PATIENTS' PERSPECTIVES ON THE ENVIRONMENTAL IMPACT OF INHALERS IN OBSTUCTIVE PULMONARY DISEASE

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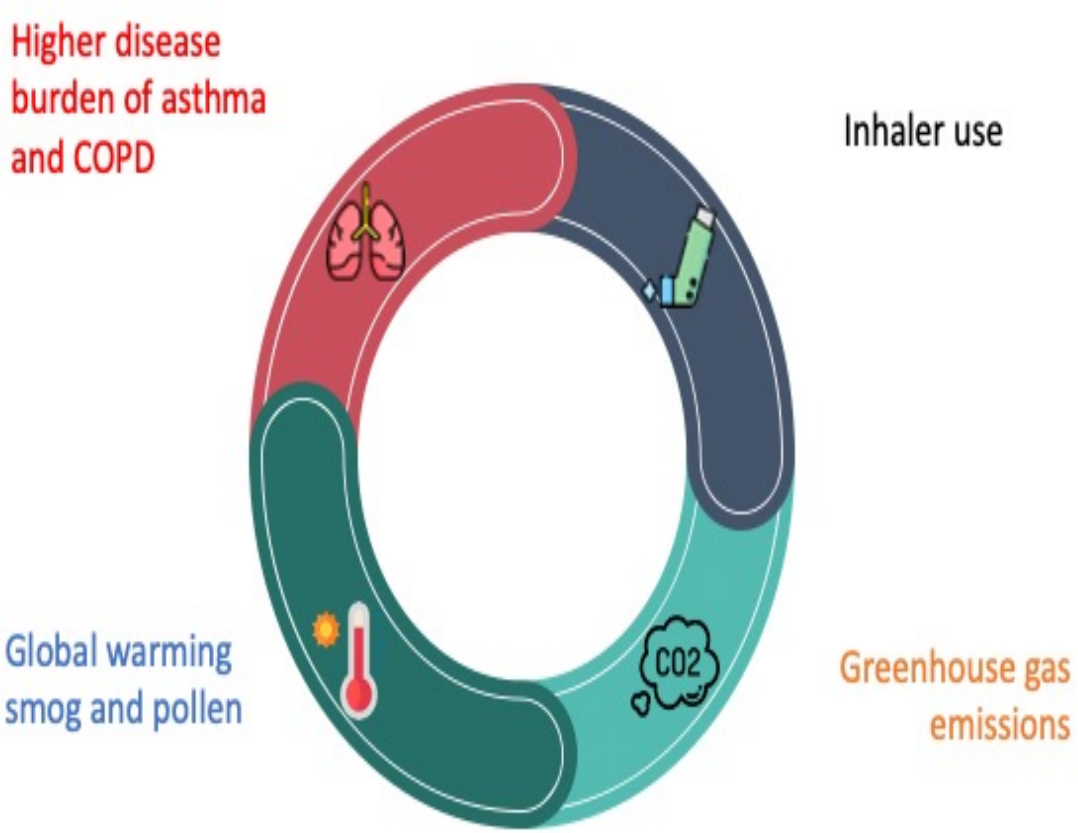
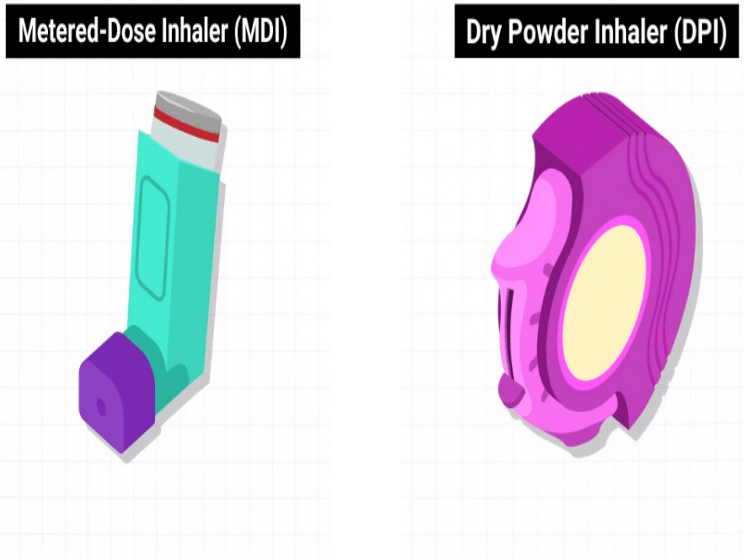
CLIMATE CHANGE



