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ARTICLE

Cost-effectiveness thresholds in policy and practice: do HTA guidelines align with estimates of health opportunity cost?

Peter Murphy[1], Susan Griffin[1], Simon Walker[1], Laura Vallejo-Torres[2], Oscar Espinosa[3], Mac Ardy J. Gloria[4] and Jessica Ochalek[1]

[1]Centre for Health Economics, University of York, UK, [2]Universidad de Las Palmas de Gran Canaria, Spain, [3]Economic Models and Quantitative Methods Research Group (IMEMC), Centro de Investigaciones para el Desarrollo, Universidad Nacional de Colombia, Colombia and [4]College of Pharmacy, University of the Philippines Manila, Philippines
Corresponding author: Peter Murphy; Email: p.murphy3@lse.ac.uk

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Abstract

Health technology assessment (HTA) processes provide evidence to inform the supply of healthcare, often comparing results from economic evaluation to a policy threshold to judge cost-effectiveness. However, recommended policy thresholds may not always align with empirical estimates of the opportunity costs of health care expenditure, captured by marginal productivity of healthcare expenditure ('*k*'). Such estimates are needed to inform the net health impact of funding decisions. We map policy thresholds in HTA guidelines against published estimates of *k*. We extract information from HTA guidelines identified in a previous literature review, including recommended perspective, relevant costs and outcomes, and justification for the threshold. Studies estimating *k* were obtained from a separate review. Of the 47 included HTA guidelines, 20 state an explicit policy threshold and 12 justify their choice. Estimates of *k* were available for 13 countries. Among the eight countries with explicit policy thresholds and *k* estimates, three matched. The recommended perspective influences whether *k* alone is sufficient or appropriate to inform cost-effectiveness judgements. It is important that guideline setters are aware of empirical estimates of *k*; and that economic evaluations consider *k* to reflect health opportunity costs even where the policy threshold is justified on other grounds.

Keywords: marginal productivity; opportunity cost; cost-effectiveness threshold; health technology assessment

1. Introduction

Health technology assessment (HTA) processes provide evidence to support the supply of healthcare (Mirelman *et al.*, 2025). Evidence of a healthcare technology's value for money forms an input to the process, with cost-effectiveness analysis (CEA) being a commonly used approach to inform this. This evidence includes a summary of how the technology changes costs and health outcomes, typically utilising generic units of health such as quality-adjusted life years (QALYs) gained or disability-adjusted life years (DALYs) averted. The results of the CEA are often compared to a cost-effectiveness threshold (referred to hereafter as a 'policy threshold') as a basis for judging value for money.

The appropriate level and source for policy thresholds have been the subject of debate (Sampson *et al.*, 2022; Thokala *et al.*, 2018; Vallejo-Torres *et al.*, 2016). Two categories are broadly

considered: demand-side thresholds and supply-side thresholds. The former represents the amount of private consumption individuals are willing to give up (or their 'willingness-to-pay') for health gains and the latter represents the healthcare cost of producing health gains at the margin in the healthcare system. Demand-side values are most relevant when the objective is to reflect societal preferences about how much should be spent on health. Supply-side estimates, by contrast, aim to capture the health opportunity costs of additional spending within the healthcare system. These opportunity costs arise whether new health technologies are funded by displacing existing activities or by drawing in new resources, since in both cases there are alternative uses of those resources that are forgone. Taken together with a supply-side estimate, a demand-side estimate can inform whether the public budget for healthcare should be expanded. Recent research has considered this in England, estimating the marginal productivity of existing spending (supply side) and the social value of additional expenditure (demand side) for England's National Health System (Lomas *et al.*, 2025).

When HTA processes recommend the use of a technology, this induces changes in the allocation of healthcare resources, and the health consequences from the expansion or contraction of prior activity is referred to as the health opportunity cost. If a new technology generates more health for a given cost than the existing system would produce with that same money then it is considered cost-effective. Empirical estimates of the supply-side threshold have been reported in the literature for a number of countries (Edney *et al.,* 2022; Pichon-Riviere *et al.,* 2023). They are estimated by modelling the relationship between changes in healthcare expenditure and health outcomes and are alternatively referred to as the marginal productivity of healthcare expenditure. We refer to such estimates of the public payer costs of producing one additional unit of health as '*k*'.

There is a body of research empirically estimating *k* (Edney *et al.,* 2022) but it is unclear if this is reflected in HTA guidelines. It is important for those developing HTA guidelines and those undertaking CEA to point to estimates of *k* to assess the health opportunity cost relative to the policy thresholds as there are real consequences for population health if they do not align. If the policy threshold is too high, then HTA decisions can reduce population health through the approval of new technologies whose health opportunity cost is greater than the health generated by the technology. If it is too low, then new healthcare technologies that could increase population health may be rejected.

Policy thresholds used in HTA processes may be implicit, based on precedent or heuristics such as the World Health Organisation's (WHO) historic recommendation of 1-3 x gross domestic product (GDP) per capita, or they may be intended to reflect alternative considerations than health opportunity cost alone (Gafni and Birch, 2006; Rawlins *et al.*, 2010; Santos *et al.,* 2018; Schwarzer *et al.,* 2015; Thokala *et al.,* 2018). HTA organisations may also accommodate the valuation of outcomes beyond health and/or costs outside of the healthcare system, in which case any appropriate empirical reference for a policy threshold would need to mirror this perspective (Walker *et al.,* 2019).

In the most common contexts, where health systems aim to maximise population health and HTA processes adopt a healthcare payer perspective (ie. considering only costs incurred by the healthcare payer, typically government), empirical estimates of *k* can provide the sole relevant information for establishing a value-for-money threshold (Brouwer *et al.,* 2019). By contrast for those taking a broader perspective, for example a societal perspective, the *k* estimate may be necessary to establish the net health impact but would not be sufficient to inform the policy threshold and value for money. Additional challenges arise in health systems where the costs are not borne entirely from public budgets and financing includes out-of-pocket (OOP) payments (such as co-payments) to access healthcare. These may represent a source of financing for healthcare but not be explicitly distinguished from other sources of finance in the HTA process. The source of financing can influence how the health opportunity cost is interpreted and have implications for whether *k* may be considered a suitable reference for a policy threshold.

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Despite the potential important consequences of misalignments in policy thresholds and estimates of *k*, to date there is limited evidence comparing them. A review by Espinosa *et al.*, (2024a) investigated the influence of thresholds in the HTA decision making of nine countries with either an explicit policy threshold or an estimate of *k* but did not compare the two. A scoping review and empirical analysis by Vallejo-Torres *et al.*, (2022) explored the use of published estimates of the health opportunity cost in CEA published in the scientific literature and limited their sample to two countries. Our aim is therefore to compare policy thresholds in HTA guidelines with published empirical estimates of *k*. To our knowledge this will be the first concise reference that maps, side-by-side, HTA policy thresholds and published *k* estimates.

