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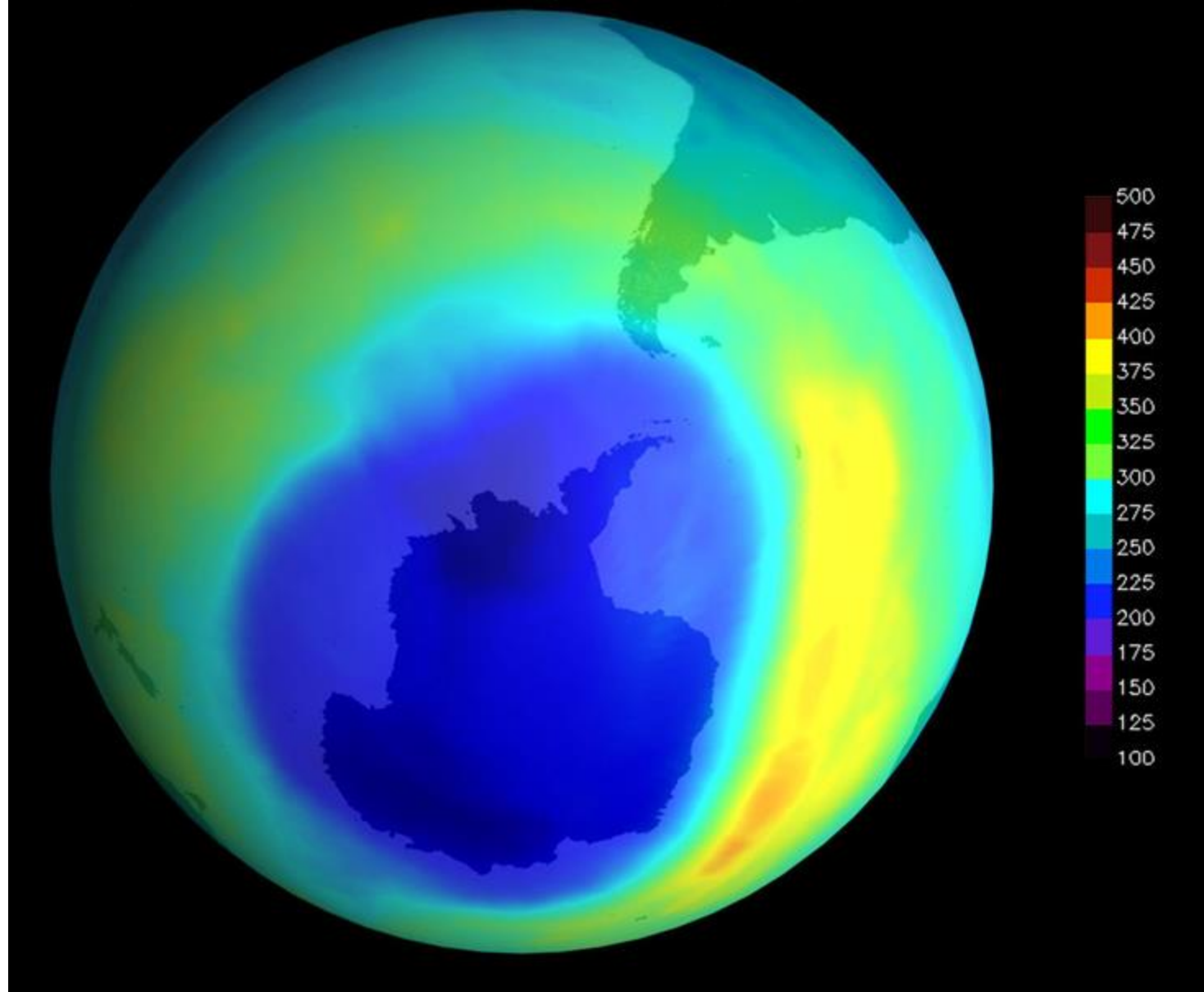
Treatment strategies on national levels

Prof. Christer Janson
Sweden

Conflicts of interest

- Prof. Janson has received honoraria for educational activities and lectures from AstraZeneca, Boehringer Ingelheim, Chiesi, GlaxoSmithKline, Novartis, Orion and Sanofi, and has served on advisory boards arranged by AstraZeneca, Boehringer Ingelheim, GlaxoSmithKline, Novartis, Sanofi and TEVA

Ozone • September 6, 2000 • Total Ozone Mapping Spectrometer (TOMS)





