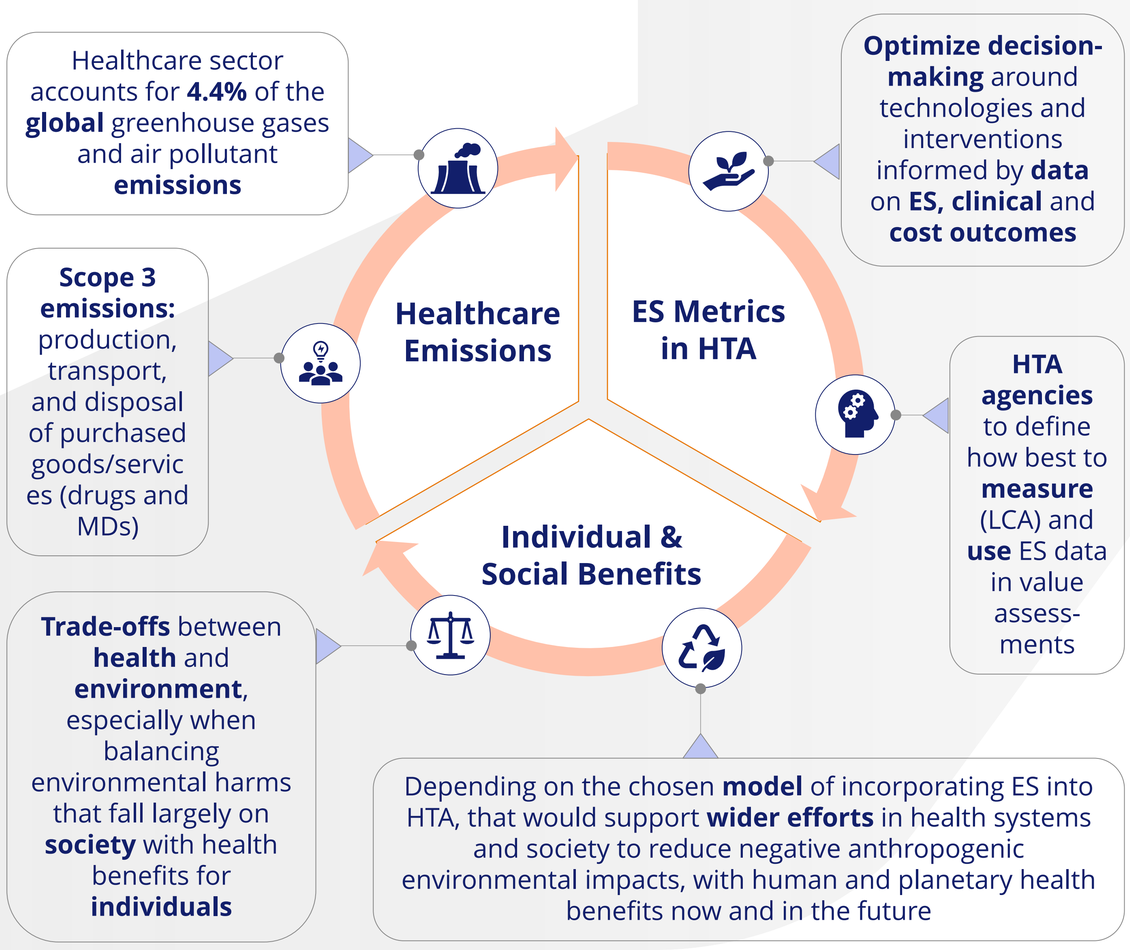
Incorporating Environmental Sustainability Considerations into National Health Technology Assessments: A Landscape Review

AUTHORS

Stelina Tsantila
Associate Consultant, Alira Health
stelina.tsantila@alirahealth.com

OBJECTIVES & BACKGROUND

The healthcare industry accounts for a significant proportion of global carbon emissions resulting in a significant environmental impact that can no longer be denied. This landscape review summarizes evidence currently available on frameworks and methods that aim to include environmental sustainability (ES) metrics into Health Technology Assessments (HTAs).



METHODOLOGY

A literature review was conducted to investigate proposed frameworks, action plans, published policies and metrics deployed by HTA bodies and national healthcare systems that were published between 2015 and 2023. The literature review involved reviewing key HTA, government and international websites, and conducted grey literature searches to maximize information collection. Evidence was scant on the incorporation of environmental impacts in clinical practice and public health guidelines.

Case studies from various countries (UK, US, APAC) and therapeutic areas (haemodialysis, diabetes) are analysed to explore the integration of environmental and sustainability considerations in HTA guidelines.

