HTA und Klima: wohin mit dem State of the Art?

Dimitra Panteli, MD, MScPH, DrPH, PD*

EbM-Kongress 2023
Potsdam, 23. März

European Observatory on Health Systems and Policies
a partnership hosted by WHO

Disclaimer(s)

- Meine Fachexpertise zu diesem Workshop:
  - allgemeine HTA-Methoden und -Prozesse
  - (noch?) **nicht** Klima
- Mein persönliches Interesse in der Fragestellung:
  - Grundsätzliche HTA-Leidenschaft
  - Überzeugung, dass die Nachhaltigkeit des Gesundheitssystems eine Priorität sein muss
  - OBS fängt jetzt an, ein Arbeitsportfolio zum klimatischen Fußabdruck von Gesundheitswesen aufzubauen, hat aber eine lange Tradition in der Beschäftigung mit Fragestellungen zu HTA, sowie zur Beschaffung von Gesundheitstechnologien
- OBS ist eine Partnerschaft, die von der WHO getragen wird, wo auch öffentliche Zahler vertreten sind

Aufbau der Präsentation

- Gibt es ein *State of the Art* zur Berücksichtigung von Umweltaspekten in HTA? (nein)
- Wie können Umweltaspekte in **HTA-Prozessen** eingebunden werden?
- **Welche Methoden** sind jeweils erforderlich bzw. bereits erprobt?
- Was sind mögliche nächste Schritte für die Wissenschaft, für die Praxis, für die HTA-Community?

State of the Art: aktuelle Praxis sehr spärlich - CADTH

CADTH Entscheidungskriterien

HTERP Deliberative Framework	
Framework Domain	**Information / Element(s)**
Background / Context	• Audience; issue and policy question(s)
Needs	• Background on health condition • Size of affected population • Availability of alternatives
Benefits	• Efficacy • Clinical effectiveness • Impact on patient-centred outcomes • Impact on clinical management • Non-health benefits (e.g. patient autonomy, dignity)
Harms	• Safety
Patient Preferences	• Acceptability of health technology by the patient
Economic Impact	• Cost-effectiveness • Infrastructure support costs • Budget impact
Implementation	• Integration of technology into existing workflow • Training / competency requirements • Repair and maintenance
Legal	• Legal impacts
Ethics	• Consistent with Canadian ethical values
Environmental Impact	• Environmental impact of health technology

International Journal of Technology Assessment in Health Care, 34:3 (2018), 317–326.
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doi:10.1017/S0266462318000351

Method

ENVIRONMENTAL IMPACT ASSESSMENT OF A HEALTH TECHNOLOGY: A SCOPING REVIEW

Julie Polisena
CADTH, Ottawa
juliep@cadth.ca

Gino De Angelis
David Kaunelis
CADTH, Ottawa

Iñaki Gutierrez-Ibarluzea
Osteba, Basque Office for Health Technology Assessment

Int J Environ Res Public Health. 2022 Sep 22;19(19):12017. doi: 10.3390/ijerph191912017.

How We Might Further Integrate Considerations of Environmental Impact When Assessing the Value of Health Technologies

Barbara Greenwood Dufour [1], Laura Weeks [1], Gino De Angelis [1], Dave K Marchand [1], David Kaunelis [1], Melissa Severn [1], Melissa Walter [1], Nicole Mittmann [1]

Affiliations + expand

PMID: 36231319 PMCID: PMC9566650 DOI: 10.3390/ijerph191912017 Sign in

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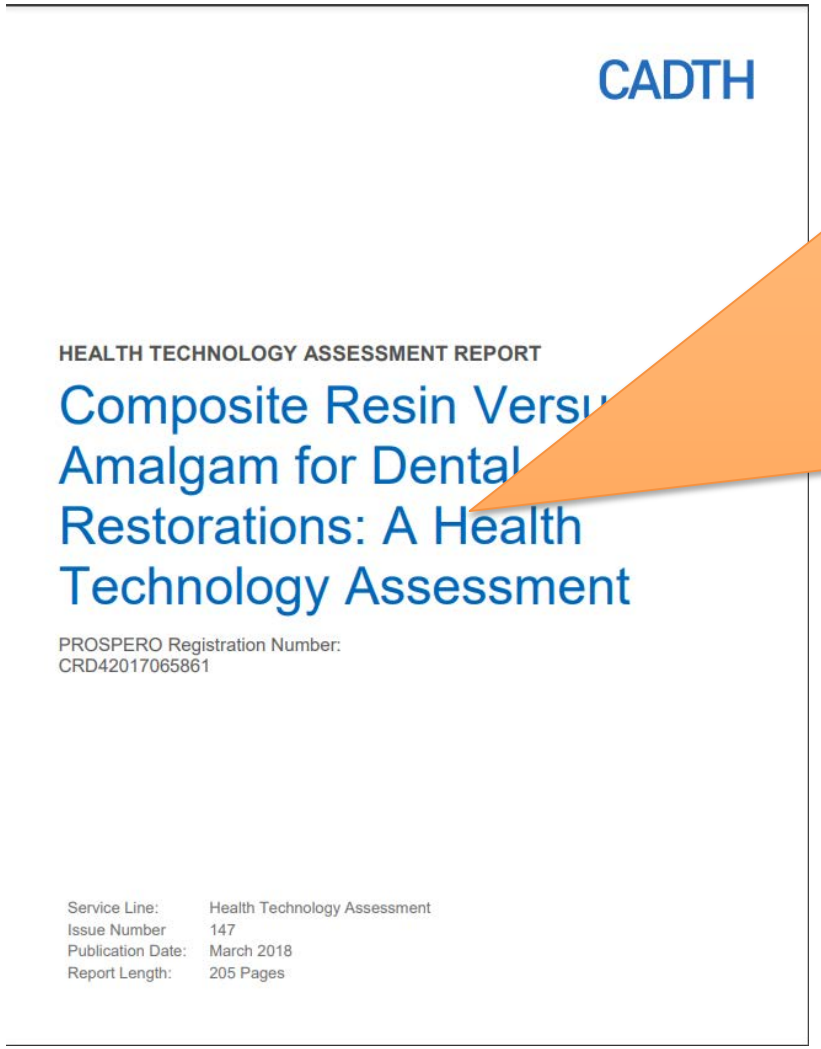
State of the Art: aktuelle Praxis sehr spärlich – CADTH (II)



CADTH

HEALTH TECHNOLOGY ASSESSMENT REPORT

Composite Resin Versu
Amalgam for Dental
Restorations: A Health
Technology Assessment

PROSPERO Registration Number:
CRD42017065861

Service Line: Health Technology Assessment
Issue Number 147
Publication Date: March 2018
Report Length: 205 Pages

Summary of Results

The dental profession relies on a variety of materials and processes to restore the anatomy and function of teeth, although these are not without some risk to the environment. Our review focused on the environmental risks associated with the two main restorative materials used in dentistry —amalgam and composite resins. In particular, we note that a detailed comparison of these two materials is not possible given the lack of focused studies on the matter. For amalgam, the presence of mercury has been of concern for decades. While mercury has been established as a chemical that is persistent, bioaccumulative, and toxic, the relative small contribution of mercury into the Canadian ecosystem from use in dentistry, as well as the over-time declines in its use, suggest that the potential impacts on the environment are much less than other sources. There is an increasing use of composite materials as dental fillings, although relatively little is known about the fate of these materials in the environment and downstream impacts on the ecosystem. Most attention and information is on BPA, and whereas this chemical has been shown to contaminate ecosystems and disrupt fish and wildlife health, linking potential impacts back to the Canadian dental sector is not possible with the current state of knowledge.