1989

HFC hydrofluorocarbons



CFC
chlorofluorocarbons



2013

Final CFC-containing MDIs to be banned

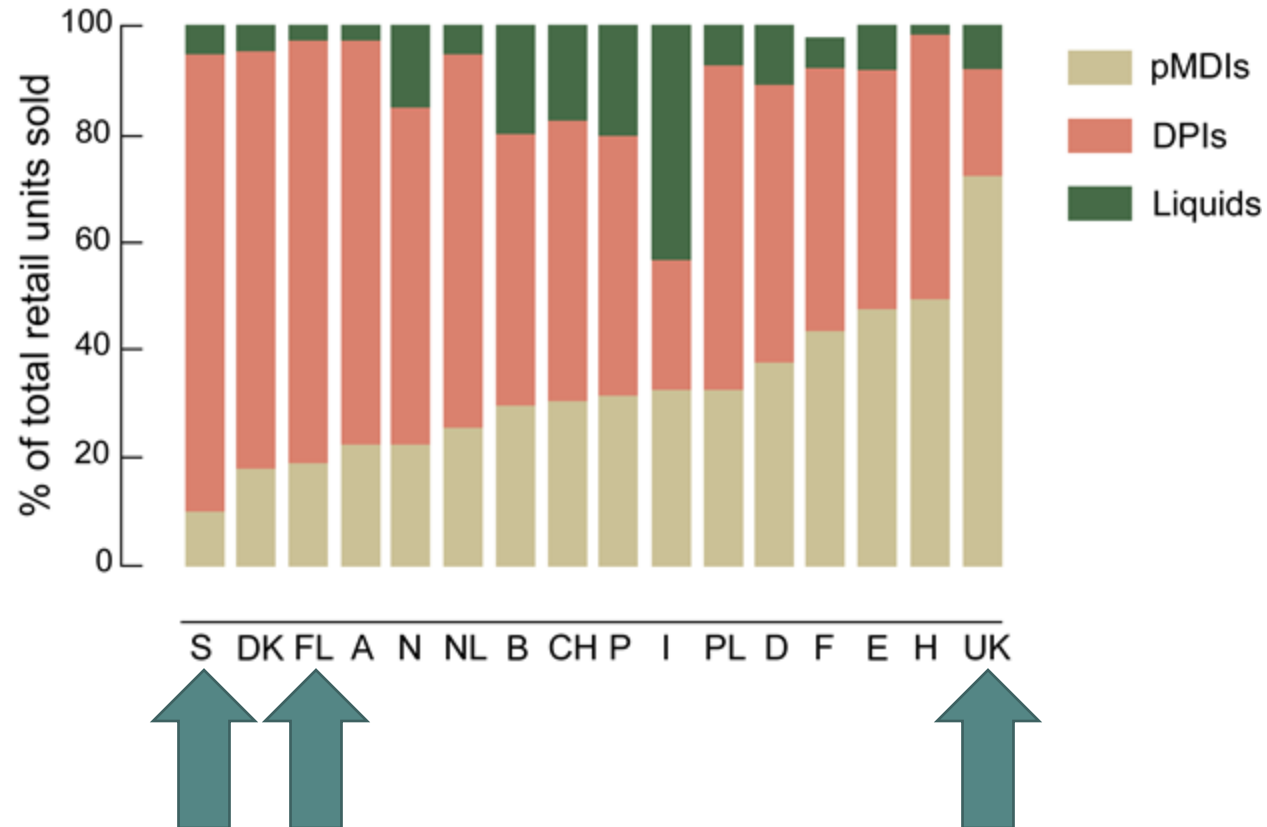


Soft mist inhaler



DPI

Retail sales of inhalation devices in European countries: So much for a global policy



A, Austria; B, Belgium; CH, Switzerland; DK, Denmark; E, Spain; F, France; FL, Finland; H, Hungary; I, Italy; D, Germany; N, Norway; NL, The Netherlands; P, Portugal; PL, Poland; S, Sweden; UK, United Kingdom.

DPIs, dry-powder inhalers; LABA, long-acting β_2 -agonist; LAMA, muscarinic antagonist; pMDIs, pressurised metered-dose inhalers; SABA, short-acting β_2 -agonist; SAMA, muscarinic antagonist.