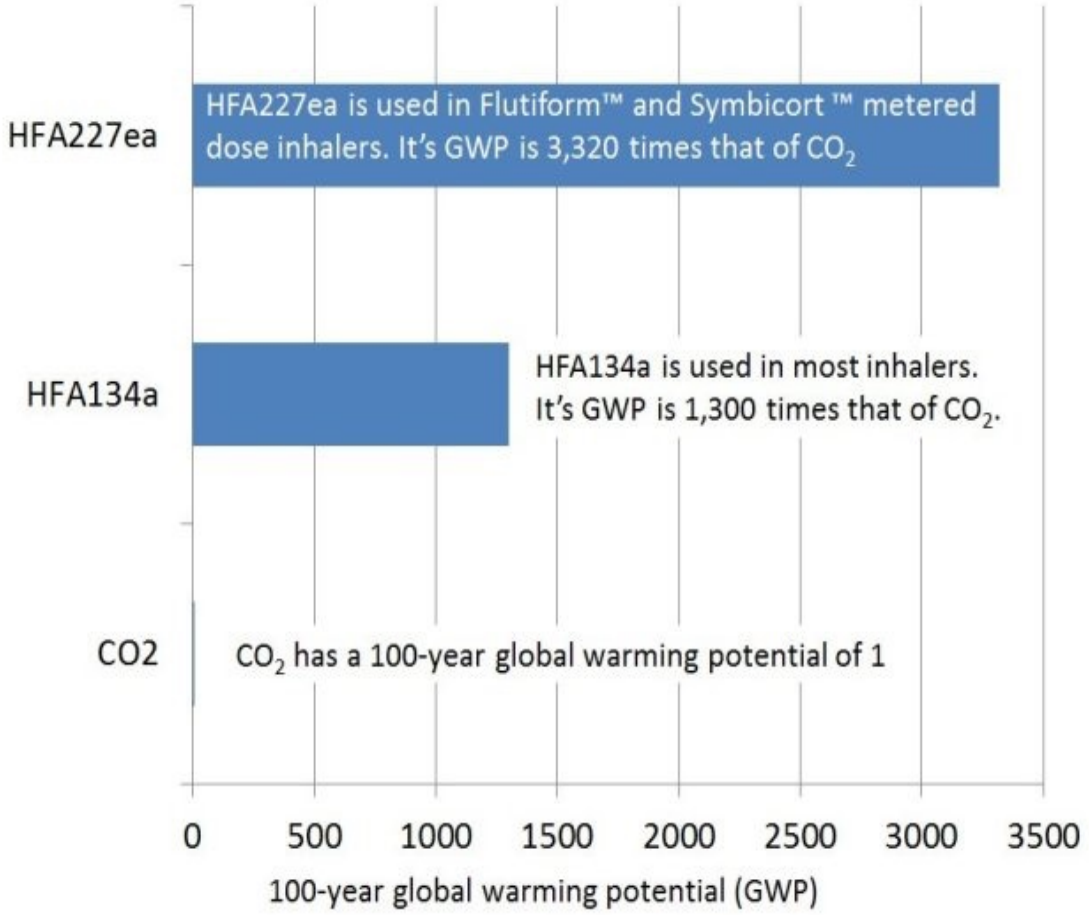
THE INHALER PARADOX



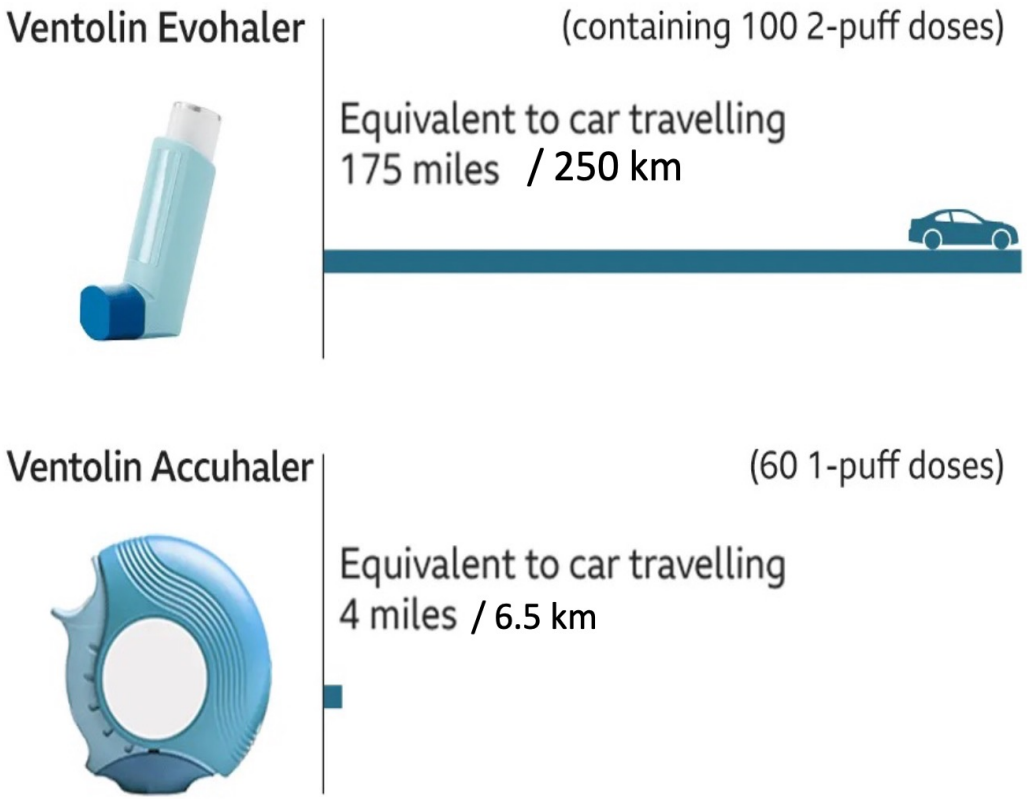
- Propellant based (hydrofluoroalkane gases - **HFAs**)
- Non-propellant based

THE INHALER PARADOX

Global Warming Potential (GWP)