State of the Art: aktuelle Praxis sehr spärlich - NICE

NHS Sustainability pledge

> J Public Health (Oxf). 2022 Dec 1;44(4):e593-e595. doi: 10.1093/pubmed/fdac077.

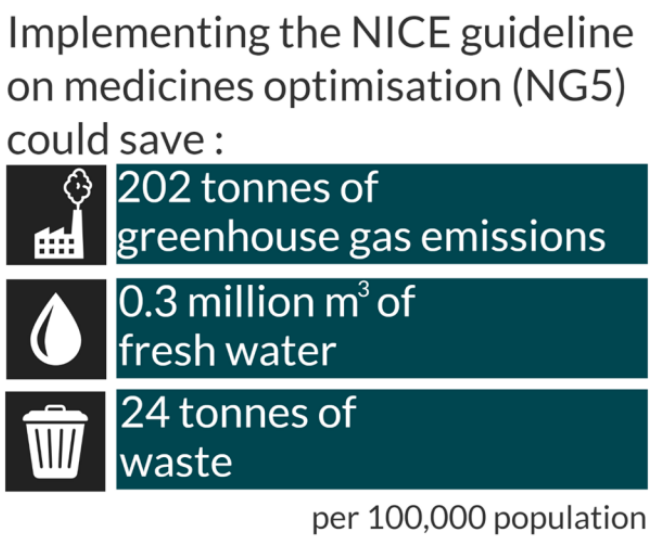
Spotlight environmental sustainability: a strategic priority for NICE

Manuj Sharma [1], Sarah Walpole [2], Koonal Shah [3]

Affiliations + expand

PMID: 35983710 PMCID: PMC9715298 DOI: 10.1093/pubmed/fdac077 Sign in

Free PMC article



The environmental impact of our guidance

We're engaging academic partners to help us develop a framework for quantifying environmental sustainability information. We intend to publish this information alongside our recommendations.

In the future, our committees will use the information to inform their decision making. And it will provide a basis for healthcare providers and patients to consider environmental impact in shared decision making.

Including environmental impact data in our guidance will send an important message. It will show manufacturers, distributors and providers that sustainability is a priority for the NHS.

We recognise that our guidance only impacts some health technologies used in the NHS. We want to develop a framework that can also be used by system partners, such as NHS Supply Chain.

We'll work closely with partners to ensure our environmental sustainability work complements other similar work undertaken across the healthcare landscape.

NICE

State of the Art: aktuelle Praxis sehr spärlich – NICE (II)

Beispiel der Berücksichtigung von Umweltfaktoren in NICE-Empfehlungen

Sedaconda ACD-S for sedation with volatile anaesthetics in intensive care

Medical technologies guidance [MTG65] Published: 27 January 2022 Register as a stakeholder

1 Recommendations

1.1 Sedaconda anaesthetic conserving device-S (Sedaconda ACD-S) is recommended as a cost-saving option for delivering inhaled sedation in an intensive care setting when the volatile anaesthetics isoflurane or sevoflurane are being considered.

1.2 Further research is recommended to identify any health conditions or groups of patients that would benefit more from inhaled sedation with Sedaconda ACD-S than from standard care. Please see the section on further research for more details.

Volatile anaesthetic drugs are potent greenhouse gases. Sedaconda ACD-S may be associated with a lower consumption of volatile drugs compared with other delivery and scavenging systems for volatile sedation.

The environmental impact of our guidance

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State of the Art: aktuelle Praxis sehr spärlich – methodische Praxis?

Sehr wenige Studien/Ansätze die das Thema Umwelteinfluss von Gesundheitstechnologien direkt ansprechen

scoping Review von Guirado-Fuentes et al. 2023

Table 1. Main characteristics of the included studies and contribution to this review.

First Author, Year [Ref]	Authors' Country of Affiliation	Design/Methods	Contribution
Gell, 2010 [8]	UK	Narrative review	1
Prassanna, 2011 [36]	USA	Experimental study	1
Ellis, 2013 [26]	Australia	Surveys	1
Pollard, 2013 [27]	UK/Australia	Modeling	1
Smith, 2013 [10]	USA/UK	EE	2
McCarthy, 2014 [37]	Ireland	Experimental study	1
Marsh, 2016a [19]	UK/USA/Denmark/Uganda	Narrative review	3
Marsh, 2016b [28]	USA/Denmark	EE	2
Richardson, 2016 [11]	UK	Audit tool	1
CADTH, 2017 [29]	Canada	Literature review	4
Kim, 2017 [30]	Canada	Literature review	4
Khangura, 2018 [31]	Canada	Literature review	4
Polisena, 2018 [20]	Canada/Spain	Scoping review	3
Sinclair, 2018 [32]	Canada	Literature review	4
Ortsäter, 2019 [21]	Sweden/The Netherlands/Germany	EE	2
Wilkinson, 2019 [33]	UK	Literature review	1
Hensher, 2020 [7]	Australia	Narrative review	3
Pekarsky, 2020 [34]	Australia	Editorial article	3
Thiel, 2020 [16]	USA/UK/Colombia	Audit tool	1
Goel, 2021 [35]	USA/UK/Australia/Scotland	Audit tool	1
McAlister, 2021 [14]	Australia	Observational study	1
Wilkinson, 2022 [12]	UK	Protocol of observational study	1

EE, economic evaluation; HTA, health technology assessment; UK, United Kingdom; USA, United State of America; 1, development of indicators, parameters, and data sources for environmental impact inclusion in HTA; 2, applied experiences for EE of environmental impact in HTA; 3, construction of a theoretical framework for the environmental impact evaluation in HTA; 4, approach to environmental issues in HTA reports.

State of the Art: aktuelle Praxis sehr spärlich – methodische Praxis?

eunethta

EUnetHTA JA2 WP8 DELIVERABLE

HTA Core Model Version 3.0

Zwei Elemente in der Sicherheitsdomäne:
Risiko und Risikomimierung (C0040 bzw. C0064)

C0040 Assessment element card

Issue: What kind of risks for public and environment may occur when using the technology?

Topic: Environmental safety

	Application	Used	Importance	Transferability	Core	Order
Application-specific properties	Diagnostic Technologies (3.0)	Yes	Optional	Partial	No	8
	Medical and Surgical Interventions (3.0)	Yes	Optional	Partial	No	8
	Pharmaceuticals (3.0)	Yes	Optional	Partial	No	7
	Screening Technologies (3.0)	Yes	Important	Partial	Yes	8
Clarification	**Common to all used applications** Several chemical substances or their toxic metabolites are potentially harmful in ecological environments; some of the most recent concerns are related to endocrine modulators and disruptors and nanoparticles. The statistical risk of radiation at the public level should also be described here.					
Methodology and sources	**Common to all used applications** Method: Systematic review. Research articles, manufacturers' product data sheets, safety monitoring databases					

Wie können Umwelteinflüsse in die HTA-Praxis integriert werden?