Comparing SABA given with pMDI and DPI

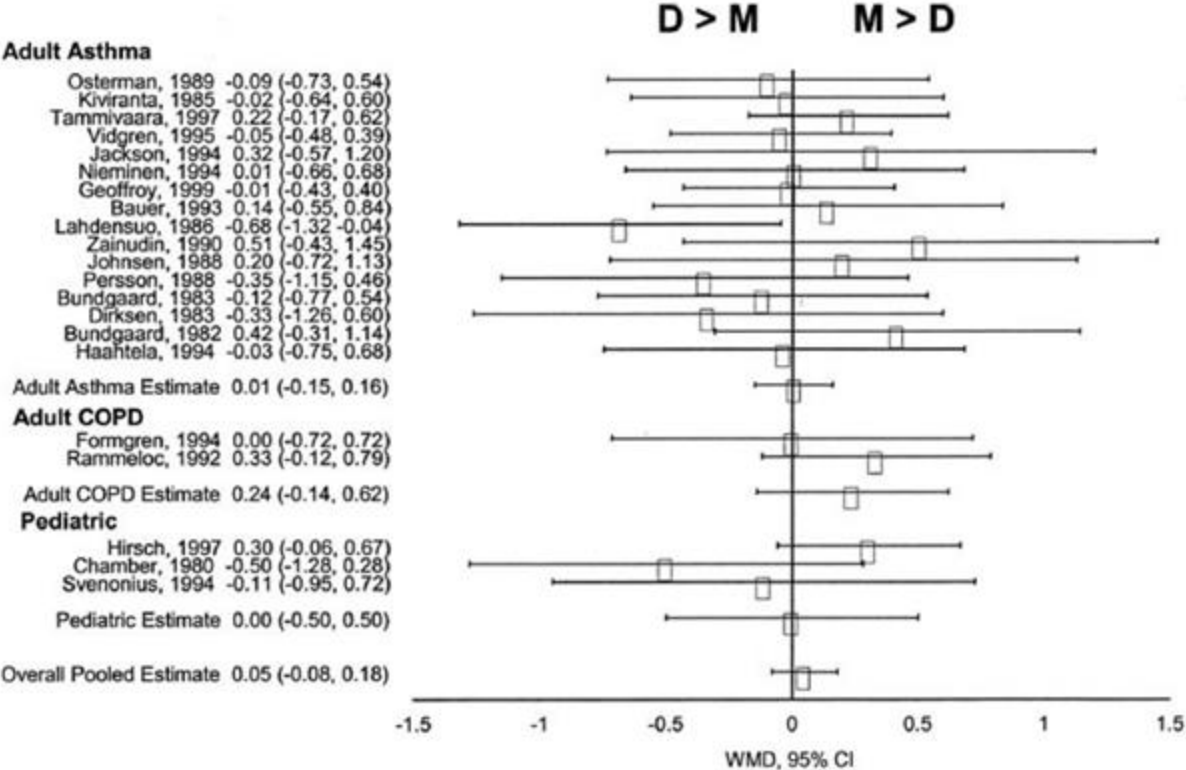
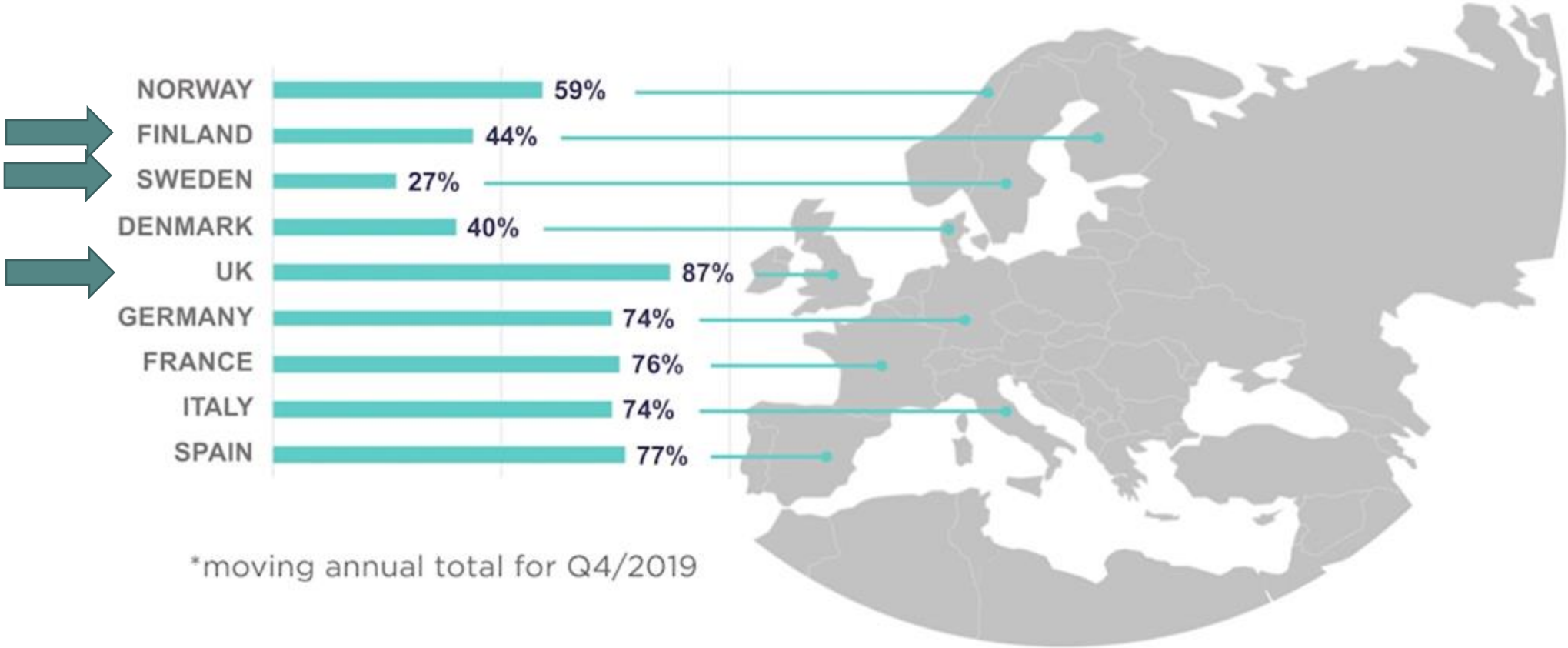