2. Methods

We collated the evidence of explicit policy thresholds reported in HTA guidelines and the evidence of empirical estimates of *k* which we define as the public payer costs of producing one additional unit of health. HTA guideline documents were obtained from a review by Breslau *et al.*, (2023) which identified 53 country and region-specific guidelines and technical manuals. We included HTA guidelines regardless of the official status of the HTA process, such as whether the recommendations are mandated within the national healthcare system, or whether they are legally binding in determining the provision of healthcare services. We excluded guidelines that could not be linked to a specific country because estimates of *k* focus on national level health care marginal productivity. We excluded those that did not relate to publicly financed healthcare. Where region-specific guidelines were included in the original Breslau study, we identified the respective countries in the regional guidelines and sought corresponding national level HTA guidelines. Guidelines which could not be retrieved were excluded. Where we were aware of additional guidelines or updated guidelines to those reported in Breslau *et al.* we included them.

From the HTA guidelines we extracted the country/region; HTA organisation; HTA guideline name; HTA guideline reference; recommended perspective for CEA; explicit policy threshold range referenced in the guidelines along with any justification reported in the guideline; inclusion of non-health care costs, including OOP payments; the description of included OOP payments in guidelines; and recommended health outcomes. As well as recording the described perspective, we categorised the perspective based on the definition provided by Kim *et al.*, (2020). In summary, a health payer perspective includes costs incurred by a third-party health payer such as a government; a health sector perspective includes all health costs regardless of who bears the cost such as OOP payments; a limited societal perspective includes all costs such as transportation and productivity but excludes other public sectors such as education; and a societal perspective includes all costs. The full definitions are reported in the supplementary material.

Empirical estimates of *k* were identified from a review by Ochalek *et al.* this special issue, which identified 18 empirical estimates of *k* with 15 country-specific estimates and 3 studies that estimate across a wide range of countries. We included studies that represent a country or region and excluded global estimates. From the included studies we extracted the empirical estimate of *k*; the outcome metric (ie. QALY or DALY); the currency; and the year *k* is estimated for.

We undertook a narrative synthesis of the results as our primary interest lay in comparing the explicit policy threshold and estimates of *k* within-country. To facilitate comparisons, we converted estimates of *k* and policy thresholds to international dollars (I$) using purchasing power parity estimates from the World Bank (World Bank Group, 2025b). We report *k* with reference to the date the corresponding study was published, and nominal policy thresholds with reference to the date the corresponding HTA process document was published. Explicit thresholds of the form 'multiples of GDP' will by their nature be dynamic and update with GDP, whereas nominal thresholds would not update without amendment to the HTA process documents, and typically these are not frequently updated. We therefore report estimates of GDP in 2024 I$ (World Bank Group, 2025a).

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To demonstrate the net health impacts of approving new technologies at the policy threshold, we report the health generated from spending $1mn on a health technology (or technologies) with an incremental cost-effectiveness ratio (ICER) at the policy threshold and compare this to the health that empirical estimates of *k* indicate a health system would get from spending $1mn within the current health system. We calculate this using the lower bound of the policy threshold as this shows the minimum health lost by approving a new technology that has an ICER at the policy threshold range. This assumes all health technologies are, on average, accepted at a cost per QALY equal to the explicit policy threshold and all health spending being displaced has, on average, a cost per QALY equal to the *k* estimate.

3. Results

Our results include 47 HTA guidelines across 46 countries, presented in Table 1. The studies excluded and the reasons for exclusion are reported in the supplementary material.

Of the 46 included countries with HTA guidelines, 32 (70 percent) were high income countries, nine were upper-middle income (19 percent) and five were lower-middle income (11 percent).

In total, 20 countries had guidelines that stated an explicit policy threshold. Eight of these were based on multiples of GDP per capita in the country (China, Hungary, India, Indonesia, Latvia, Lithuania, Mexico and Poland); three have thresholds that align with published estimates of cost-effectiveness thresholds (Colombia, Saudi Arabia and South Africa); one policy threshold was based on a multiple of the average monthly wage (Slovakia); and for eight no clear justification was given (Czech Republic, England, Ireland, Netherlands, Norway, Portugal, Thailand and USA-ICER guidelines).

Empirical estimates of *k* were available for thirteen (30 percent) of the countries for which we reviewed HTA guideline documents (Australia, China, Colombia, England, Germany, Greece, Indonesia, Netherlands, Saudi Arabia, South Africa, Spain, Sweden and the United States). A summary table of the countries with explicit policy thresholds and estimates of *k* is provided in the supplementary material.

Figure 1 shows a map of the location of the countries with HTA guidelines that reference an explicit policy threshold and the countries with published estimates of *k*.

Of the 47 guidelines reviewed, 21 recommend a healthcare payer, 7 recommend a healthcare sector and 3 recommend a health payer or health sector perspective alongside a societal perspective. Of the 21 recommending a healthcare payer perspective 10 state an explicit policy threshold (Colombia, Czech Republic, England, Hungary, Ireland, Latvia, Mexico, Portugal, Slovakia, South Africa), four have an estimate of *k* (Australia, Colombia, England and South Africa) and three have both (Colombia, England and South Africa). The policy thresholds included in HTA guidelines for Colombia and South Africa align with the estimates of *k* ($5,181 per QALY and ZAR38,500 per QALY, respectively) whereas in England the policy threshold (£20,000–30,000 per QALY) is higher than the estimate of *k* (£12,936). The HTA guidelines for Saudi Arabia recommend a healthcare payer perspective alongside a societal perspective and include an explicit policy threshold that aligns with an estimate of *k* (SAR 50,000–75,000 per QALY). The HTA guidelines for Spain also recommend a limited societal and healthcare payer for additional analyses. No explicit policy threshold is provided but an empirical estimate of *k* is available (Vallejo-Torres, 2025; Vallejo-Torres *et al.*, 2018). Of the seven HTA guidelines that recommend a healthcare sector perspective, only one includes an explicit policy threshold (Poland) and none have an associated estimate of *k*.