- HTA-Institutionen veröffentlichen Informationen zu den Konsequenzen von bewerteten Technologien für die Umwelt („information conduit“)

- HTA-Institutionen schließen Umweltfaktoren in die Analyse mit ein
  - Integriert (z.B. im Rahmen einer Kosten-Effektivitätsanalyse; würde neue/adaptierte analytische Ansätze erfordern)
  - Parallel (relevante Informationen werden aufbereitet und im Zusammenhang mit etablierten Dimensionen berücksichtigt; würde standardisierte Ansätze zur Messung/Berücksichtigung erfordern)

- HTA-Institutionen bewerten auch Technologien mit Umwelteinfluss aber ohne direkten Einfluss auf Patientenendpunkte

Toolan et al. 2023

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Toolan et al. 2023

Schritt 1: Wie können Umwelteinflüsse für HTA-Zwecke gemessen werden?

Was wird gemessen?

- Treibhausgasemissionen
- Luftverschmutzung mit Feinstaub
- Belastung der Umwelt mit Chemikalien
- Produktion/Entsorgung von Abfall
- Wasserverbrauch

Für die meisten dieser Belastungen gibt es keine standardiserten validierten Ansätze, die eine Ableitung von Werten für eine konkrete Technologie zulassen

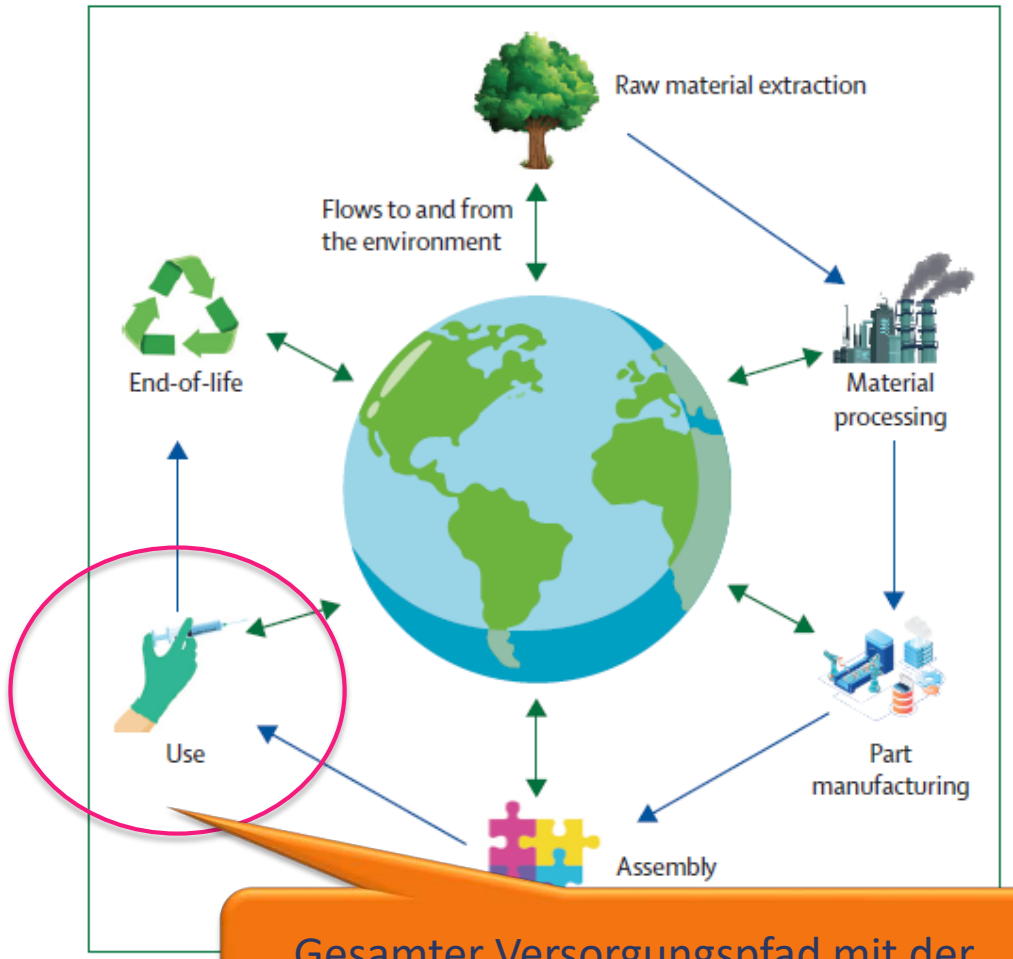
Wie können Umwelteinflüsse für HTA-Zwecke gemessen werden?

Was wird gemessen?

- **Treibhausgasemissionen**
- Luftverschmutzung mit Feinstaub
- Belastung der Umwelt mit Chemikalien
- Produktion/Entsorgung von Abfall
- Wasserverbrauch

- Validierte Berechnungsmethoden nach internationalen Standards (z.B. *GHG Protocol Product Life Cycle Accounting and Reporting Standard or International Organization for Standardization (ISO) 14067*)
- Scope 1, Scope 2, Scope 3 emissions
- Lebenszyklusansatz

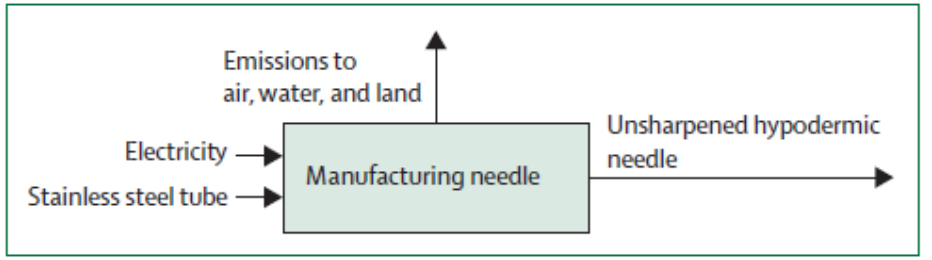
Messung von Treibhausgasemissionen für eine Technologiebewertung



