

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

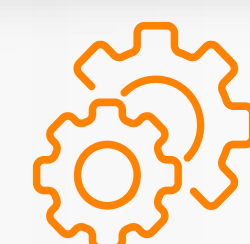
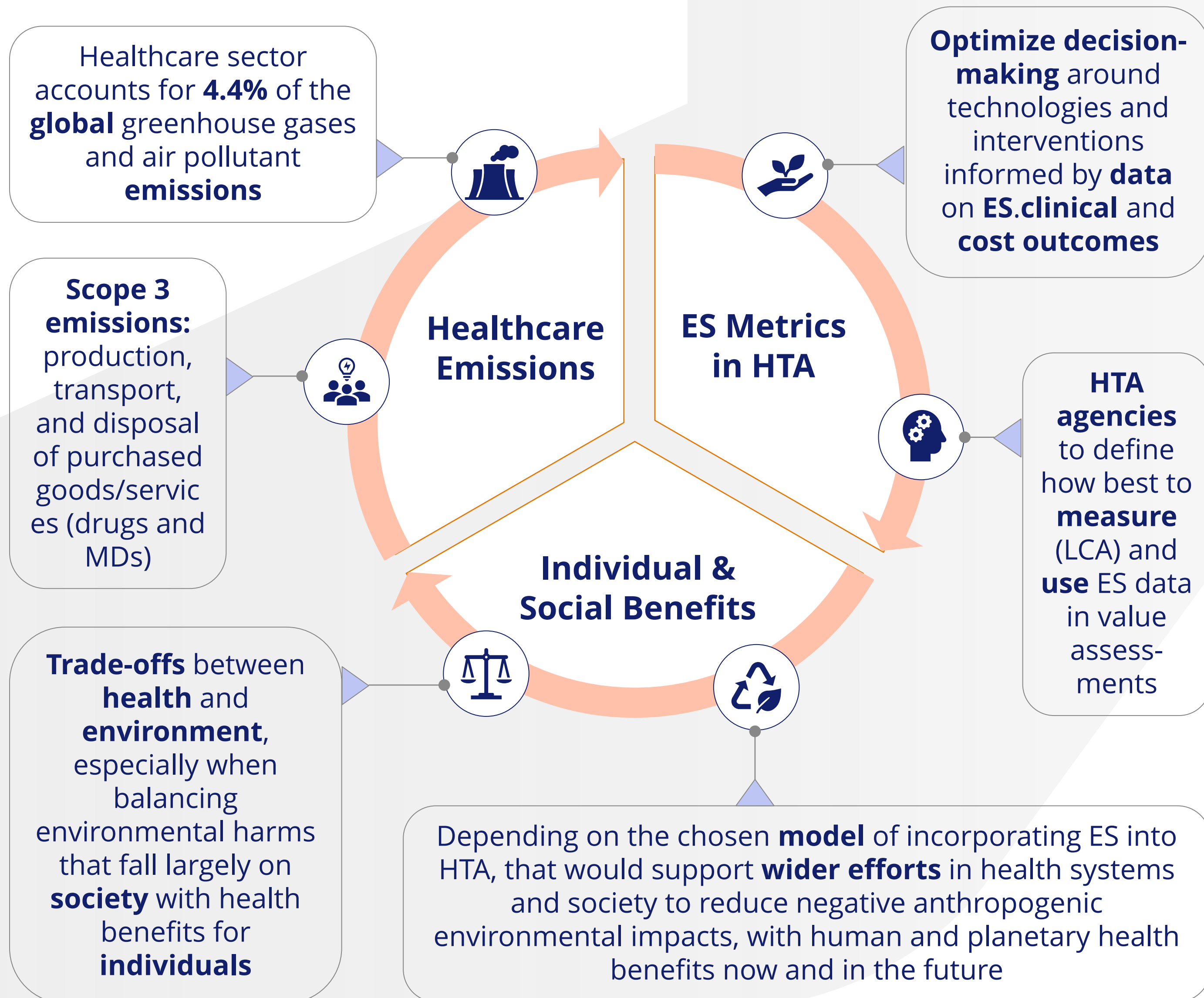
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OBJECTIVES & BACKGROUND

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).



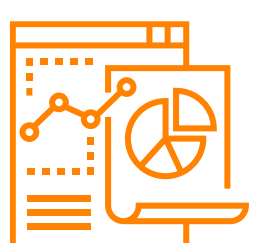
METHODOLOGY

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 ₂ e/patient	Marsh, 2016b	ICER threshold	Marsh, 2016a	QALYs / HRQOL	Marsh, 2016a
	CO ₂ e/QALY	Fordham, 2020				
	CO ₂ e/LY	de Preux et al., 2018				
Cost-Benefit Analysis (CBA)		Marsh, 2016a	Willingness-to-pay (WTP) for CO ₂ e	Marsh, 2016a	DALYs	Debaveye, 2016, 2020
		Fordham, 2020				
Multi-criteria Decision Analysis (MCDA)	Criteria in decision-making	Marsh, 2016a, 2018	Total cost of CO ₂ e	Ortsäter et al., 2020	WTP for QALYs/DALYs	Debaveye, 2016
	Total CO ₂ e	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 (CO₂e) 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 CO₂e, 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).