Twelve countries recommend a societal perspective, with nine being classified as limited societal and three as societal. Of the nine guidelines that recommend evaluations adopt a limited societal perspective, five specify an explicit policy threshold (China, Indonesia, Norway, India and Thailand), four have an estimate of *k* (China, Germany, Indonesia and Sweden) and two have both

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Table 1. HTA guidelines and published estimates of *k*

Country/ Region	HTA organisation	HTA guidelines	Recommended perspective for CEA	Perspective based on Kim et al. categories (Kim *et al.*, 2020)	Explicit HTA policy threshold referenced in the guidelines	Non-health costs included in recommended CEA?	Description of the OOP payments in guidelines in recommender CEA	Description of health outcomes in recommended CEA	Published *k*
Australia	Pharmaceutical Benefits Advisory Committee	Guidelines for preparing a submission to the Pharmaceutical Benefits Advisory Committee (Merlin, Tamblyn, and Schubert 2016)	Healthcare system (base case), alternative as scenario analysis	Healthcare payer	No explicit threshold	N	n/a	QALY	AUD 28,033 per QALY (95% CI: AUD 20,758–37,667) (2011/2012) (Edney *et al.*, 2018)
Belgium	Belgian Health Care Knowledge Centre	Belgian Guidelines for Economic Evaluations and Budget Impact Analyses: Second Edition (Cleemput *et al.*, 2012)	Healthcare payers	Healthcare sector	No explicit threshold	Y	Healthcare costs including patients' co-payments	LYG, QALY	–
Brazil	Ministry of Health	Economic Assessment Guidelines, 2nd edition (Ministry of Health 2014)	Healthcare system, additional recommended analysis is from a societal perspective	Healthcare payer	No explicit threshold	N	No OOP included in the recommended perspective. An additional recommended analysis is from the societal perspective, which should include all costs of producing the service/ procedure and the time lost by patients and their families, in addition to costs related to lost productivity and premature death.	QALY	–
Canada	The Canadian Agency for Drugs and Technologies in Health	Guidelines for the Economic Evaluation of Health Technologies: Canada 4th Edition (CADTH 2017)	Publicly funded health care payer	Healthcare payer	Nothing explicit – the guidelines do state they use a 'supply-side' threshold	N	No OOP should be included in recommended CEA. However, if reporting a societal perspective, incorporating	QALY	–

(*Continued*)

Table 1. (*Continued*)

Country/ Region	HTA organisation	HTA guidelines	Recommended perspective for CEA	Perspective based on Kim et al. categories (Kim *et al.*, 2020)	Explicit HTA policy threshold referenced in the guidelines	Non-health costs included in recommended CEA?	Description of the OOP payments in guidelines in recommender CEA	Description of health outcomes in recommended CEA	Published *k*
							individual OOP costs, charges, and fees that reflect actual payments by an individual (eg. copayments) are applicable		
China	Pharmacoeconomics Technical Committee of the Chinese Pharmaceutical Association	China Guidelines for Pharmacoeconomic Evaluations (Liu *et al.*, 2020)	Societal and healthcare system	Limited societal	1–3 times national GDP per capita is recommended as the willingness-to-pay threshold per QALY	Y	All direct medical and non-medical costs, as well as indirect costs, should be included.	QALY	27,923–52,247 (2017 RMB) (central estimate 37,446) per DALY averted or 47–88% of GDP per capita (central estimate 63%) (Ochalek *et al.*, 2020)
Colombia	Instituto de Evaluación Tecnológica en Salud (IETS)	Manual metodológico para la elaboración de evaluaciones económicas en salud 2.0 (IETS 2025)	Payer of public resources of the health system	Healthcare payer	$5,181 per QALY (ie. 86% of GDPpc, and in sensitivity analyses, use 1 and 3 times GDPpc).	N	n/a	QALY	US$4487.5 (14.7 million Colombian pesos, COP, at 2019 prices) per YLL avoided and US$5180.8 (17 million COP at 2019 prices) per QALY gained (Espinosa *et al.*, 2022)
Cuba	Ministry of Public Health, National School of Public Health, Economy Area	Methodological Guide for Economic Evaluation in Health. Cuba. (González and María 2004)	Social	Limited societal	No explicit threshold	Y	All costs that fall on any individual.	Not specified	–
Czech Republic	Státní Ústav Pro Kontrolu Léčiv (State Institute for Drug Control)	Postup pro posuzování analýzy nákladové efektivity (Procedure for assessing cost - effectiveness analysis) (Státní Ústav Pro Kontrolu Léčiv 2020)	Healthcare payer	Healthcare payer	1,200,000 CZK per QALY	N	Only direct costs – medical and non-medical, if they are demonstrably paid from health insurance	QALY	–
Denmark	Danish Centre for Health Technology Assessment	Health Technology Assessment Handbook (Kristensen and Sigmund 2008)	Societal	Limited societal	No explicit threshold	Y	User payment (medicine, dentist), transport, time spent on investigation/ treatment,	QALY	–

(*Continued*)

Table 1. (*Continued*)

Country/ Region	HTA organisation	HTA guidelines	Recommended perspective for CEA	Perspective based on Kim et al. categories (Kim *et al.*, 2020)	Explicit HTA policy threshold referenced in the guidelines	Non-health costs included in recommended CEA?	Description of the OOP payments in guidelines in recommender CEA	Description of health outcomes in recommended CEA	Published *k*
							(unpaid) time spent by family or friends in caring for patients Changes in patients' temporary absence through sickness, reduced ability to work due to sickness and disability, or lost production in the case of premature death.		
Egypt	Ministry of Health and Population, Egypt	Recommendations for Reporting Pharmacoeconomic Evaluations in Egypt (Elsisi *et al.*, 2013)	Healthcare services	Healthcare payer	No explicit threshold	N	Indirect costs paid by patients can be considered in sensitivity analysis	QALY	–
England	National Institute for Health and Care Excellence	NICE health technology evaluations: the manual (National Institute for Health and Care Excellence 2022)	NHS and personal social services	Healthcare payer	£20,000 to £30,000 per QALY gained or £100,000 per QALY gained for highly specialised technologies.	N	n/a	QALY	£12,936 per QALY (£2018–29,314) (Claxton *et al.*, 2015)
Estonia	Tervisetehnoloogiate hindamise keskus (Centre for Health Technology Assessment)	Tervisetehnoloogiate hindamise Eesti juhend (Estonian Guide to Health Technology Assessment) (Tervisetehnoloogiate hindamise keskus 2024)	Public funder. Payer or societal perspective can be presented	Healthcare payer	No explicit threshold	N	Additional analysis can be carried out from a broader perspective and take into account all significant costs	QALY	–
Finland	Pharmaceuticals Pricing Board (Lääkkeiden Hintalautakunta Läkemedelsprisnämnden)	Preparing a Health Economic Evaluation to be Attached to the Application for Reimbursement Status and Wholesale Price for a Medicinal Product (Lääkkeiden Hintalautakunta 2019)	Unclear	Could not be determined	No explicit threshold	Y	All costs irrespective of the payer	QALY	–

(*Continued*)

Table 1. (*Continued*)

Country/ Region	HTA organisation	HTA guidelines	Recommended perspective for CEA	Perspective based on Kim et al. categories (Kim *et al.*, 2020)	Explicit HTA policy threshold referenced in the guidelines	Non-health costs included in recommended CEA?	Description of the OOP payments in guidelines in recommender CEA	Description of health outcomes in recommended CEA	Published *k*
France	French National Authority for Health (Haute Autorité de santé (HAS))	Choices in Methods for Economic Evaluation to HAS (Choix méthodologiques pour l'évaluation économique à la HAS) (Haute Autorité de Santé 2020)	Collective (covering all individuals or institutions affected)	Healthcare sector	Nothing explicit	Y	The reference case analysis uses a collective perspective, covering all individuals or institutions affected by the production of an intervention: Compulsory National Health Insurance costs, Supplementary health insurance scheme costs and Patient costs (ie. deductible and surcharge)	LYG, all-cause mortality, QALY	–
Germany	Institute for Quality and Efficiency in Health Care (IQWiG)	General Methods (Institut für Qualität und Wirtschaftlichkeit im Gesundheitswesen (IQWIG) 2023)	SHI-insured community	Limited societal	No explicit threshold	Y	Reimbursable: Costs borne by the insured persons, such as co-payments for drugs, medical remedies and aids, and outpatient visits. Direct non-medical costs include resources that support the provision of health care services in the health care sector, such as travel costs.	QALY	€88,107 per life-year gained (2014 EUR) (Gandjour 2023)