FIGURE 7. Weighted standardized mean difference for combined end point (FEV₁, PEF, or sGaw) in outpatient β_2 -agonist trials comparing MDI (M) vs DPI (D). See the legend of Figure 2 for abbreviations not used in the text.

pMDI market share of total sales units by country



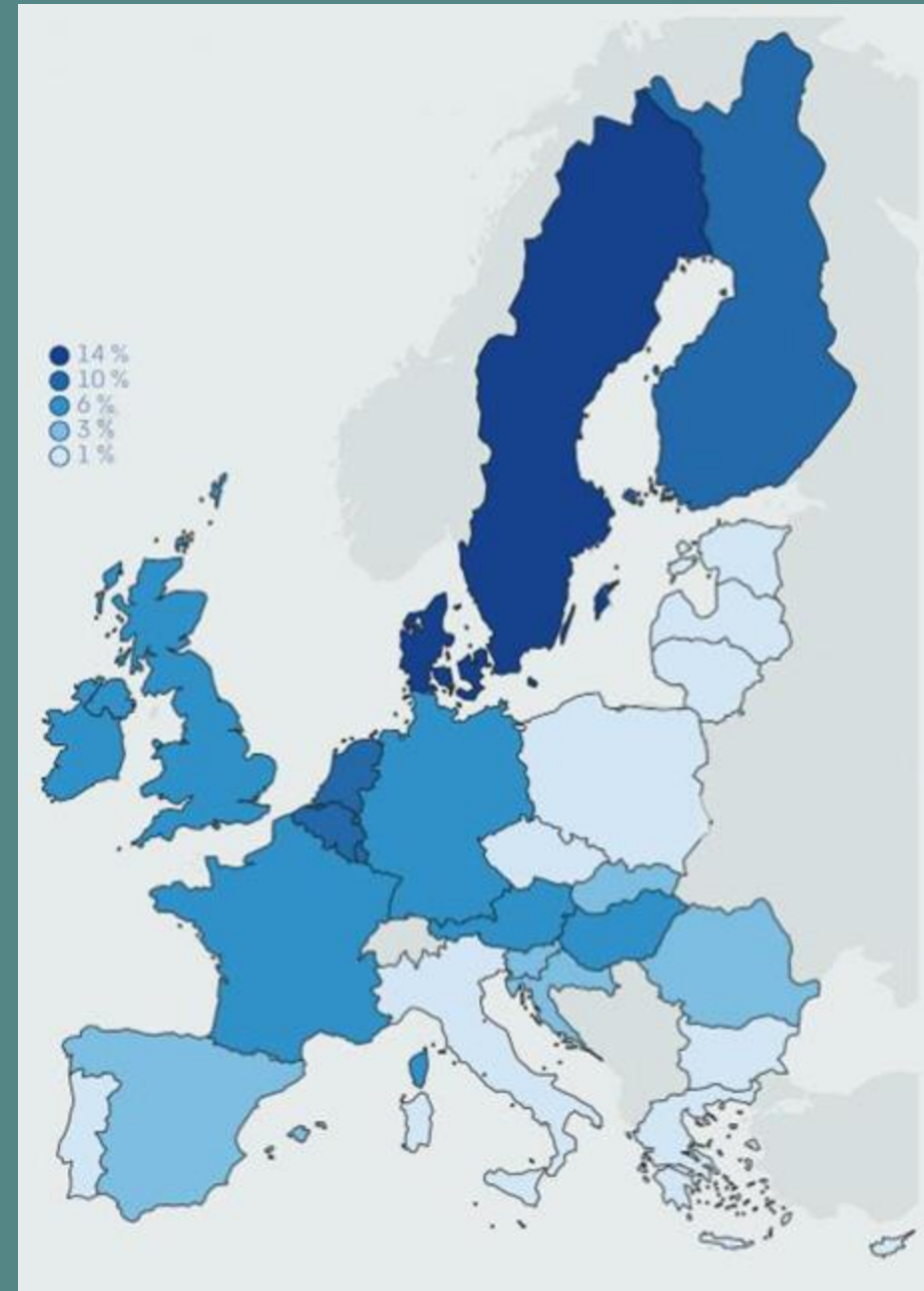
Global warming potential (GWP) for different propellants

