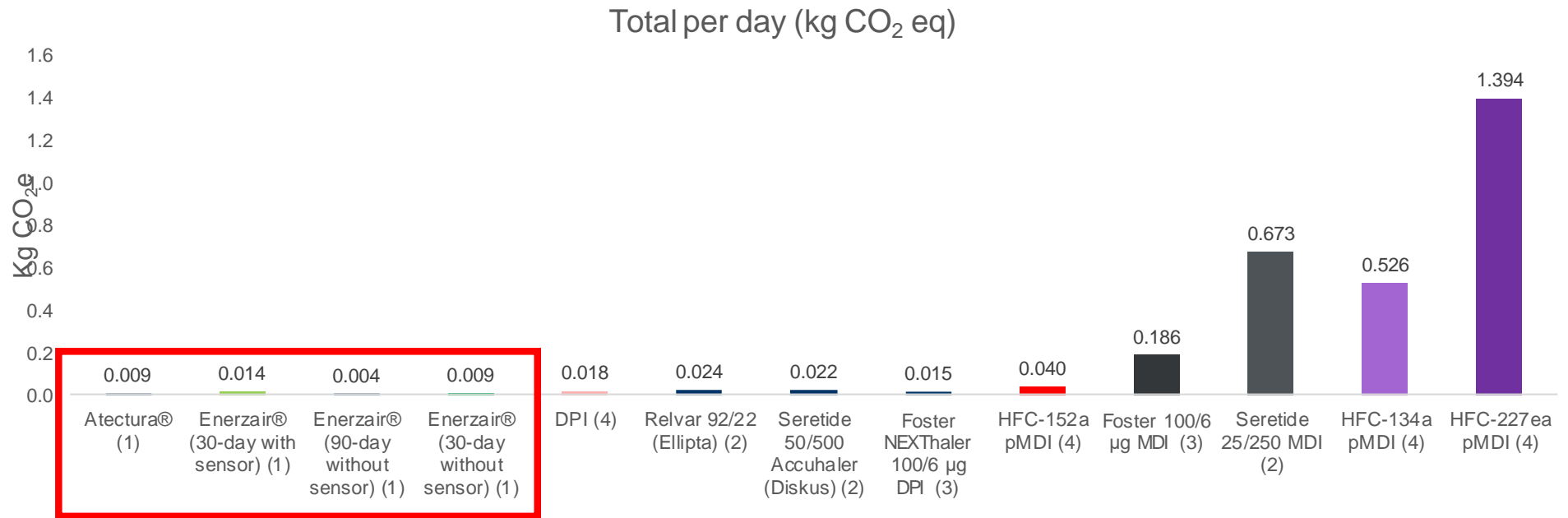
# Results

- Results were extracted for four geographies (UK, Germany, France, Japan) - only UK results are shown below