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Table 1. (*Continued*)

Country/ Region	HTA organisation	HTA guidelines	Recommended perspective for CEA	Perspective based on Kim et al. categories (Kim *et al.*, 2020)	Explicit HTA policy threshold referenced in the guidelines	Non-health costs included in recommended CEA?	Description of the OOP payments in guidelines in recommender CEA	Description of health outcomes in recommended CEA	Published *k*
							Non-reimbursable non-medical costs are, for example, disease-related net income losses (eg. financial losses of patients receiving sickness allowance below their net income) or the time invested by affected patients and their relatives.		
Ghana	Ministry of Health, Republic of Ghana	Process Guideline for Health Technology Assessment in Ghana (Republic of Ghana Ministry of Health 2022)	Unclear	Unclear	No explicit threshold	Unclear	Estimation of the potential economic impact on the household is mandatory.	Health-related quality of life and mortality	–
Greece	Assessment and Reimbursement of Medicines for Human Use Committee	Official Government Gazette (*Official Government Gazette, 2018. Αριθμ. Οικ. 52029/2018 – ΦΕΚ Β 2768/ 11.07.2018.*, n.d.)	Unclear	Could not be determined	No explicit threshold	Unclear	Unclear	QALY	€27,117 per QALY gained (2019 EUR) (Athanasakis, Agorastos, and Kyriopoulos 2024)
Hungary	The National Institute of Pharmacy and Nutrition (Országos Gyógyszerészeti és Élelmezés-egészségügyi Intézet (OGYÉI))	Professional Healthcare Guideline on the Methodology of Health Technology Assessment (Dóczy, Dózsa, and Dudás 2017)	Healthcare system	Healthcare payer	1.5-10 x GDP per capita depending on the magnitude of the health gain.	N	n/a	QALY	–
India	Department of Health Research Ministry of Health & Family Welfare Government of India	Health Technology Assessment in India A Manual (Rajsekar *et al.*, 2018)	Societal	Limited societal	1 × GDP	Y	Direct medical and nonmedical costs borne by the patients (Out-of-pocket expenditure), direct medical costs borne by the health system in	QALY	–

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Table 1. (*Continued*)

Country/ Region	HTA organisation	HTA guidelines	Recommended perspective for CEA	Perspective based on Kim et al. categories (Kim *et al.*, 2020)	Explicit HTA policy threshold referenced in the guidelines	Non-health costs included in recommended CEA?	Description of the OOP payments in guidelines in recommender CEA	Description of health outcomes in recommended CEA	Published *k*
							the analysis. Indirect costs/ productivity losses should be omitted in base-case analysis.		
Indonesia	Indonesia Health Technology Assessment Committee (InaHTAC)	General Guideline for Health Technology Assessment In Indonesia (Suryawati and Wiweko 2022)	Societal	Limited societal	1–3 × GDP per capita	Y	Direct costs (insurance or out-of-pocket costs); direct non-medical costs (costs incurred by patients and their families such as transportation, accommodation, meals); and indirect costs (lost productivity)	QALY	$235 per DALY averted (2019 US$) (Moler-Zapata *et al.*, 2022)
Ireland	Health Information and Quality Authority	Guidelines for the Economic Evaluation of Health Technologies in Ireland (Health Information and Quality Authority 2019)	Publicly funded health and social care system	Healthcare payer	€20,000–45,000 per QALY	N	n/a	QALY	–
Italy	Italian Pharmaceutical Agency	Linee Guida Per La Compilazione Del Dossier A Supporto Della Domanda Di Rimborsabilità E Prezzo Di Un Medicinale (Guidelines For The Compilation Of The Dossier In Support Of The Application Refundability And Price Of A Medicine) (Agenzia Italiana Del Farmaco 2019)	Health service	Healthcare payer	No explicit threshold	N	N/a	QALY	–
Japan	Centre for Outcomes Research and Economic Evaluation for Health,	Guideline for Preparing Cost-Effectiveness Evaluation to the Central Social Insurance	Public healthcare payer	Healthcare sector	No explicit threshold	Y	An analysis of public healthcare costs should include not only the portion of	QALY	–

(*Continued*)

Table 1. (*Continued*)

Country/ Region	HTA organisation	HTA guidelines	Recommended perspective for CEA	Perspective based on Kim et al. categories (Kim *et al.*, 2020)	Explicit HTA policy threshold referenced in the guidelines	Non-health costs included in recommended CEA?	Description of the OOP payments in guidelines in recommender CEA	Description of health outcomes in recommended CEA	Published *k*
	National Institute of Public Health	Medical Council (Fukuda 2019)					costs paid by the insurer but also those paid by the government and patients as co-payment (ie. the total public healthcare expense)		
Latvia	Cabinet of Ministers	Procedures for the Reimbursement of Expenditures for the Acquisition of Medicinal Products and Medical Devices Intended for the Outpatient Medical Treatment (Cabinet of Ministers 2006)	Health service	Healthcare payer	3 × GDP per capita per QALY or LY	N	Additional analysis can be aimed at the public in general, thereby including other costs (both direct and indirect costs outside the health care system): costs of social services, costs related to the patient transfer and other costs to the patient or his or her family.	LYG, QALY, life year without progression	–
Lithuania	Minister Of Health of the Republic of Lithuania, State Medicines Control Agency of Lithuania	Order On The Approval Of The Cost-Benefit Reference Value (Minister of Health of the Republic of Lithuania 2020; State Medicines Control Agency of Lithuania 2019)	Medical costs	Could not be determined	1–5 x GDP per capita per quality life year (depending on disease burden value category)	Unclear	n/a	QALY	–
Malaysia	Ministry of Health, Malaysia	Pharmacoeconomic Guidelines for Malaysia (Ministry of Health Malaysia 2019)	Ministry of Health's perspective	Healthcare payer	No explicit threshold	N	n/a	QALY	–
Mexico	Comisión Interinstitucional del Cuadro Básico de	Guía para la Conducción de Estudios de Evaluación	Public health sector.	Healthcare payer	1 x national GDP per capita per	N	n/a	QALY, DALY	–

(*Continued*)

Table 1. (*Continued*)