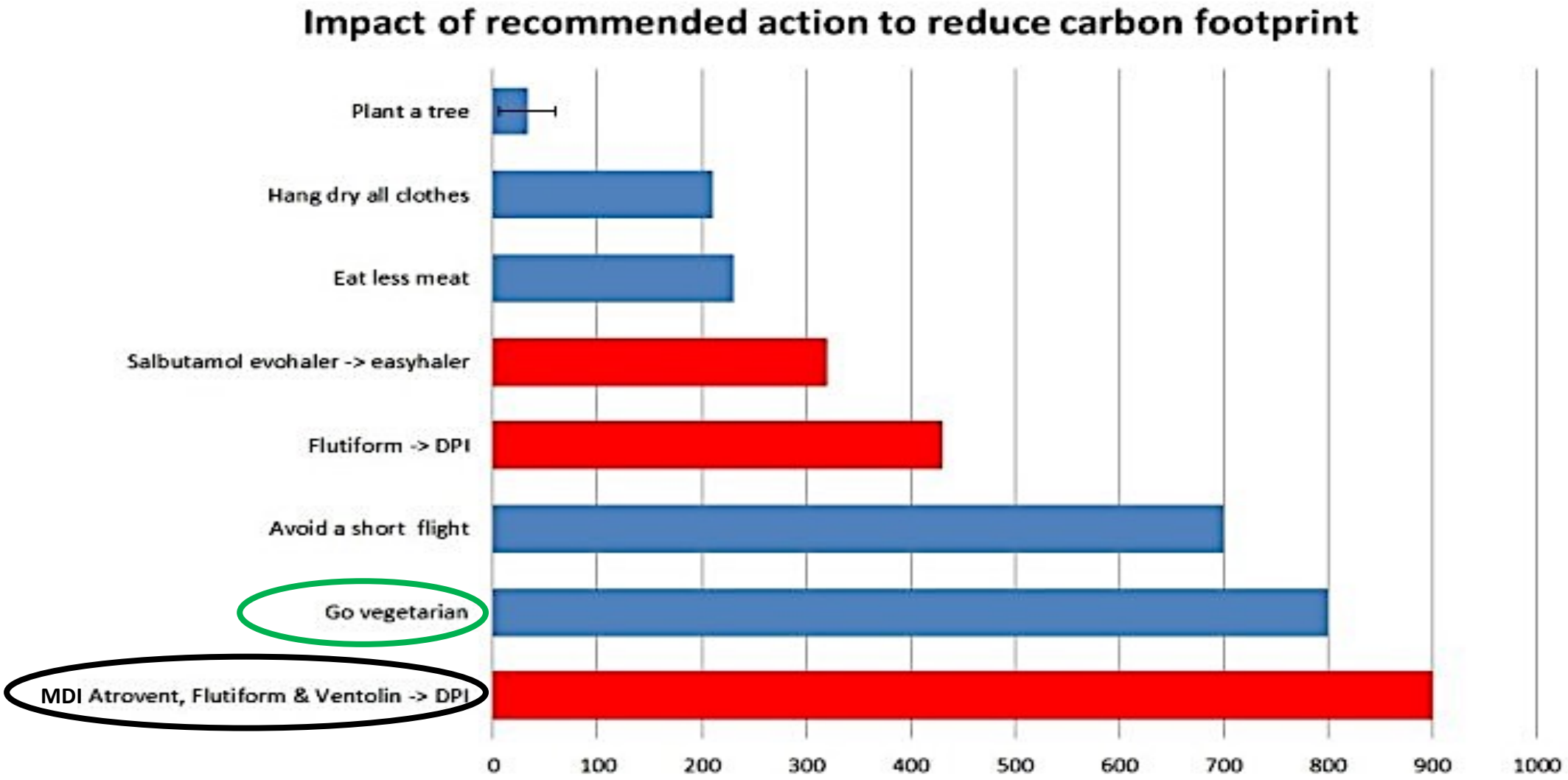


Some inhalers have a large carbon footprint ("CO_2 equivalent")



https://www.gov.scot/publications/nhs-scotland-climate-emergency-sustainability-strategy-2022-2026

Ventolin® - salbutamol



Greenhouse gas impact of various recommended actions (based on mean values from Wynes and Nicolas 2017 Envriron. Res. Let. 12 091001) compared to some inhaler switches. Assumes one of each inhaler used monthly.

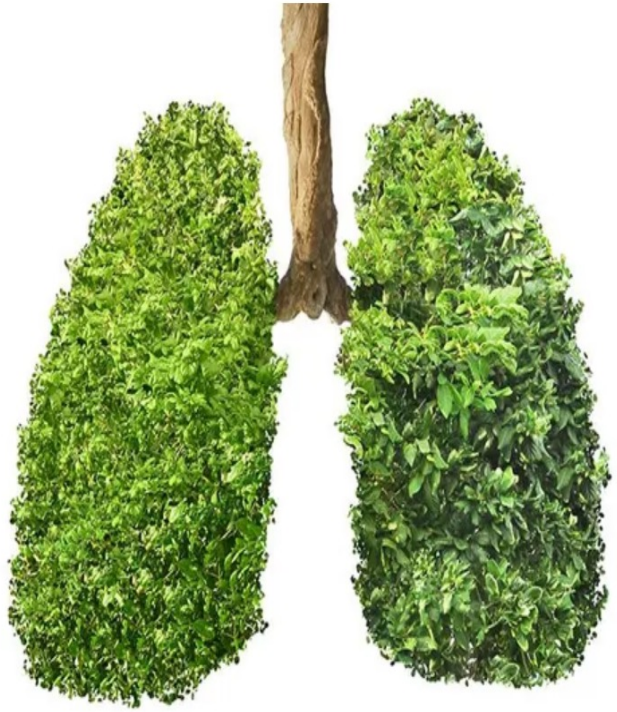
GREENER CHOICES IN HEALTHCARE: WHEN SAFE, GO LOW-IMPACT!