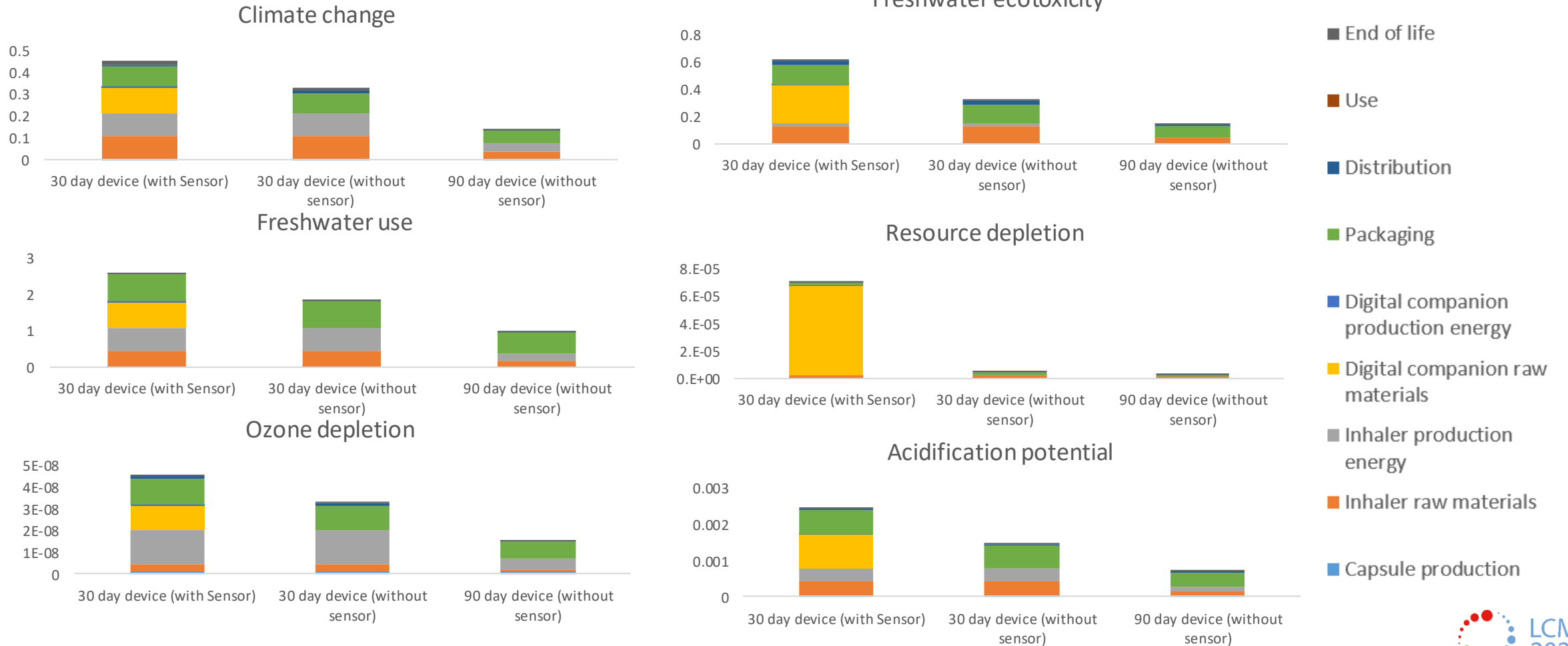
# Comparisons with Similar Products

- Data for other inhaler products were taken from literature sources.
- This table compares products excluding API (not included in some studies), with the Novartis devices highlighted and showing their impact to be small
- Other DPI devices also have a low footprint, far exceeded by those of pMDI products