Economic Evaluation Model /HTA	Additional Information		Cost Consequence		Health Consequence	
	Indicator	Publication	Indicator	Publication	Indicator	Publication
Enriched Cost Utility Analysis (CUA) & Cost-effectiveness analysis (CEA)	$kgCO_2e$/ patient	Marsh, 2016b Fordham, 2020 de Preux et al., 2018	ICER threshold	Marsh, 2016a	QALYs / HRQOL	Marsh, 2016a
	CO_2e/QALY	Marsh, 2016a			DALYs	Debaveye, 2016, 2020
	CO_2e/LY	Fordham, 2020				
Cost-Benefit Analysis (CBA)			Willingness-to-pay (WTP) for CO_2e	Marsh, 2016a	WTP for QALYs/ DALYs	Debaveye, 2016
			Total cost of CO_2e	Ortsäter et al., 2020		
Multi-criteria Decision Analysis (MCDA)	Criteria in decision-making	Marsh, 2016a, 2018				
	Total CO_2e	Venkatesh, 2016 Janson, 2020				

Table: Taxonomy of Approaches that Include the Environmental Impact in HTA techniques

RESULTS

The analysis identified four approaches for incorporating environmental metrics into existing HTA models: [1] Enriched Cost-Utility Analysis (CUA) and [2] Cost-Effectiveness Analysis (CEA) both using carbon dioxide emissions (CO_2e) relative to the patient, or QALY, or LY or, ICER threshold, or HRQOL; [3] Cost-Benefit Analysis (CBA) based on the willingness-to-pay per CO_2e, or per QALY/DALY, and [4] Multicriteria Decision Analysis (MCDA) that formulates decision-making on criteria and outcome trade-offs. These approaches are categorized according to how they included the data in the HTA processes, i.e., as additional information to other HTA outcomes (CUA, CEA, MCDA), as cost consequence of environmental impacts in monetary terms (CUA, CEA, CBA), and as health consequence (CUA, CEA, CBA).

CUA & CEA

- ? CEA: **carbon footprint** of the technology as **efficiency** metric to perform an adapted cost-effectiveness analysis.
- ? CUA: **health gains** associated with improved environmental outcomes are converted into estimates of **HRQoL** to perform an enriched CUA.
- ? **Cost-effectiveness ratio (ICER):** marginal health benefit derived from the technology is divided by the incremental costs.
- \+ CUA is widely accepted and HTAs are more familiar with it.
- − Low-emission products could benefit from a higher ICER threshold regardless of their ability to marginally improve the health outcome.
- − Incorporating environmental impacts into HRQoL measures confines the evaluation of environmental impacts to health, when technologies have wider consequences on the environment.

CBA

- ? CBA: all outcomes are concerted to **monetary** terms; health outcomes and costs are derived from the **willingness to pay** (WTP). A reduction in product-related emissions would be positively rewarded as cost-saving.
- ? **Social Cost of Carbon (SCC):** cost estimates for carbon emissions could be included as an additional output.
- \+ The evidence necessary to support the application of CBA to ES outcomes is established (SSC, air pollution).
- − The economic evaluation of environmental and health outcomes (non-market goods) is subject to significant uncertainty and debate.

MCDA

- ? MCDA elicits outcome **trade-offs** from decision-makers to determine the most preferred treatment option.
- \+ For HTAs, the EVIDEM model has been frequently used, considering the relevance and validity of evidence, cost-effectiveness of intervention, public health interest, impact on spending, the improvement of patient reported outcomes, the size of the population affected by the disease.
- − There is lack of established best practice to guide applications of MCDA to HTA.

Figure: Summary of Approaches that Include the Environmental Impact in HTA techniques and Categorisation based on their Data Inclusion Approach

	Advantages	Disadvantages
As Additional Information	▪ High feasibility/ practicability ▪ Rapid implementation feasible	▪ Challenging to contextualize for decision-makers ▪ Low manufacturer incentive for improvement ▪ Possibly minimal effect/ impact
As Cost Consequence	▪ Adaption possible for variety of HTA methods ▪ Clear representation of formerly concealed costs ▪ Strong incentive for manufacturers	▪ Possible limitation to carbon emissions ▪ Adds more pressure for healthcare budgets ▪ Opportunities for manufacturers to game the system
As Health Consequence	▪ No price rise to put a strain on healthcare budgets ▪ Clear signal to manufactures and decision-makers ▪ Possibly high effect/ impact	▪ Preliminary stage of development ▪ High capacity building in HTA agencies and businesses is necessary

Table: Advantages and Disadvantages of Data Inclusion Approaches

CONCLUSION

Extending HTA to consider costs and benefits across a health technology's lifecycle may increase attention to supply chains, spotlighting raw material sources and production processes, enhancing transparency around manufacturing, and promoting improved labour and environmental standards.

Despite the international consensus on the importance of embedding sustainability into existing clinical guidelines and HTA, there are still substantial challenges to overcome. Further to the expansion of HTA models, is the deployment of a common methodology to estimate environmental footprint, such as the life cycle assessment (LCA) and the standardization of environmental criteria that HTA agencies will accept.

AliraHealth

REFERENCES

1. Toolan, Michael, et al. 2023. Environmental Impact Assessment in Health Technology Assessment: Principles, Approaches, and Challenges. Int J Technol Assess Health Care.
2. Marsh, K, et al. 2016. Incorporating Environmental Outcomes Into A Health Economic Model. Int J Technol Assess Health Care.
3. Pinho-Gomes, Ana-Catarina, et al. 2022. Incorporating Environmental and Sustainability Considerations into Health Technology Assessment and Clinical and Public Health Guidelines: a Scoping Review. Int J Technol Assess Health Care