ERS EUROPEAN RESPIRATORY SOCIETY
every breath counts

British Thoracic Society

The National Academies of SCIENCES ENGINEERING MEDICINE

ISQua
International Society for Quality in Health Care



British Thoracic Society | NICE National Institute for Health and Care Excellence | Healthcare Improvement Scotland SIGN

Asthma inhalers and climate change

What is this decision aid about?

Inhalers are a key part of treating your asthma. The most important thing is that your asthma is kept as well controlled as possible, using inhalers that suit you well.

Box 2 NHG Guidelines 'Asthma in adults' (2020) and 'COPD' (2021)

One of the criteria in the decision aid for choosing an inhaler device is: A general objection against metered-dose inhalers is that they contain a greenhouse gas with a strong environmental impact.
Note: Metered-dose inhalers use hydrofluorocarbon propellants. The F-gas hydrofluorocarbon does not affect the ozone layer but is a strong greenhouse gas. The environmental impact of 1 inhalation is 25 times larger than a dry powder inhalation. Environmental impact of production, transport and waste processing (...) have not been included.

Belgian lung specialists recommend environmentally friendly inhalers that produce better treatment results for lung patients

Dry-powde
inhalers.

2 july 2019

The department heads of Belgian university hospitals are recommending the use of dry-powder inhalers to lung patients because they can deliver better treatment results for asthma and COPD. Moreover, they are far less damaging to the environment than traditional propellant driven aerosols. The outgoing Minister of Health, Maggie De Block, supports their initiative.

THE AIM OF THE STUDY

- To assess asthma and COPD patients' attitudes toward

the environmental impact of inhalers

factors influencing their inhaler choices

STUDY DESIGN

- **Setting**: Novi Sad (360000 inhabitants), Serbia
- **Study sample:** adult asthma and COPD patients at the Polyclinic Department of the Institute for Pulmonary Diseases of Vojvodina, Novi Sad
- **Study period:**

  15th November 2023 - 20th January 2024
- **Ethical approval:**

✓Ethics Committee of the Institute for Pulmonary Diseases of Vojvodina

Study instrument

The questionnaire*

Sociodemographic, clinical and medication characteristics of participants

- Patients' satisfaction with inhaler use and symptom control
- patients' attitudes on environmental concerns and inhaler choice

Patients' agreement with switching inhaler types:
- for personal reasons
- based on their doctor's advice.

At the end, participants read a brief note on HFA inhalers' environmental impact and were again asked if it would affect their decision to switch.

*Woodall MJ. et al. The New Zealand Medical Journal 2023;136(1573):94-105.

Data analysis

- IBM SPSS Statistics 22 software (IBM Corporation, Armonk, New York, USA)

- Chi-squared test
- Man Whitney U test
- Fisher’s test
- $p<0.05$


RESULTS

104 patients

SOCIODEMOGRAPHIC CHARACTERISTICS		N	(%)
Gender	Male	46	(44.23)
	Female	58	(55.77)
Age	20-50 years	28.	(26.92)
	51-75 years	64	(61.54)
	76+ years	12	(11.54)
Marital status	Married/married	60	(57.69)
	Unmarried/unmarried	12.	(11.54)
	Divorced	20	(19.23)
	Widower/widow	12	(11.54)
Level of education	Primary school/ High school	57	(54.81)
	Faculty	40	(38.46)
	Master/Doctorate	7	(6.73)
Occupational status	Employed	45	(43.27)
	Unemployed	9	(8.65)
	Retired	50	(48.08)
Diagnosis of pulmonary disease	COPD	40	(38.46)
	Asthma	64	(61.54)
The duration of pulmonary disease	Less than 5 years	28	(26.92)
	5-9 years	34	(32.69)
	10-14 years	21	(20.19)
	More than 15 years	21	(20.19)
How often do you use an inhaler?	1-2 times a day	64	(61.54)
	2-3 times a day	19	(18.27)
	Once a week or less	0	(0.00)
	Only if necessary	21.	(20.19)
What type of inhaler do you use?	MDI	52	(50.00)
	DPI	22	(21.15)
	SMI	3	(2.88)
	MDI & DPI	27	(26.05)