Country/ Region	HTA organisation	HTA guidelines	Recommended perspective for CEA	Perspective based on Kim et al. categories (Kim *et al.*, 2020)	Explicit HTA policy threshold referenced in the guidelines	Non-health costs included in recommended CEA?	Description of the OOP payments in guidelines in recommender CEA	Description of health outcomes in recommended CEA	Published *k*
	Insumos del Sector Salud (Interinstitutional Commission of the Basic Table of Health Sector Inputs)	Económica para la Actualización del Cuadro Básico y Catálogo de Insumos del Sector Salud en México (Guide for the conduction of economic evaluation studies for the update of the basic table and catalo of supplies of the health sector in Mexico) (de Salubridad General 2017)			year of life gained				
Netherlands	Zorginstituut Nederland (National Health Care Institute)	Guideline for economic evaluations in healthcare (Zorginstituut Nederland 2024)	Societal	Societal	€20 000, €50 000, and €80 000 per quality-adjusted life year gained	Y	All relevant societal costs irrespective of who bears it, including costs for the patient and the family (for example informal care, own contributions) and costs incurred in other social sectors (such as productivity losses)	QALY	€73,600 (€53,000 to €94,000) per QALY (2014 EUR) (Stadhouders *et al.*, 2019) and €41,000 (25,900–110,400) per QALY gained (2010 EUR) (van Baal *et al.*, 2019)
New Zealand	Pharmaceutical Management Agency	Prescription for Pharmacoeconomic Analysis (Pharmaceutical Management Agency (PHARMAC) 2015)	Health funder	Healthcare sector	No explicit threshold	Y	All direct patient healthcare costs should be included, this includes the cost to government plus the additional cost to the patient. These costs include general practitioner visits, pharmaceutical co-payments, and home or continuing care.	QALY	–

(*Continued*)

Table 1. (*Continued*)

Country/ Region	HTA organisation	HTA guidelines	Recommended perspective for CEA	Perspective based on Kim et al. categories (Kim *et al.*, 2020)	Explicit HTA policy threshold referenced in the guidelines	Non-health costs included in recommended CEA?	Description of the OOP payments in guidelines in recommender CEA	Description of health outcomes in recommended CEA	Published *k*
Norway	Statens Legemiddelverk (The Norwegian Medicines Agency)	Guidelines for the submission of documentation for single technology assessment (STA) of pharmaceuticals (Norwegian Medicines Agency 2018; Norwegian Ministry of Health and Care Services 2017)	Extended health service	Limited societal	NOK 275,000-825 000 per healthy life year	Y	The following costs must be included: Treatment or prevention costs, paid by the health service or by the patient/relatives; Transport costs linked to travelling to and from treatment, whether paid by the health service, or by the patient/relative; Patient's and relative's use of time in connection with treatment	QALY	–
Philippines	Department of Health - Philippines	Philippine Methods Guide for Health Technology Assessment (Health Technology Assessment Unit 2020)	Publicly-funded healthcare payer	Healthcare payer	No explicit threshold	N	n/a	QALY	–
Poland	The Agency for Health Technology Assessment and Tariff System	Health Technology Assessment Guidelines(Medycznych 2009)	Entity financing health care services (public payer, patient, other payers). Another analysis adopting a social perspective, specifying the indirect costs, may be justified	Healthcare sector	3xGDP per capita per QALY or LY	Y	Costs borne by the patient (eg. co-payments) should be included.	LYG, QALY	–

(*Continued*)

Table 1. (*Continued*)

Country/ Region	HTA organisation	HTA guidelines	Recommended perspective for CEA	Perspective based on Kim et al. categories (Kim *et al.*, 2020)	Explicit HTA policy threshold referenced in the guidelines	Non-health costs included in recommended CEA?	Description of the OOP payments in guidelines in recommender CEA	Description of health outcomes in recommended CEA	Published *k*
Portugal	INFARMED	The National Health Technology Assessment System (SiNATS) (Perelman *et al.*, 2019)	Health service	Healthcare payer	Alternative thresholds between 10,000 EUR and 100,000 EUR per QALY gained should be considered	N	n/a	QALY	–
Russia	Federal State Budgetary Institution; Center for expertise and quality control of medical care, Ministry of Health of Russia	State Budgetary Institution of the Ministry of Health of Russia (The International Society for Pharmacoeconomics and Outcomes Research 2022)	Healthcare payer	Healthcare payer	No explicit threshold	N	n/a	Health indices, QALY	–
Saudi Arabia	Saudi Food and Drug Authority	Economic Evaluation Studies Guidelines (Saudi Food and Drug Authority 2024)	Healthcare payer and/or societal	Healthcare payer (limited societal for additional perspective)	The threshold ranges between SAR 50,000 – 75,000 per QALY	N (Y in societal)	Intangible costs are encouraged to be provided when adapt societal perspective. The costs resulted from a long period of patient care or inability to work during illness are encouraged to be included in the analysis.	Natural units, QALY	SAR 50,000 to 75,000 per QALY gained (SAR 2018) (Al-Jedai *et al.*, 2023)
Scotland	Scottish Medicines Consortium	Guidance to submitting companies for completion of New Product Assessment Form (NPAF) (Scottish Medicines Consortium 2020)	Health service and social work	Healthcare payer	No explicit threshold	N	n/a	QALY	–
Singapore	Agency for Care Effectiveness	Drug evaluation methods and process guide (Agency for Care Effectiveness Version 1.6 2024)	Healthcare system	Healthcare sector	No explicit threshold	Y	Costs paid out of the government's healthcare or insurance budgets and patients' co-payments including out-of-pocket expenses.	QALY	–

(*Continued*)

Table 1. (*Continued*)

Country/ Region	HTA organisation	HTA guidelines	Recommended perspective for CEA	Perspective based on Kim et al. categories (Kim *et al.*, 2020)	Explicit HTA policy threshold referenced in the guidelines	Non-health costs included in recommended CEA?	Description of the OOP payments in guidelines in recommender CEA	Description of health outcomes in recommended CEA	Published *k*
Slovakia	Ministry of Health of the Slovak Republic	Decree of the Ministry of Health of the Slovak Republic on the details of pharmaco-economic analysis of the drug (Republiky 2012; The National Council of the Slovak Republic 2018)	Public health insurance (public payer)	Healthcare payer	No higher than 41 x the reference average monthly wage per one acquired year of life of standardised quality	Unclear	All direct costs from the perspective of the health insurance system	QALY	–
South Africa	Department of Health, South Africa	Health Technology Assessment Methods Guide (Republic of South Africa Department of Health 2022)	Public health system	Healthcare payer	ZAR38,500 per QALY	N	OOPs can be included in non-reference case analyses (eg. Private payer, societal) such as co-payments for drugs, dental, assistive devices; cost of travel, paid caregivers; medical aid premiums; patient's time spent for travel and receiving treatment; and lost productivity costs	Natural units, life years saved, QALY	ZAR 38,500 (USD 3015) per DALY averted, ~53% of South Africa's per capita GDP in 2015 (Edoka and Stacey 2020)
Spain	Spanish Ministry of Health	Guía de Evaluación Económica de Medicamentos (Guideline for the Economic Evaluation of Medicines) (López-Bastida *et al.*, 2010)	Societal and health service	Limited societal (healthcare payer for additional analysis)	No explicit threshold	Y (if societal is presented)	From societal perspective: production losses caused by illness, the costs associated with nonremunerated care provided by family members and friends (informal care), as well as the costs of private home	QALY	€22,000 and €25,000 per QALY (2012 EUR) (Vallejo-Torres, García-Lorenzo, and Serrano-Aguilar 2018) and €34,000 (2022 EUR) (Vallejo-Torres 2025)