- GWP given as equivalent CO₂ (CO₂e)

Gas	CO ₂	CFC-11/12	HFC 134a	HFC 227ea
GWP	1	CFC-11: 4750 CFC-12: 10900	1430	3220
Example of use	---	No longer in use	<ul style="list-style-type: none">• Seretide Evohaler• Ventolin Evohaler	Used in some other inhalers

CFC: chlorofluorocarbons HFC: hydrochlorofluorocarbons GWP: global warming potential (/100 years)⁵

The EU should give priority to the climate



Med Turbuhaler® kom *enkelheten* in i astmaterapin.



*Och numera är den
Sveriges mest använda
inhalator.*

TURBUHALER introducerades i astmaterapin som den *första färdigaddade pulverinhalatorn*. Framgången lät inte vänta på sig, många insåg snabbt hur enkelt det blev för patienterna att ta sin astmamedicin.

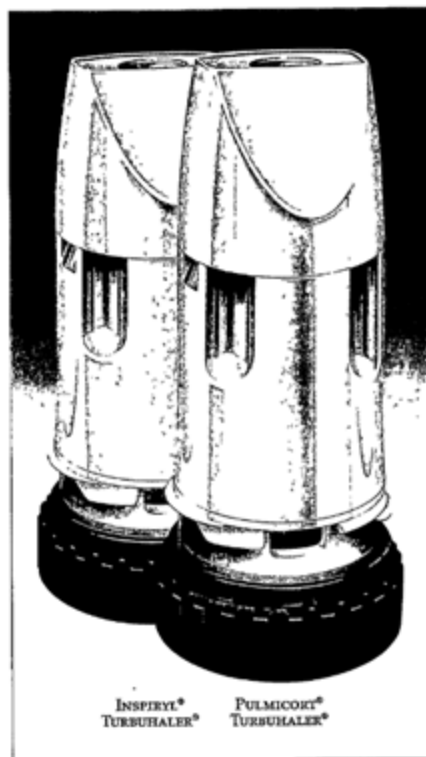
Därför har det varit självklart för oss att vidareutveckla idén med Turbuhaler, göra den tillgänglig för flera.

Det senaste tillskottet i "Turbuhaler-familjen" är INSPIRYL® TURBUHALER®. Den innehåller *salbutamol*, en välkänd och väldokumenterad bronkdilaterare, som sedan länge använts som aktiv substans i bland annat Ventoline.

Inspiry! Turbuhaler tillsammans med inhalationssteroiden PULMICORT® TURBUHALER® (*budesonid*) ger Dig goda möjligheter att behandla astma:

Pulmicort för att minska inflammationen i luftvägarna och *Inspiry!* för att häva akuta symptom.

Och *Turbuhaler* för att göra det enkelt, både för Dig och Dina patienter.



TURBUHALER®
Gör det enkelt.

1996

Proportion of MDI use in different classes 2017 and potential reduction in kilo tons (kt) of CO₂e if changing proportion of MDI use in the England to the level of Sweden



	England: inhalers/year	England: % MDI	Sweden: % MDI	England: CO ₂ e (kt) per year	England: Potential annual reduction of CO ₂ e (kt)
SABA	21 931 511	94	10	414.00	350.0
LABA	700 195	65	2	9.30	8.4
SAMA	421 191	100	100	8.40	0
ICS	6 733 445	94	15	127.00	101.0
ICS + LABA	14 075 067	47	13	140.00	91.0
LAMA and LAMA + LABA	6 549 448	0	0	6.55	0
LAMA + LABA + ICS	5211	99	100	-0.10	0
Total	49 994 877	70	13	705.0	550.0