Gesamter Versorgungspfad mit der Technologie und deren Effekte

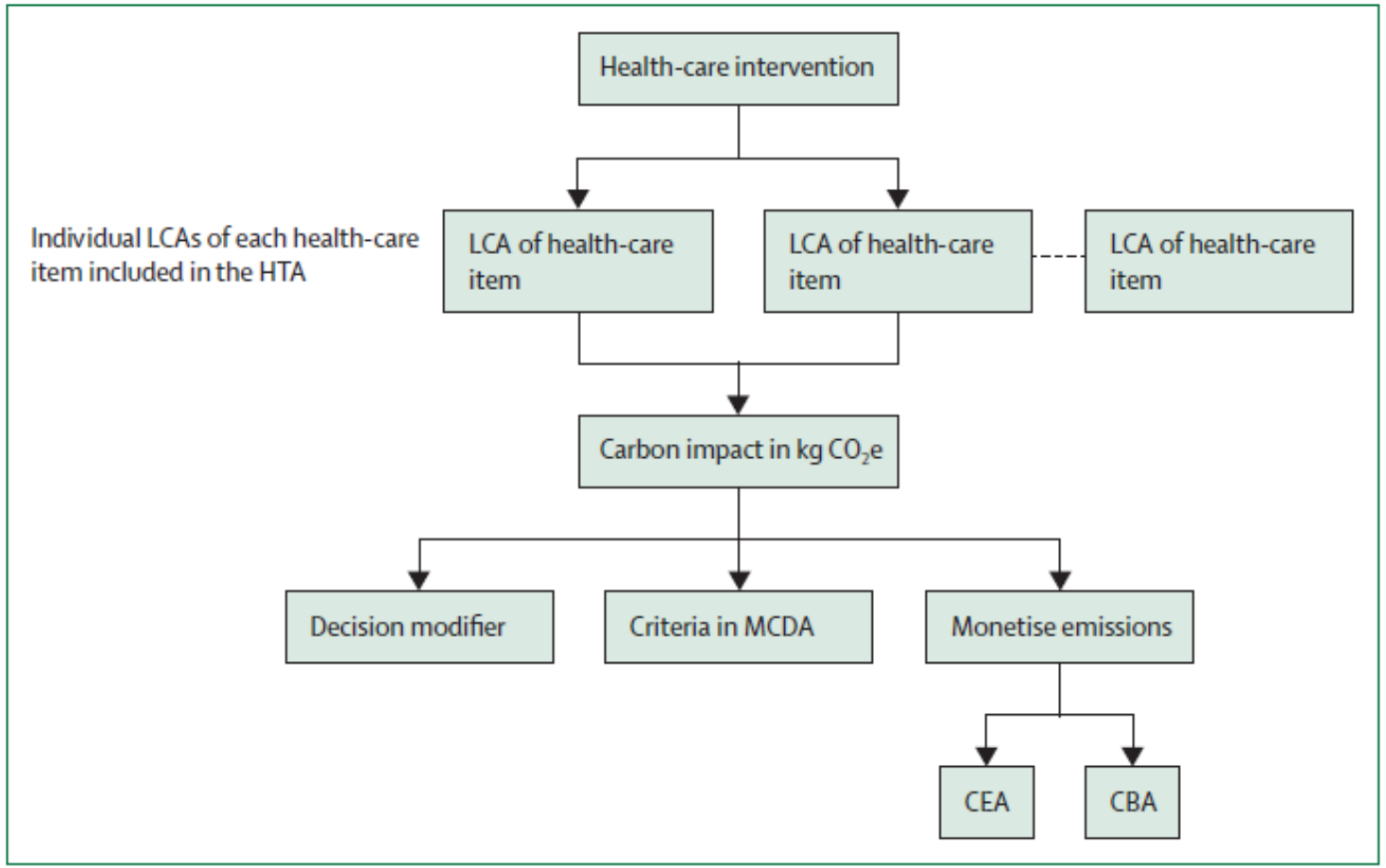
Ansatz: Life Cycle Assessment (LCA)
Lebenszyklusanalyse/ Umweltbilanz/ Ökobilanz

Methodische Optionen für LCA
- Environmentally extended Input-Output Analyse (EIO)
- **Prozessbasierte LCA**



Marsh et al. 2016, McAlister et al. 2022

Einbindung von quantifizierten Treibhausgasemissionen in die Bewertung



- Für alle Technologien? *Oder nur wenn Effektivität und Kosten vergleichbar ausfallen?*
- Woher kommen die Daten (wie prüfen?) *Hersteller? Gemeinsame LCA Datenbank?*
- Welche ungewollte Konsequenzen? *Gaming-Potential? Aufwand?*

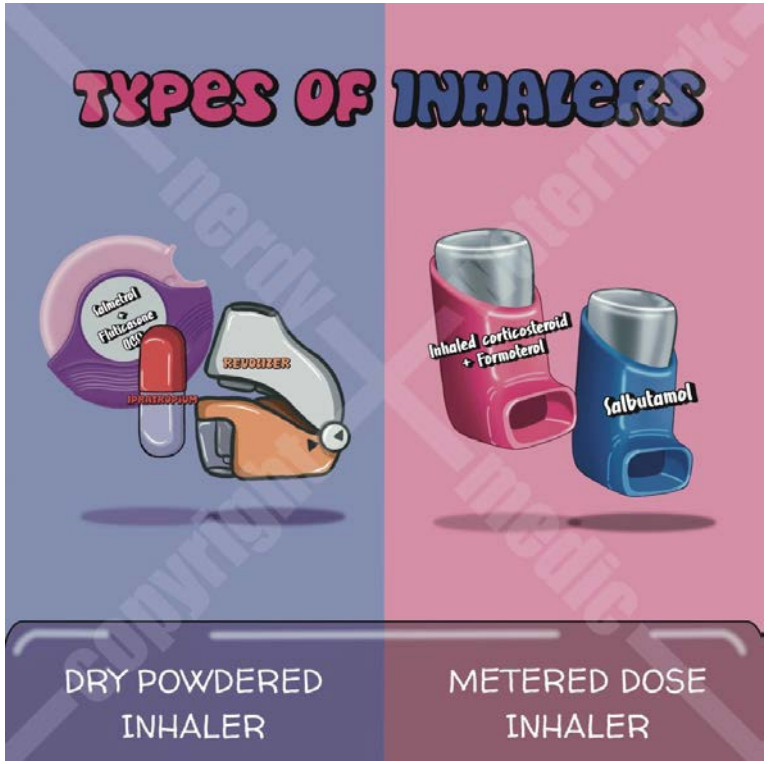
McAlister et al. 2022

Vllt. das bekannteste Beispiel: der Fußabdruck von Inhalatoren

Table 2 Contribution of phases in the life cycle, from 'cradle to grave', of Foster 100/6 µg MDI 120 doses and Foster NEXThaler DPI 100/6 µg 120 doses, to their individual carbon footprint for single actuation (gCO_2e/actuation) and their relative contribute (%)

Product name (INN)		Foster 100/6 µg MDI 120 doses		Foster NEXThaler 100/6 µg DPI 120 doses	
Life cycle stage		Absolute contribute gCO_2e/actuation	Relative contribute %	Absolute contribute gCO_2e/actuation	Relative contribute %
Upstream	Raw materials—active pharmaceutical ingredients and excipients*	1.29	1.36	0.02	0.24
	Raw materials—device components	0.81	0.85	1.60	21.02
	Raw materials—packaging components	0.12	0.13	0.33	4.37
	Supplementary materials—device packaging	0.96	1.02	2.46	32.20
Total		3.18 gCO_2e/actuation	3.37%	4.41 gCO_2e/actuation	57.83%
CORE	Raw materials transportation	0.10	0.11	0.14	1.89
	Energy and water consumption	2.00	2.12	1.96	25.72
	Manufacturing waste	0.07	0.08	0.07	0.94
	HFA leaks and air emissions	1.43	1.51	0.00	0.00
Total		3.60 gCO_2e/actuation	3.82%	2.18 gCO_2e/actuation	28.54%
Downstream	Distribution and transportation	0.33	0.35	0.33	4.29
	User phase	66.27	70.19	0.00	0.00
	End of life	21.04	22.28	0.71	9.34
Total		87.64 gCO_2e/actuation	92.82 %	1.04 gCO_2e/actuation	13.63 %
Total CF gCO_2e/actuation		94.42		7.63	

Data calculated using the CF-SA method.
*Excipients including propellant gas HFA134a in case of Foster 100/6 MDI.
CF, carbon footprint; CF-SA, systematic approach for CF calculation; DPI, Dry Powder Inhaler; HFA, hydrofluoroalkane; INN, International Nonproprietary Names ; MDI, metered-dose inhaler.