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Table 1. (*Continued*)

Country/ Region	HTA organisation	HTA guidelines	Recommended perspective for CEA	Perspective based on Kim et al. categories (Kim *et al.*, 2020)	Explicit HTA policy threshold referenced in the guidelines	Non-health costs included in recommended CEA?	Description of the OOP payments in guidelines in recommender CEA	Description of health outcomes in recommended CEA	Published *k*
							assistance and the support given by social services		
Sweden	The Swedish Dental and Pharmaceutical Benefits Agency	Amendment to the Swedish Dental and Pharmaceutical Benefits Agency's general advice (TLVAR 2003: 2) on financial evaluations (Läkemedelsförmånsverket 2017)	Social	Limited societal	No explicit threshold	Y	All relevant costs associated with treatment and illness should be identified, quantified and evaluated. The production loss for treatment and sickness should also be included	QALY	SEK 370,000 (2016 SEK) per LY (Siverskog and Henriksson 2019)
Switzerland	Swiss Confederation Performance and Principles Committee (ELGK)	Operationalisation of the terms effectiveness, expediency and economy (Federal Office of Public Health FOPH 2022)	Payer perspective	Healthcare payer	No explicit threshold	N	n/a	Unclear	–
Taiwan	Taiwan Society for Pharmacoeconomics and Outcomes Research	Guidelines of Methodological Standards for Pharmacoeconomic Evaluations in Taiwan (Taiwan Society for Pharmacoeconomic and Outcomes Research (TaSPOR) 2006)	Societal	Societal	No explicit threshold	Y	All costs irrespective of who actually bears the cost	QALY	–
Thailand	Department of Health, Ministry of Public Health	Guideline for Health Technology Assessment in Thailand Updated Edition: 2019 (Pannarunothai *et al.*, 2021)	Societal	Limited societal	THB 160,000	Y	All costs including direct medical costs, direct non-medical costs (eg. transportation, meal and accommodation; those associated with special devices, home modification, and payment for	QALY	–

(*Continued*)

Table 1. (*Continued*)

Country/ Region	HTA organisation	HTA guidelines	Recommended perspective for CEA	Perspective based on Kim et al. categories (Kim *et al.*, 2020)	Explicit HTA policy threshold referenced in the guidelines	Non-health costs included in recommended CEA?	Description of the OOP payments in guidelines in recommender CEA	Description of health outcomes in recommended CEA	Published *k*
							Caregivers; time lost by unpaid caregivers), and indirect costs (eg. productivity and time loss as a result of receiving treatment)		
Tunisia	National Agency for Health Assessment and Accreditation (INEAS)	Methodological Choices for Pharmaco-Economic Studies (National Authority for Assessment and Accreditation in Healthcare (INEAS-Tunisia) 2021)	Public payers (National Health Insurance Scheme)	Healthcare sector	No explicit threshold	Y	Medical costs borne by patients and caregivers (out-of-pocket, eg. treatment, hospitalisation or medication, depending on the portion not covered by the public payer)	QALY	–
USA – ICER	Institute for Clinical and Economic Review	ICER's reference case for economic evaluations: Principles and rationale (Institute for Clinical and Economic Review 2024)	Health care system (societal perspective as scenario analysis)	Healthcare sector (limited societal for additional analysis)	Health benefit price benchmark relative to $100,000 to $150,000 per QALY. Note, results reported should compared to $50,000, $100,000, $150,000, and $200,000 per QALY.	N	Only direct health costs, can include OOP payments separately	LYG, equal value LYG, QALY	$104,000 per QALY (UI, $51,000 to $209,000 per QALY) (2019 USD) (Vanness, Lomas, and Ahn 2021)

(*Continued*)

Table 1. (*Continued*)

Country/ Region	HTA organisation	HTA guidelines	Recommended perspective for CEA	Perspective based on Kim et al. categories (Kim *et al.*, 2020)	Explicit HTA policy threshold referenced in the guidelines	Non-health costs included in recommended CEA?	Description of the OOP payments in guidelines in recommender CEA	Description of health outcomes in recommended CEA	Published *k*
USA – Second Panel	Second Panel on Cost-Effectiveness in Health and Medicine	Recommendations for Conduct, Methodological Practices, and Reporting of Cost-effectiveness Analyses (Sanders *et al.*, 2016)	Reference cases should include a health care sector and societal	Societal	No explicit threshold	Y	Medical costs (current and future, related and unrelated) borne by third-party payers and paid out-of-pocket by patients, time costs of patients in seeking and receiving care, time costs of informal (unpaid) caregivers, transportation costs, effects on future productivity and consumption, and other costs and effects outside the health care sector.	QALY	As above.

EUR, euros; GDP, gross domestic product; HTA, health technology assessment; NICE, National Institute for Health and Care Excellence; OOP, out-of-pocket; QALY, quality-adjusted life year; SHI, statutory health insurance.