Reliever therapy for asthma



Number of successfully treated patients

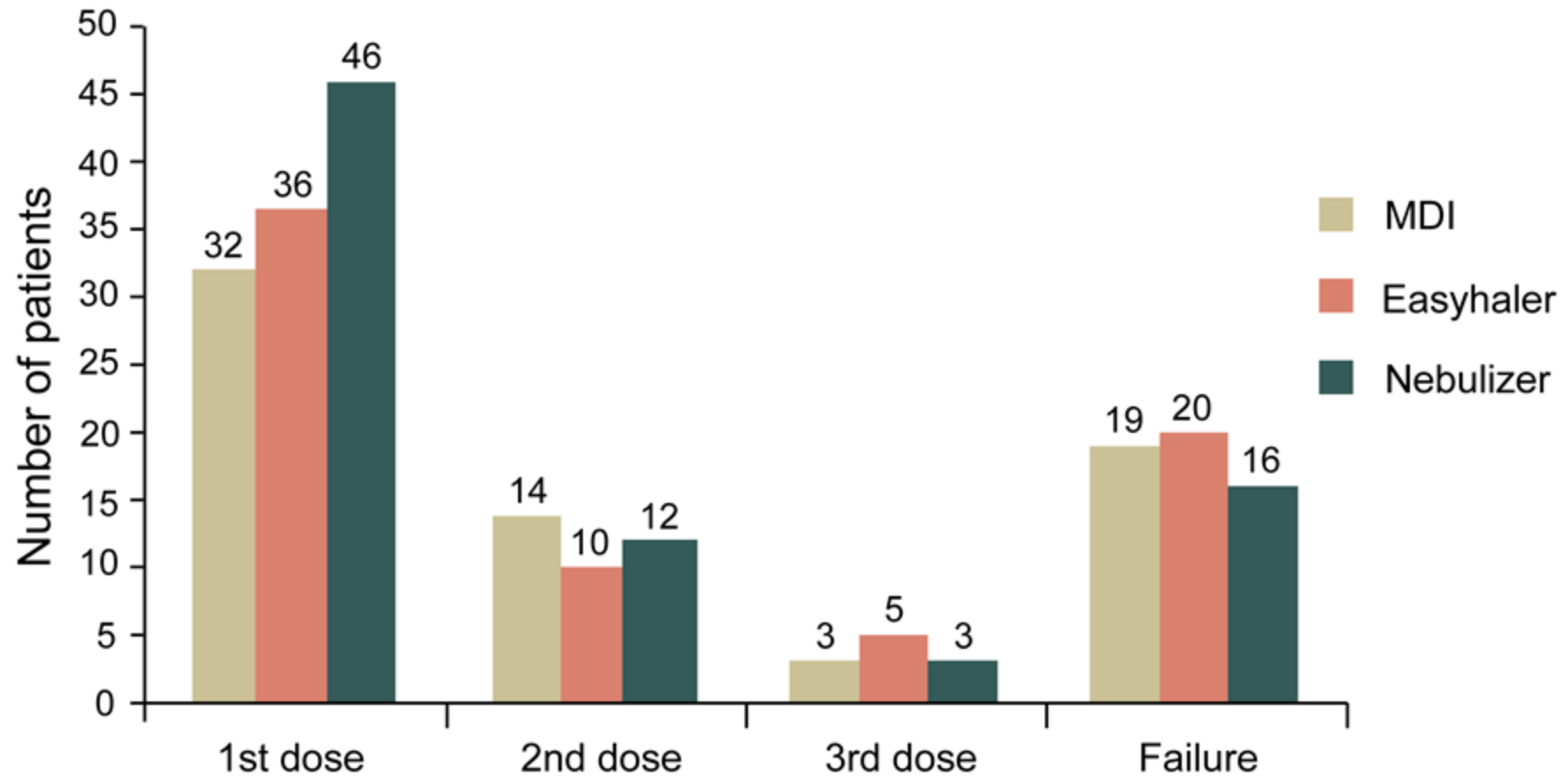



Figure 1. Number of successfully treated patients with study medications



OPEN ACCESS

Carbon footprint impact of the choice of inhalers for asthma and COPD

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ABSTRACT

In the 1990s, metered dose inhalers (MDIs) containing chlorofluorocarbons were replaced with dry-powder inhalers (DPIs) and MDIs containing hydrofluorocarbons (HFCs). While HFCs are not ozone depleting, they are potent greenhouse gases. Annual carbon footprint (CO₂e), per patient were 17 kg for Relvar-Ellipta/Ventolin-Accuhaler; and 439 kg for Seretide-Evohaler/Ventolin-Evohaler. In 2017, 70% of all inhalers sold in England were MDI, versus 13% in Sweden. Applying the Swedish DPI and MDI distribution to England would result in an annual reduction of 550 kt CO₂e. The lower carbon footprint of DPIs should be considered alongside other factors when choosing inhalation devices.