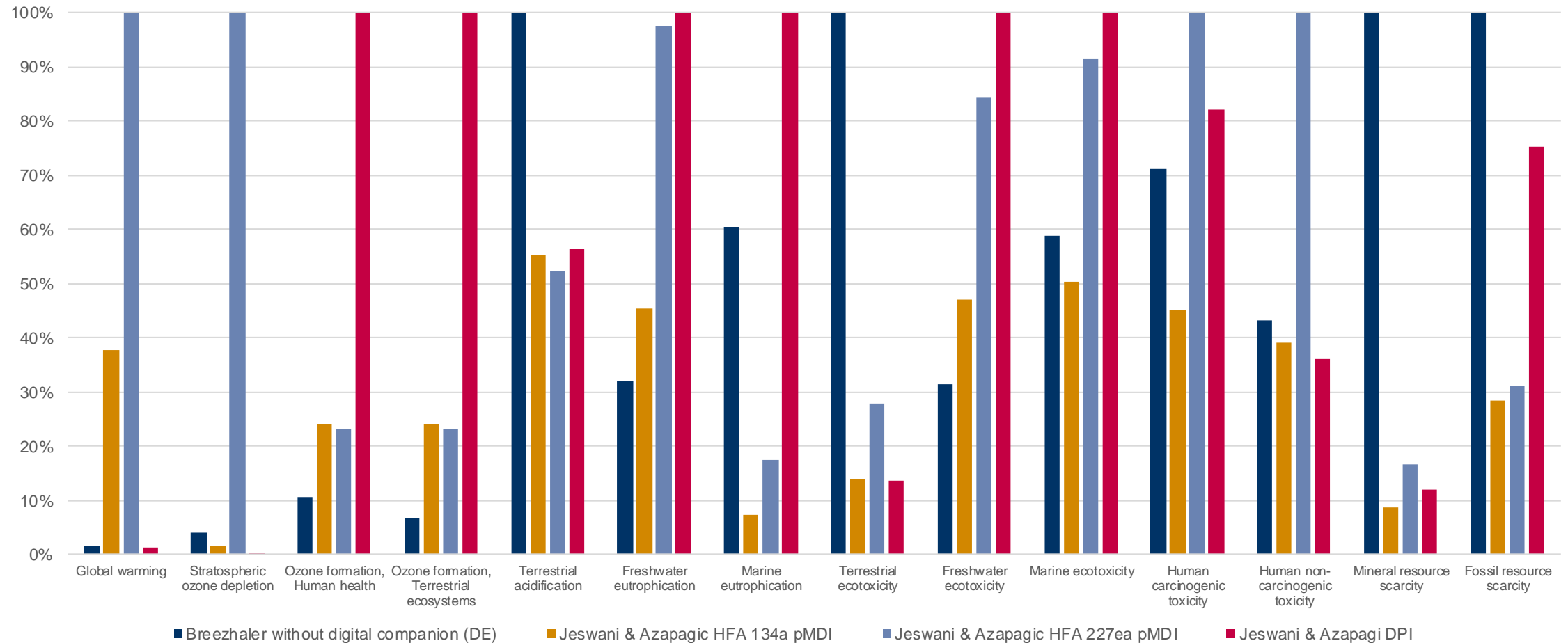
- Adapted from Life-Cycle Assessment of the Breezhaler® Breath-Actuated Dry Powder Inhaler, Fulford, B *et al. Sustainability* 2021, 13(12), 6657
- Adapted from Product Carbon Footprint Certification Summary Report, Carbon Trust (2014)
- Adapted from Environmental impact of inhalers for respiratory diseases: decreasing the carbon footprint while preserving patient-tailored treatment Panigone S, *et al. BMJ Open Res* 2020;7:e000571. doi:10.1136/bmjresp-2020-000571.
- Adapted from Life cycle environmental impacts of inhalers Jeswani, HK & Azapagic, A. 2019, *Journal of Cleaner Production*, vol. 237, 117733. <https://doi.org/10.1016/j.jclepro.2019.117733>.

# Life Cycle Assessment (LCA)





# LCA comparison

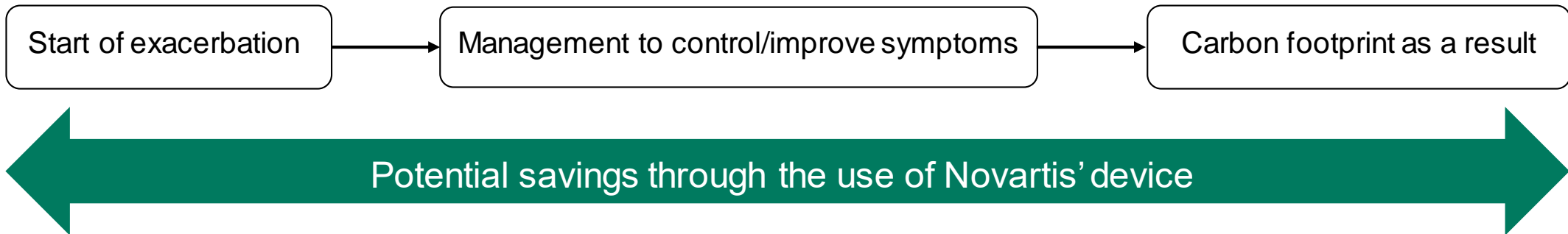


Notes: Adapted from Life-Cycle Assessment of the Breezhaler® Breath-Actuated Dry Powder Inhaler, Fulford, B *et al. Sustainability* 2021, 13(12), 6657 and Life cycle environmental impacts of inhalers Jeswani, HK & Azapagic, A. 2019, *Journal of Cleaner Production*, vol. 237, 117733. <https://doi.org/10.1016/j.jclepro.2019.117733>  
 Breezhaler results re-extracted using Recipe 2016 V1.04 to try to be consistent with Jeswani and Azapagic  
 LCA study system boundaries and assumptions may differ between the studies from which these results are drawn, to the extent that they should not be precisely compared.