Panigone et al. 2020

Vllt. das bekannteste Beispiel: der Fußabdruck von Inhalatoren

Eur Respir J. 2022 Jul; 60(1): 2102106. PMCID: PMC9301054
Published online 2022 Jul 21. doi: 10.1183/13993003.02106-2021 PMID: 34916263

The environmental impact of inhaled therapy: making informed treatment choices

Ashley Woodcock,[✉12] Kai M. Beeh,[3] Hironori Sagara,[4] Simon Aumônier,[5] Emmanuel Addo-Yobo,[6] Javaid Khan,[7] Jørgen Vestbo,[1,2] and Helen Tope[8]

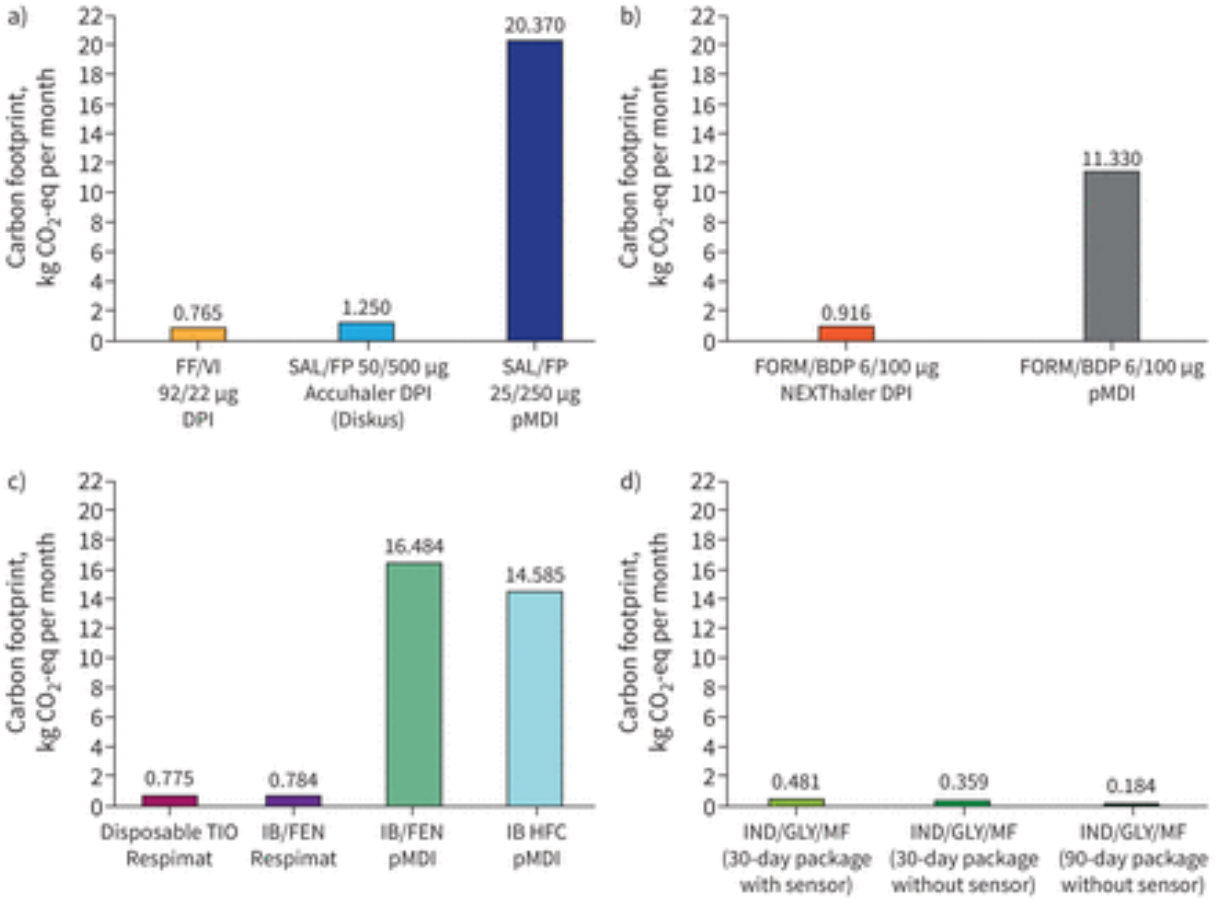
Tweetable abstract @ERSpublications

click to tweet

There is increasing interest regarding the carbon footprint of inhaled therapies; while efficacy, safety and patient preference should be prioritised, the increasingly available carbon footprint data may be factored into treatment decision making

https://bit.ly/3I6atV2

Entscheidungsmodifikation



Woodcock et al. 2022

Vllt. das bekannteste Beispiel: der Fußabdruck von Inhalatoren

Applied Health Economics and Health Policy (2020) 18:433–442
https://doi.org/10.1007/s40258-019-00540-0

5-Jahre-Modell in DE

ORIGINAL RESEARCH ARTICLE

Incorporating the Environmental Impact into a Budget Impact Analysis: The Example of Adopting RESPIMAT® Re-usable Inhaler

Gustaf Ortsäter[1] · Fredrik Borgström[1,2] · Mike Baldwin[3] · Carolin Miltenburger[4]