Patient Satisfaction with Inhaler Ease of Use and Symptom Control

Statements	Satisfaction	Total
Ease of inhaler use	Unsatisfied	11.5%
	Satisfied	88.5%
Relief/prevention of symptoms	Unsatisfied	11.5%
	Satisfied	88.5%

Statements	Satisfaction	Type of inhaler				p
		MDI	DPI	SMI	MDI & DPI	
Ease of inhaler use	Unsatisfied	13.5%	13.6%	16.7%	4.2%	0.548
	Satisfied	86.5%	86.4%	83.3%	95.8%	
Relief/prevention of symptoms	Unsatisfied	7.7%	9.1%	16.7%	20.8%	0.297
	Satisfied	92.3%	90.9%	83.3%	79.2%	

Patient Attitudes on Environmental Concerns and Inhaler Choice

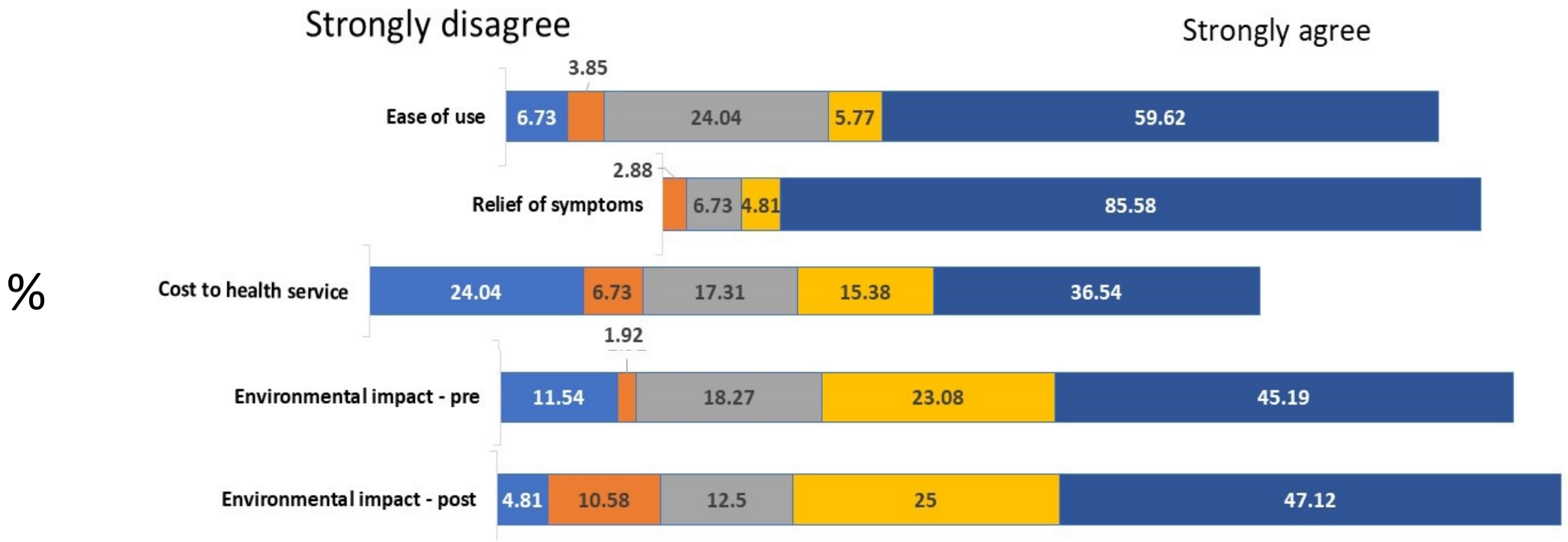
Statements	Respondents' satisfaction	Total
I think global warming is an important problem.	Disagree	23.08%
	Agreed	76.92%
I care about both my healthcare and its environmental impact.	Disagree	33.65%
	Agreed	66.35%
I'm aware that some inhalers contribute more to global warming.	Disagree	82.69%
	Agreed	17.31%