# Asthma Exacerbation Study

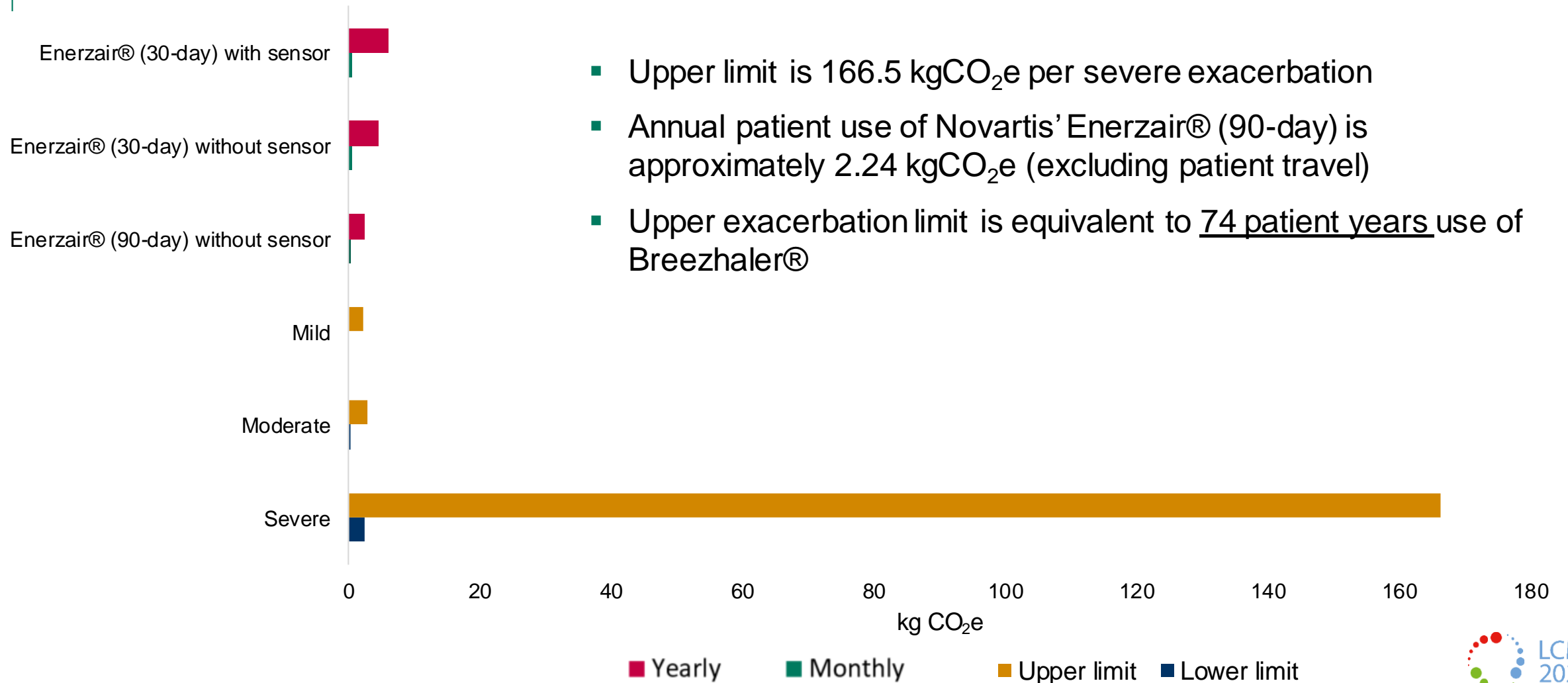
- Inhaled medicines reduce asthma exacerbations compared with alternatives
- Carbon footprint study carried out to quantify the climate change impact of asthma exacerbations (mild -> severe)
- Compare this product benefit against the impact of the Breezhaler® device itself



VS



# Exacerbation Study Results





**Thank you**

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