Published online: 6 December 2019
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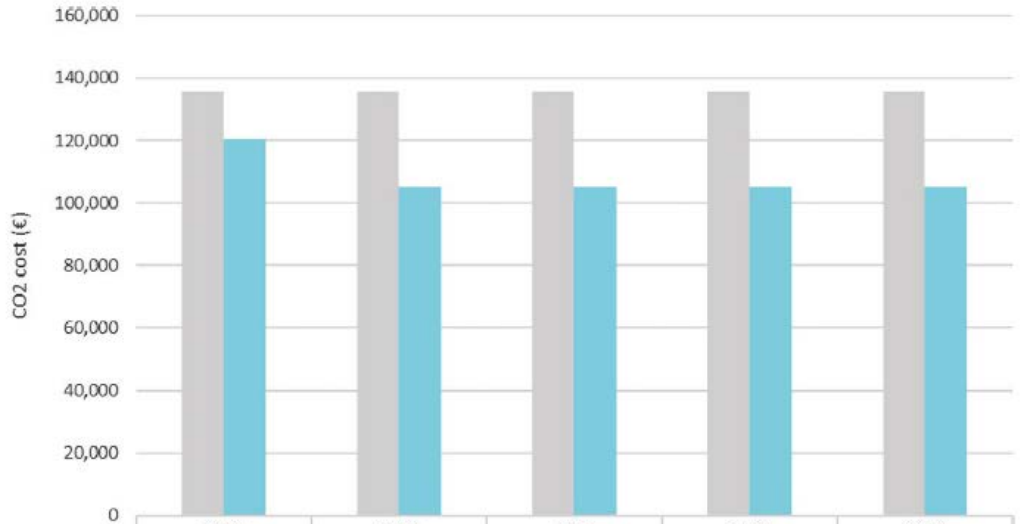
Monetarisierung

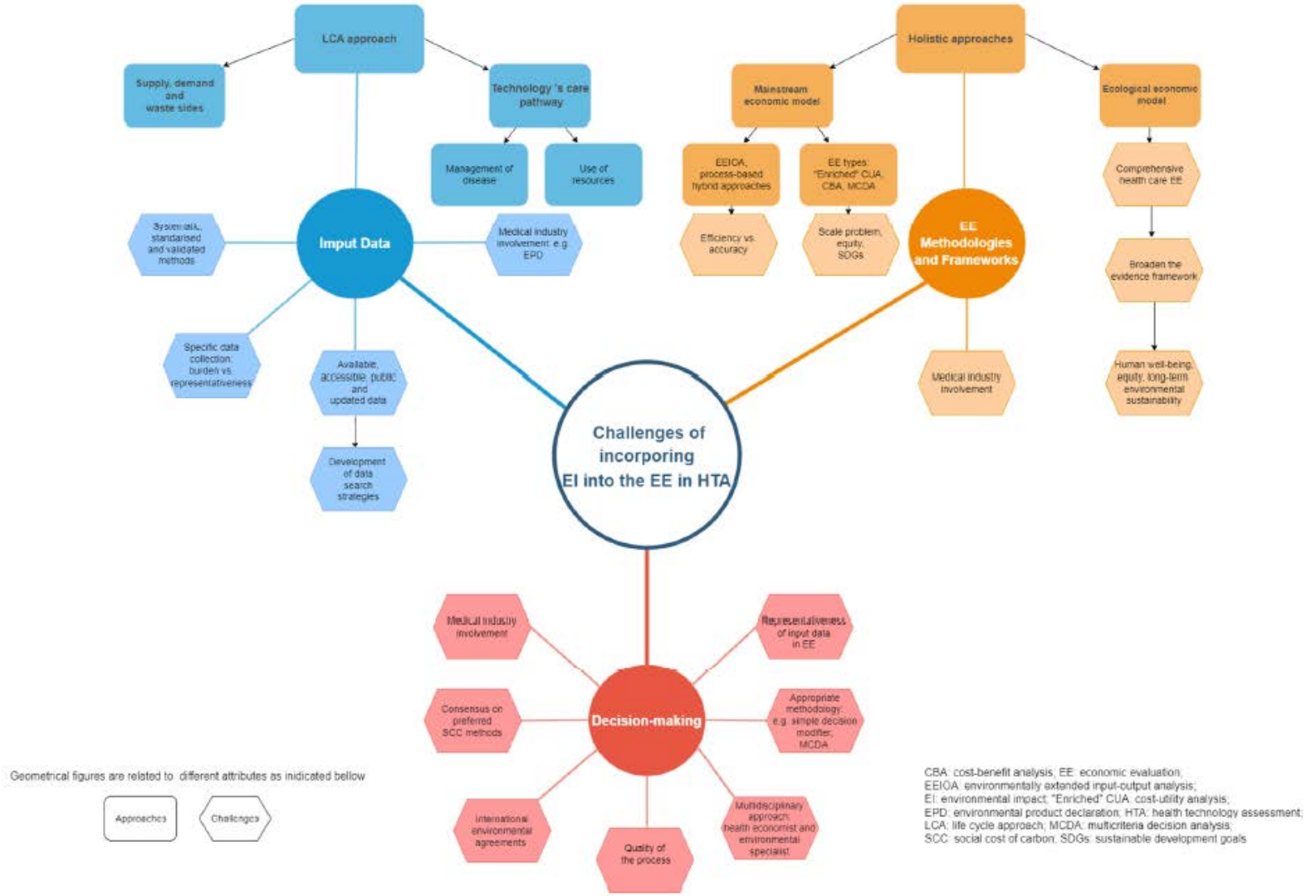
Fig. 2 Societal cost of carbon emission by year



	2019	2020	2021	2022	2023
World Without RESPIMAT® re-usable	135,780	135,780	135,780	135,780	135,780
World With RESPIMAT® re-usable	120,448	105,116	105,116	105,116	105,116