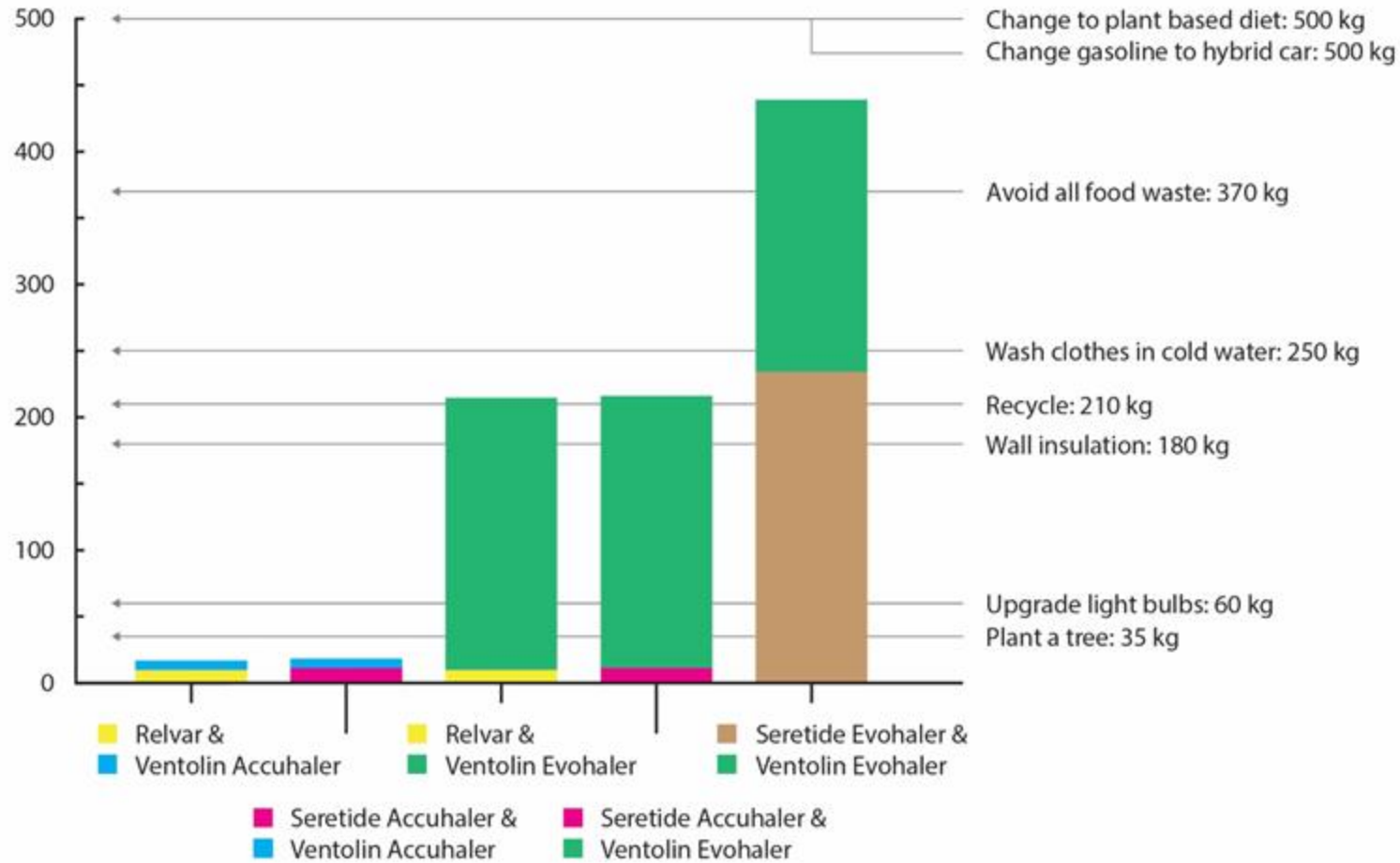
METHODS

The CO₂e of average use of three ICS and long-acting β₂-agonist combinations Relvar[®] Ellipta (fluticasone furoate/vilanterol) (DPI), Seretide[®] Accuhaler (fluticasone propionate/salmeterol) (DPI), Seretide Evohaler (MDI) and two short acting β₂-agonists Ventolin[®] Accuhaler (salbutamol) (MDI), and Ventolin Evohaler (MDI) in asthma and COPD have been estimated based on individually produced carbon footprints by GlaxoSmithKline and certified by the Carbon Trust. This was achieved by taking into account the whole life cycle of the device: production of pharmaceutical ingredients and the final product, packaging of product, distribution and storage, use and disposal (online supplementary file).