Statements	Change of inhaler due to environmental reasons – personal choice		(p)
	No	Yes	
I think global warming is an important problem.	45.5%	12.7%	<0.001
	54.5%	87.3%	
I care about both my healthcare and its environmental impact.	57.6%	22.5%	<0.001
	42.4%	77.5%	
I'm aware that some inhalers contribute more to global warming.	84.8%	81.7%	0.692
	15.2%	18.3%	

Statements		I think GW is an important problem.		Chi square test (p)	I care about both my healthcare and its environmental impact.		Chi square test (p)	I'm aware that some inhalers contribute more to GW.		Chi square test (p)
Respondents' agreement		Disagree (%)	Agree (%)		Disagree (%)	Agree (%)		Disagree (%)	Agree (%)	
Gender	Male	19.60	80.40	0.573 (0.449)	43.50	56.50	3.566 (0.059)	73.90	26.10	4.442 **(0.035)**
	Female	25.90	74.10		25.90	74.10		89.70	10.30	
Age group	20-50 years	21.40	78.60	0.073 (0.964)	35.70	64.30	4.203 (0.122)	82.10	17.90	2.630 (0.268)
	51-75 years	23.40	76.60		28.10	71.90		85.90	14.10	
	76+ years	25.00	75.00		58.30	41.70		66.70	33.30	
Level of education	Primary/ High school	31.60	68.40	5.891 (0.053)	40.40	59.60	4.935 (0.085)	86.00	14.00	8.337 **(0.015)**
	Faculty	15.00	85.00		30.00	70.00		85.00	15.00	
	Master's /PhD degree	0.00	100.00		0.00	100.00		42.90	57.10	
Marital status	Married	20.00	80.00	4.666 (0.198)	31.70	68.30	1.214 (0.750)	81.70	18.30	1.29 (0.32)
	Unmarried	41.70	58.30		25.00	75.00		75.00	25.00	
	Divorced	30.00	70.00		40.00	60.00		85.00	15.00	
	Widower/widow	8.30	91.70		41.70	58.30		91.70	8.30	
Occcupational status	Employed	20.00	80.00	0.797 (0.671)	31.00	68.90	0.254 (0.881)	80.00	20.00	2.827 (0.243)
	Unemployed	33.30	66.70		33.30	66.70		66.70	33.30	
	Retired	24.00	76.00		36.00	64.00		88.00	12.00	

Statements		I think GW is an important problem.		I care about both my healthcare and its environmental impact.		I'm aware that some inhalers contribute more to GW.	
Respondents' agreement		Disagree	Agree	Disagree	Agree	Disagree	Agree
Pulmonary disease	COPD	22.5%	77.5%	35.0%	65.0%	92.5%	7.5%
	Asthma	23.4%	76.6%	32.8%	67.2%	76.6%	23.4%
	χ2 (p)	0.120 (0.912)		0.53. (0.818)		4.369 (0.037)	
Duration of pulmonary disease	Less than 5 years	14.3%	85.7%	25.0%	75.0%	78.6%	21.4%
	5-9 years	23.5%	76.5%	44.1%	55.9%	85.3%	14.7%
	10-14 years	19.0%	81.0%	23.8%	76.2%	81.0%	19.0%
	More than 15 years	38.1%	61.9%	38.1%	61.9%	85.7%	14.3%
	χ2 (p)	4.083(0.253)		3.703(0.295)		0.671(0.880)	

Patient Willingness to Switch Inhaler Type Based on Physician Recommendation



Factors were rated: 1=strongly disagree, 2=somewhat disagree, 3=neutral, 4=somewhat agree, 5=strongly agree. The numbers in the bars are the percent of participants (%) selecting that option. Participants re-scored Environmental Impact after reading information about the environmental impact of different inhaler types.

Conclusion

- A large number of respondents believe global warming is an important issue and would consider changing their inhaler to a more environmentally friendly type.
- Many respondents were not aware that MDIs have a high carbon footprint.
- Raising awareness about the environmental impact of inhalers could play a key role in encouraging more climate-friendly choices.