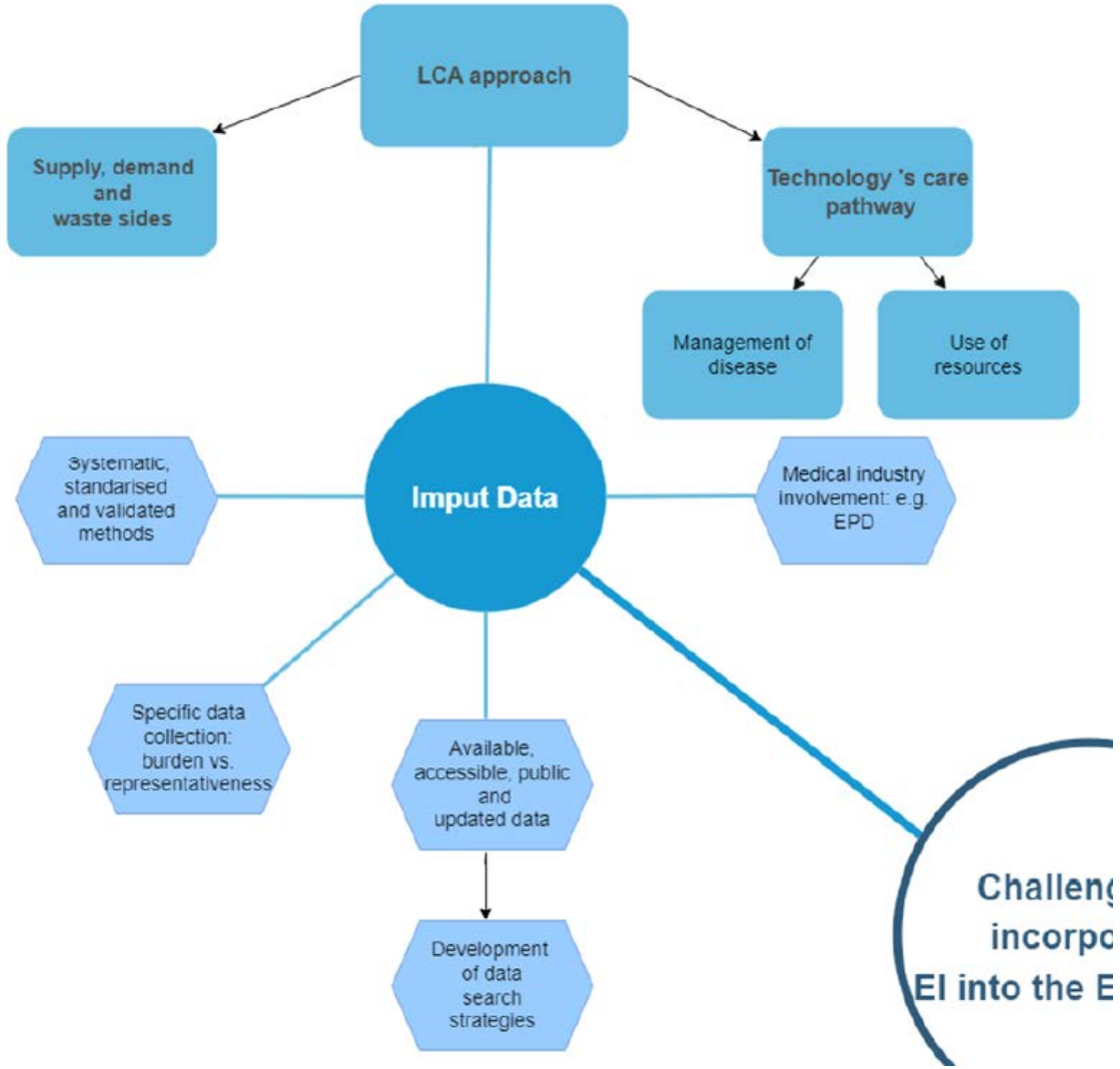
Ortsäter et al. 2022

Herausforderungen für die Berücksichtigung von Umweltaspekten



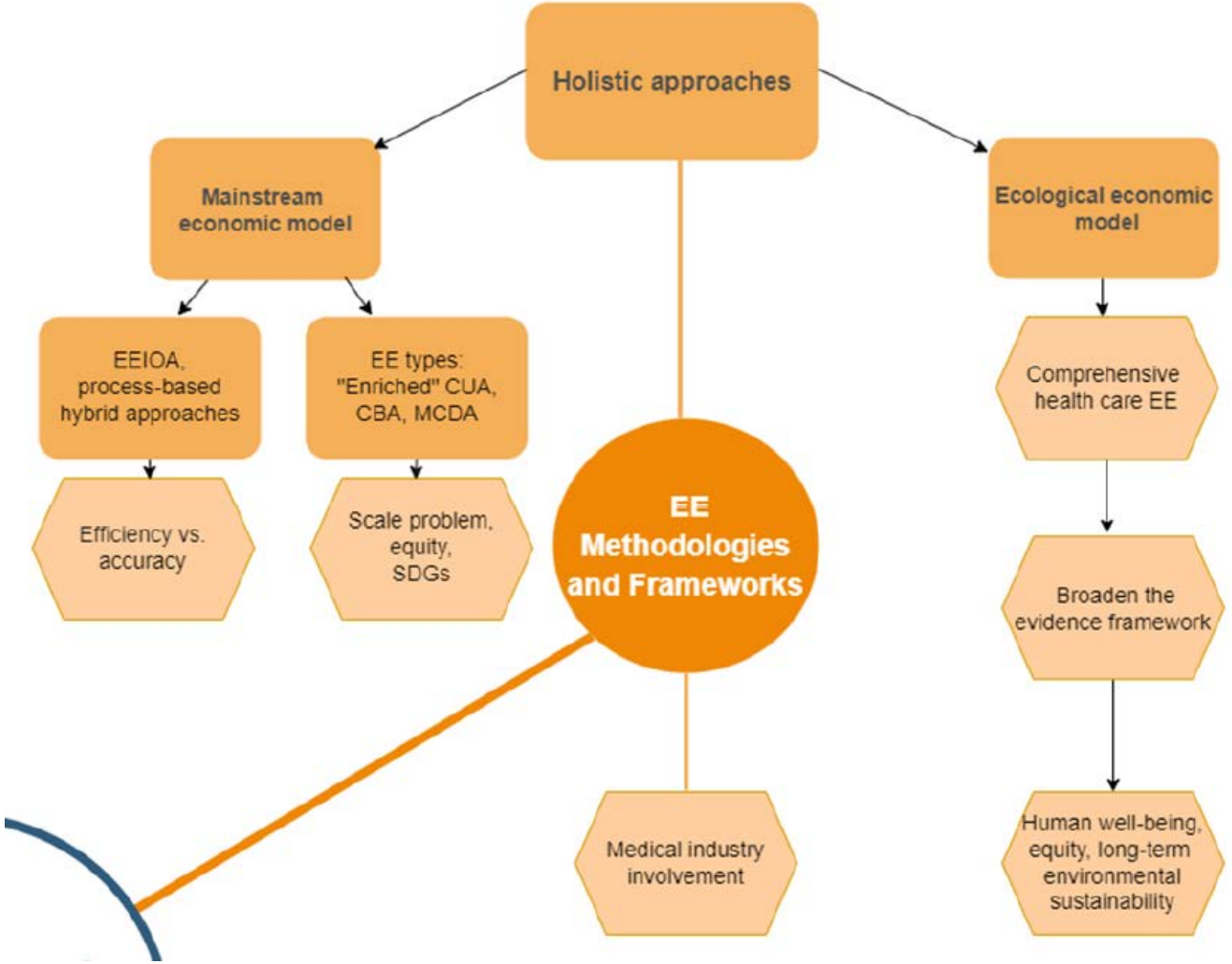
Guirado-Fuentes et al. 2023

Herausforderungen für die Berücksichtigung von Umweltaspekten



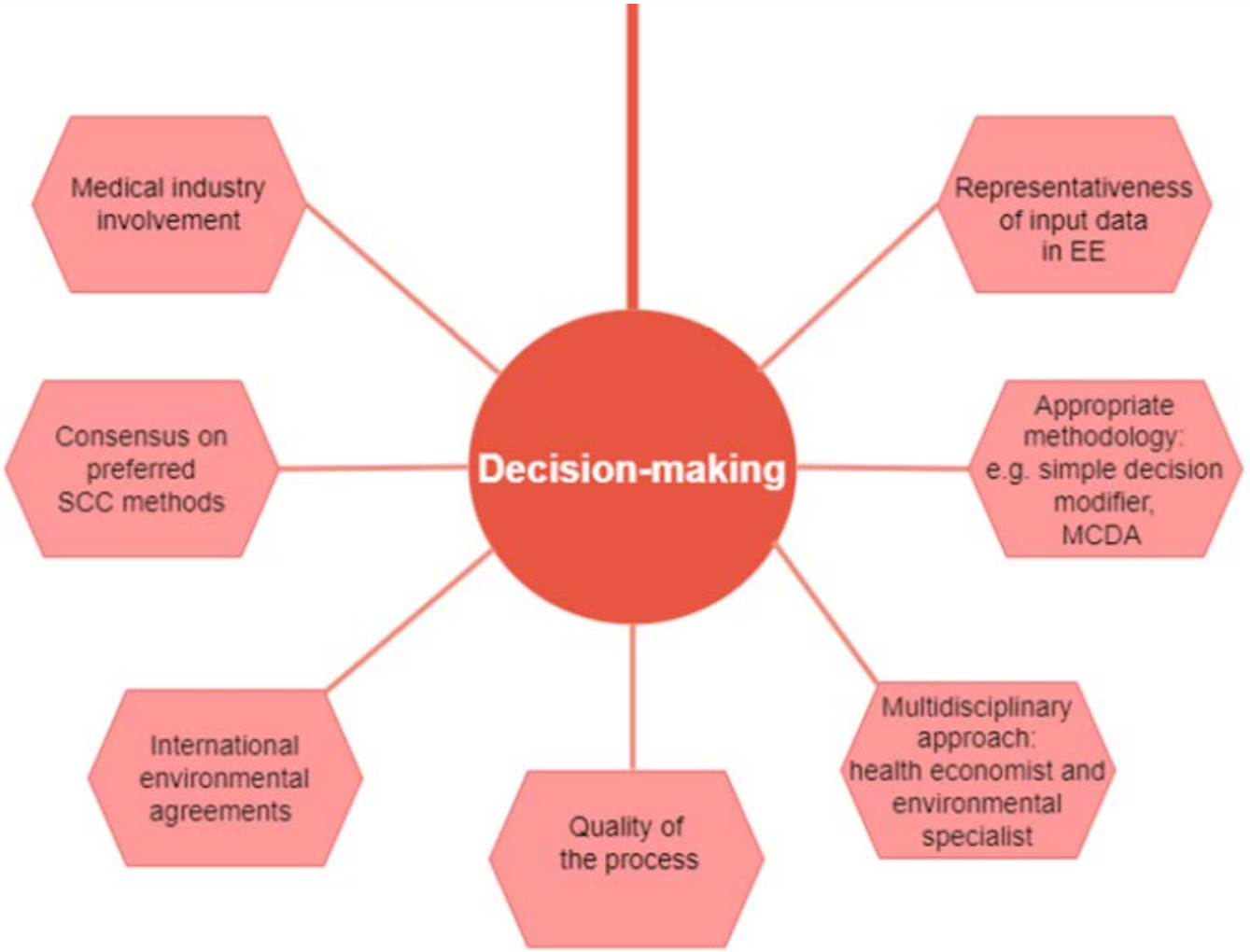
Guirado-Fuentes et al. 2023

Herausforderungen für die Berücksichtigung von Umweltaspekten



Guirado-Fuentes et al. 2023

Herausforderungen für die Berücksichtigung von Umweltaspekten



Guirado-Fuentes et al. 2023

Nächste Schritte?

- Entwicklung von standardisierten Mess- und Analysemethoden
- Entwicklung von Datenbank(en) von zugänglichen Daten zum Klimaabdruck von Technologie(komponente)n
- Scoping für die Entdeckung von Hotspot-Technologien