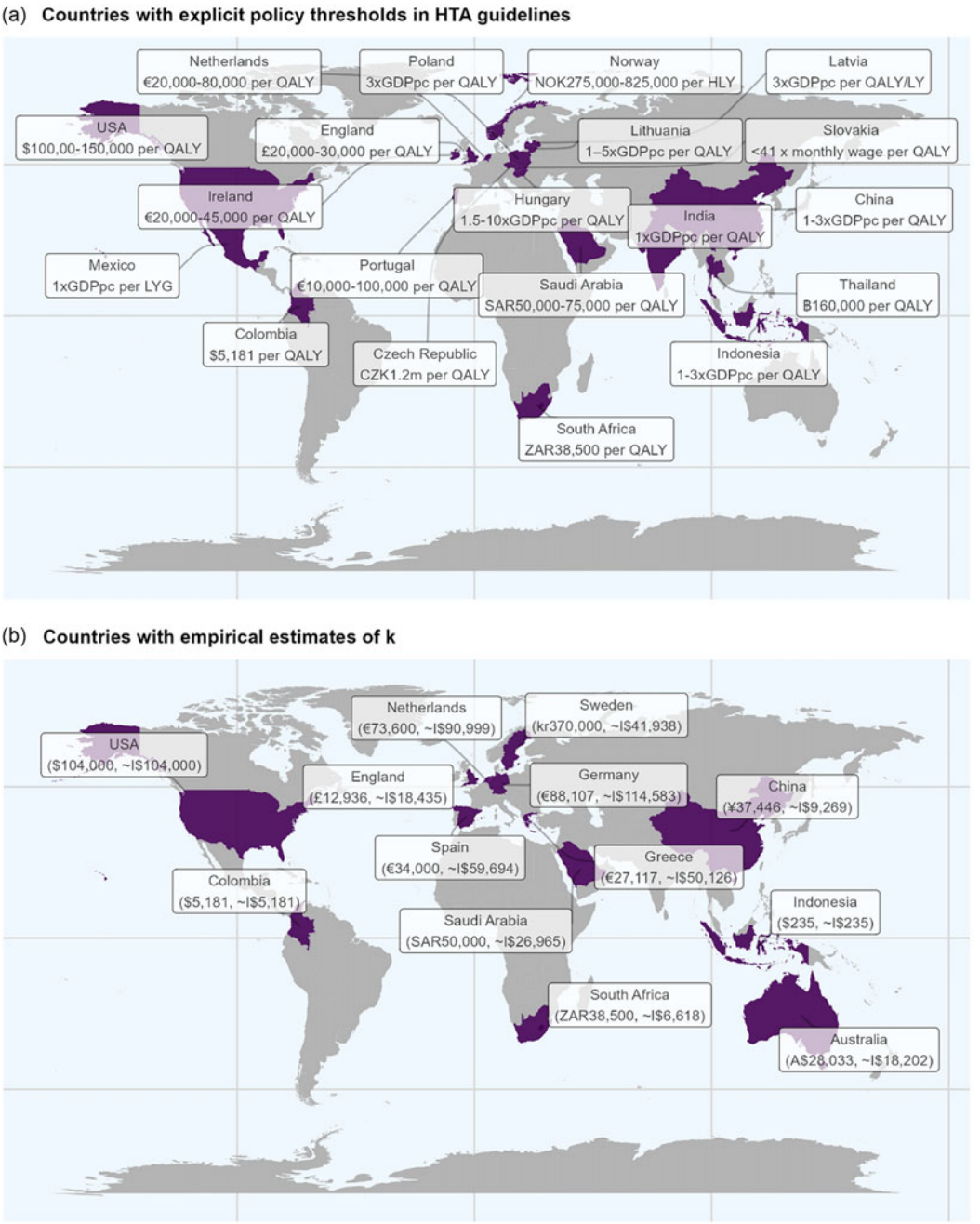

Figure 1. World map of countries with explicit policy thresholds and those with published *k*.

(China and Indonesia). In both China and Indonesia, the explicit policy threshold is 1–3 × GDP per capita whereas the estimate of *k* is ¥27,923–52,247 per QALY in China (Ochalek *et al.,* 2020) and $235 per DALY averted in Indonesia (Moler-Zapata *et al.,* 2022). Of those that recommend a societal perspective, only one (The Netherlands) states an explicit policy threshold of €20,000–80,000 per QALY and has an empirical estimate of *k* (€73,600 per QALY from (Stadhouders *et al.,* 2019) and €41,000 (25,900–110,400) per QALY from (van Baal *et al.,* 2019).

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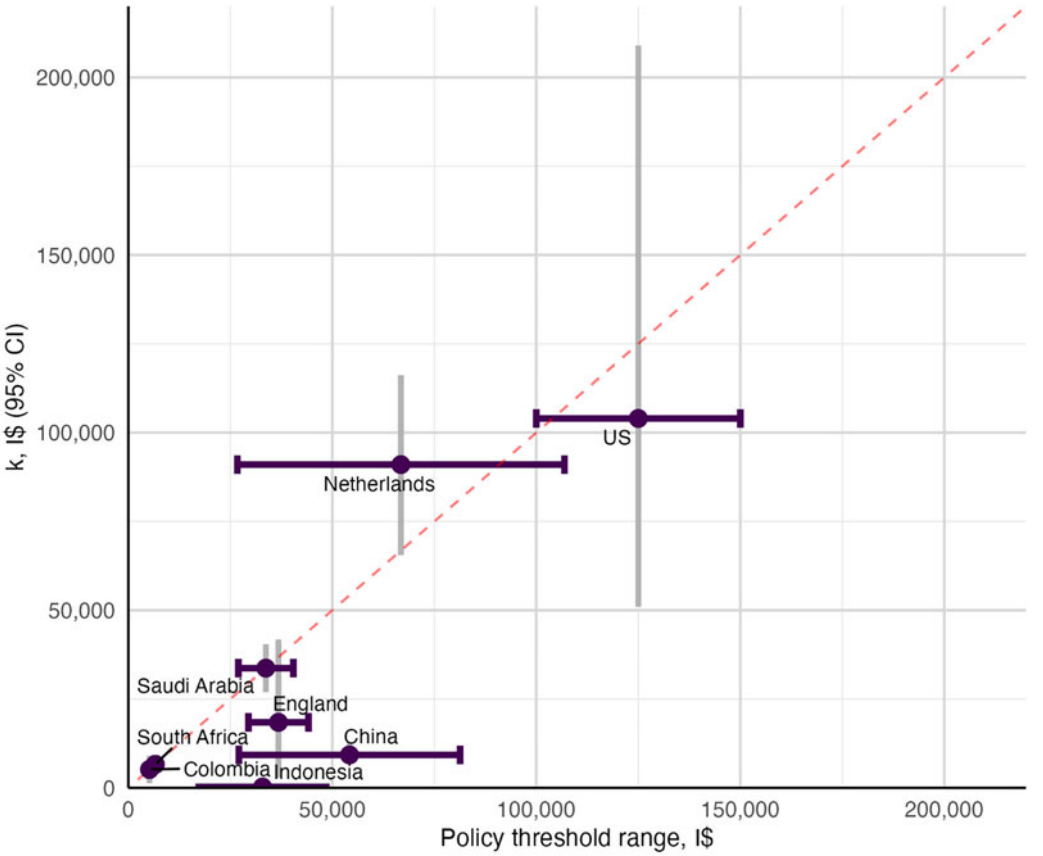

Figure 2. Policy threshold vs. estimate of *k*.
Note: for GDP per capita-based thresholds ie. China and Indonesia, the GDP per capita in I$ was extracted from the World Bank I$ GDP per capita data (World Bank Group 2025a).

Figure 2 plots the policy threshold range and the empirical estimate of *k* in I$ for the eight countries with explicit estimates of both. England, Indonesia and China all have policy threshold ranges below the equivalence line (red-dashed line). Colombia, Saudi Arabia and South Africa have policy threshold estimates on the equivalence line showing the policy thresholds align with empirical estimates of *k*. The Netherlands and the US have ranges that cross the equivalence line indicating policy decisions can be made that are higher or lower than estimates of *k*.