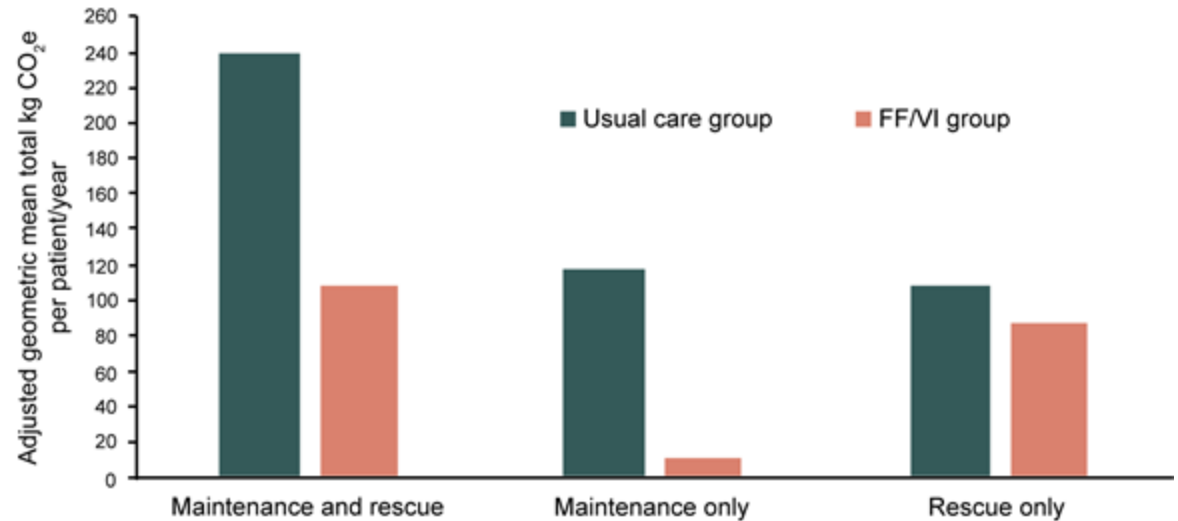
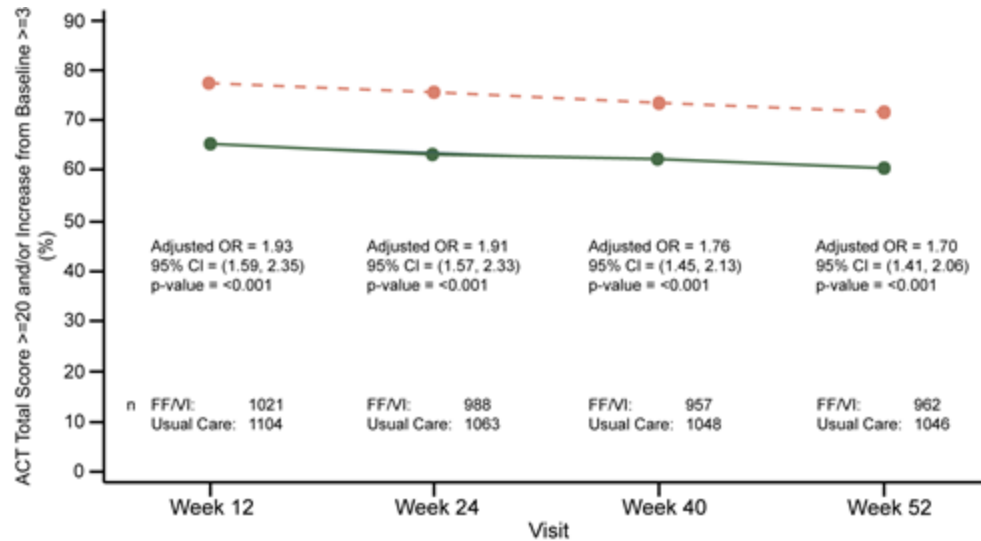
Data on the prescriptions dispensed of inhale

Kg CO₂e/ year

CO₂e saving effect/year



Effects of switching from a metered dose inhaler to a dry powder inhaler on climate emissions and asthma control: post-hoc analysis



Miljö och lunghälsa – ett yttrande från Svensk Lungmedicinsk Förening (SLMF)

Hydrofluorocarbons (HFCs) now used in inhalation sprays - pMDI (pressurized metered dose inhalers) - are powerful greenhouse gases, with 1400–3200 times more negative climate impact than carbon dioxide.

If equivalent alternatives exist, inhaler devices with the least negative environmental impact should be recommended.

Choice of inhaler



MDI

DPI
SMI

Clinical effect
Inhalation technique
Inspiratory flow
Coordination
Patient's preference
Price

GWP

Conclusion

- There are large differences between countries in the use of inhaler devices
- In most patients DPIs and MDIs are equally effective
- The high use of DPIs in Sweden was historically probably not a result of environmental awareness
- The awareness that inhalers using HFC as propellants have 20 times larger GWP than DPIs is increasing
- Choosing inhalers that do not contain HFC is a way for health care workers to influence the environment in a positive way.