- Erprobung von Ansätzen zur
  - Priorisierung der Bewertung von Technologien mit besonderer Relevanz von Umweltfaktoren
  - Berücksichtigung von Umweltfaktoren für Technologien (wenn andere Domänen vergleichbar ausfallen, allgemein – MCDA?)
- Breitere Umweltperspektive: proaktiv Aktivitäten zur Berücksichtigung von Umweltkonsequenzen fördern…

… und Bewusstein steigern

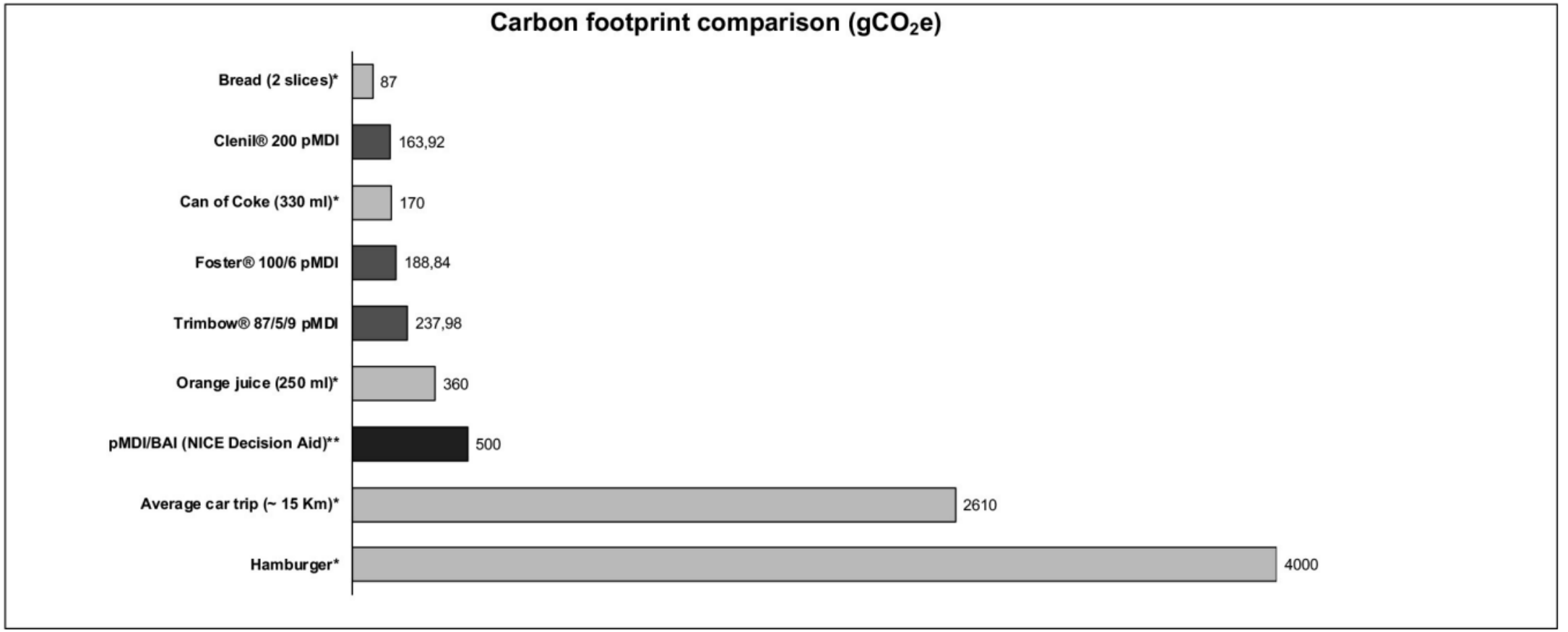


Figure 2 CF data for specific MDI products, compared with standard data reported for commonly used products (*)[3] and in official documents (**).[9] Data for inhaled products are reported per dose, equal to two actuations. BAI, breath-actuated inhaler; CF, carbon footprint; MDI, metered-dose inhaler.

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