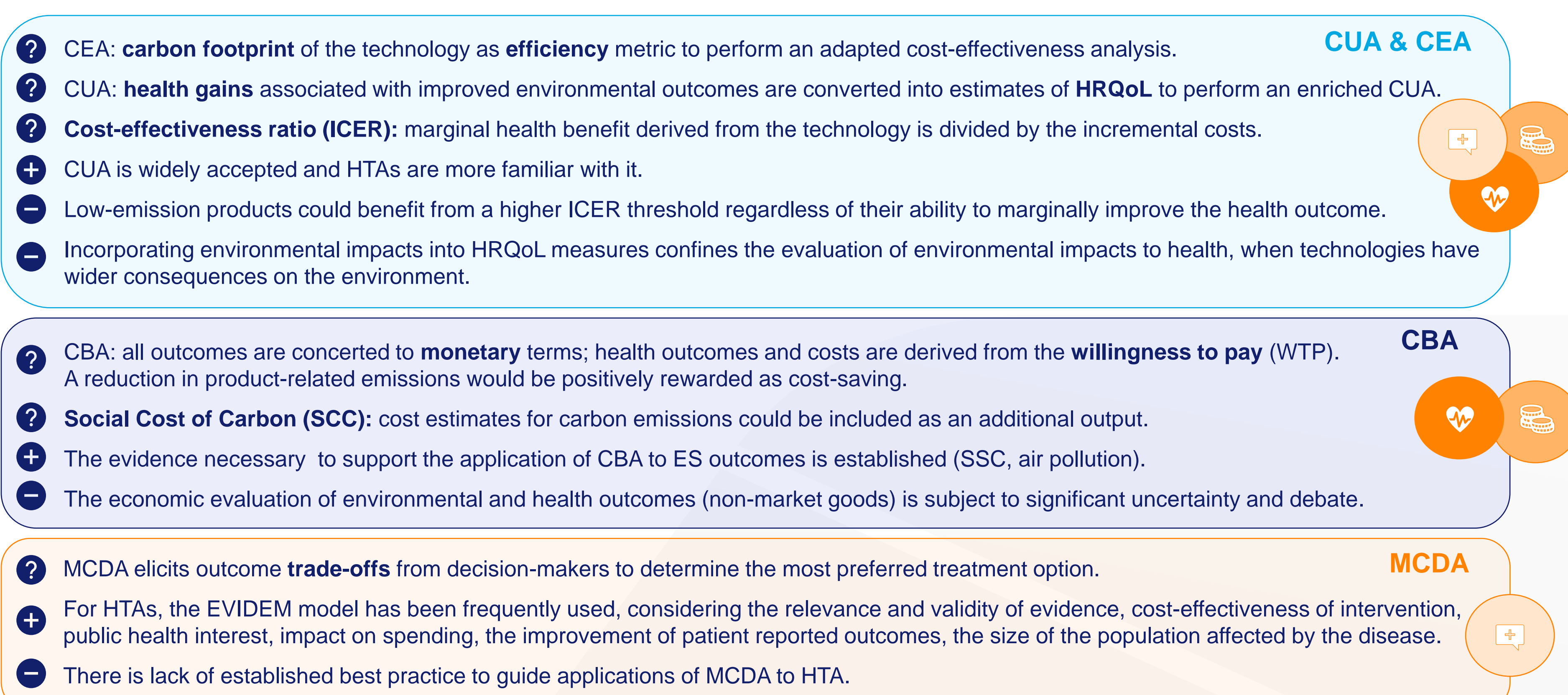


Figure: Summary of Approaches that Include the Environmental Impact in HTA techniques and Categorisation based on their Data Inclusion Approach

	Advantages	Disadvantages
As Additional Information	<ul style="list-style-type: none"> High feasibility/ practicability Rapid implementation feasible 	<ul style="list-style-type: none"> Challenging to contextualize for decision-makers Low manufacturer incentive for improvement Possibly minimal effect/ impact
As Cost Consequence	<ul style="list-style-type: none"> Adaption possible for variety of HTA methods Clear representation of formerly concealed costs Strong incentive for manufacturers 	<ul style="list-style-type: none"> Possible limitation to carbon emissions Adds more pressure for healthcare budgets Opportunities for manufacturers to game the system
As Health Consequence	<ul style="list-style-type: none"> No price rise to put a strain on healthcare budgets Clear signal to manufactures and decision-makers Possibly high effect/ impact 	<ul style="list-style-type: none"> 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.



REFERENCES

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