Table 2 displays the countries with an explicit policy threshold in the guidelines and an estimate of *k* reported in I$ to allow for comparison. In Colombia, Saudi Arabia and South Africa the policy threshold and the estimate of *k* are equivalent. In China, England and Indonesia the policy threshold is higher than *k*, with the largest relative and absolute discrepancy observed for Indonesia in which 1 × GDP per capita is equivalent to I$16,448 while the estimate of *k* is I$235. In guidelines for the Netherlands and the United States, the lower bound of the policy threshold range recommended is lower than *k*. The HTA guidelines in the Netherlands recommend applying a threshold of €20,000 (ie. I$26,725) whereas *k* is estimated to be I$90,999 (Stadhouders *et al.*, 2019).

In Indonesia, spending $1million on a new technology with a cost per additional DALY of 1xGDP per capita increases DALYs lost by 4,195 compared to spending that million funding existing healthcare. On the other hand, in the Netherlands spending $1 million on a new technology that produces one QALY per €20,000 would produce 26 more QALYs compared to

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Table 2. Countries with an explicit HTA policy threshold in the guidelines and an estimate of *k*

Country/ Region	Policy threshold (I$)	*k* from published paper	PPP-adjusted *k*	Health lost per million $ (lower policy threshold estimate)
China	1–3 × GDP per capita per QALY (I$27,105–81,315)	¥37,446 per QALY (2017)	I$9,269	71 QALYs
Colombia	0.86 × GDP per capita per QALY (I$5,181)	US $5180.8 (17 million COP) per QALY (2019)	I$5,181	0
England	£20,000–30,000 per QALY (I$29,439–44,158)	£12,936 per QALY (2008)	I$18,435	20 QALYs
Indonesia	1–3 × GDP per capita (I$16,448–49,344)*	US $235 per DALY averted (2019)	I$235	4,195 DALYs
Netherlands	€20 000, €50 000, and €80 000 per QALY (I$26,725, I$66,812 and I $106,899)	€73,600 per QALY (2014)	I$90,999	26 QALYs (gained)
Saudi Arabia	SAR 50,000–75,000 per QALY (I$26,965–40,448)	SAR 50,000 to 75,000 per QALY gained (2018)	I$26,965	0
South Africa	ZAR38,500 per QALY (I$6,618)*	ZAR 38,500 per DALY (2020)	I$6,618	0
United States	$100,000–150,000, per QALY (I$100,000–150,000)	$104,000 per QALY (2019)	I$104,000	10 QALYs (gained)

Note: Australia, Germany, Greece, South Africa, Spain, and Sweden have k but no explicit threshold in guidelines.
Health lost per million was estimated as the number of units of health (eg. QALYs or DALYs) that could be achieved for the $1,000,000 using the CET less the health that could be achieved using the estimate of k. The estimate of *k* for the Netherlands was based on Stadhouders *et al.*, 2019.
*The cost-effectiveness threshold uses QALYs as the unit of health and the estimate of *k* uses DALYs. We have assumed a QALY = DALY in the above calculation. For GDP per capita-based thresholds, the GDP per capita in I$ was extracted from the World Bank I$ GDP per capita data.
Abbreviations: DALY, disability-adjusted life year; CET, cost-effectiveness threshold; GDP, gross domestic product; I$, international dollars; k, empirical estimates of the Government cost of producing an additional unit of health; PPP, purchasing power parity; QALY, quality-adjusted life year; SAR, Saudi riyal; ZAR, South African Rand.

spending $1 million on existing services. The results of the health lost per million I$ using the mid-point of the policy threshold range and the upper bound can be seen in the supplementary material.

4. Discussion

Mapping policy thresholds to estimates of *k* has revealed an increasing number of countries have an explicit policy threshold recommended in HTA guidelines when compared to a similar review (Sharma *et al.*, 2021). There is also increasing availability of empirical estimates of *k*. However, these are rarely aligned.

The majority of explicit policy thresholds used in HTA are not stated to be based on estimates of the health opportunity cost and where justification is provided, 40 percent are based on productivity, be that at a national or individual level. The use of GDP-based thresholds is particularly common in low- and middle-income countries (Kazibwe *et al.*, 2022; Leech *et al.*, 2018) despite the literature cautioning against their use for being disconnected from local budget constraints and not accounting for the health opportunity cost (Bertram *et al.*, 2016; Chi *et al.*, 2020; Robinson *et al.*, 2017). The use of policy thresholds that exceed the estimate of the health opportunity cost is not limited to low- and middle-income countries as we show the case of

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England which uses a policy threshold of £20,000–30,000 per QALY and has an estimate of *k* of £12,936 per QALY (Claxton *et al.*, 2015; Lomas *et al.,* 2019). Setting policy thresholds; however, is not always within the remit of the HTA agencies. Confidential price negotiations between manufacturers and payers (through, for example, national procurement bodies, managed entry agreements, or risk-sharing schemes) may result in discounts and rebates that bring the effective price below that implied by the cost-effectiveness analysis. There are health consequences to the adoption of policy thresholds that exceed the health opportunity cost. The approval of new technologies under such policy thresholds can displace more health than they create. Furthermore, as shown in Table 2 and previous literature (Ochalek *et al.*, 2018), the health losses may be greater in low- and middle-income countries.

Setting the policy threshold can be a highly political process. For example, in Canada efforts to align prices more closely with value informed by the opportunity cost provoked strong opposition from industry and patient groups (Amyotrophic Lateral Sclerosis Society of Canada, 2022) and was ultimately abandoned following legal challenges (Reguly *et al.*, 2022) and political pressure.

At the time of writing, there is active debate in the UK around changing the policy threshold used by the National Institute for Health and Care Excellence as a result of industrial and economic policy (Gainsbury and Naci, 2025). In Thailand, decision-making bodies jointly released a policy statement recommending that the current policy threshold be maintained, and that future adjustments to the policy threshold be based on evidence of health opportunity cost (HITAP, 2025). In Indonesia, where HTA processes are relatively newer, the policy debate to set the policy threshold is ongoing (CHEPS, 2025; HFACT, 2025). In contrast to Canada, where the policy process and accompanying technical work on thresholds have been relatively well documented, such deliberations may be opaque and infrequently recorded in the public domain.

The majority of HTA guidelines in our sample recommend a healthcare payer perspective is adopted in the reference case meaning an empirical estimate of *k* would in theory represent a key piece of information to assess cost-effectiveness. Colombia, Saudi Arabia and South Africa offered the only examples of countries that recommend evaluations adopt a health system perspective and provide an explicit policy threshold that aligns with *k* ($5,181 per QALY, SAR50,000 per QALY and ZAR38,500 per QALY). Countries such as Spain adopt a healthcare perspective and have an estimate of *k* (€22,000–34,000) (Vallejo-Torres *et al.*, 2018; Vallejo-Torres, 2025), but have no explicit policy threshold. While decisions in these contexts could be based on *k,* this is not known to the public. The presence of implied thresholds represents the largest group in our study as only 20 of 46 countries have an explicit threshold, consistent with previous research (Fasseeh *et al.*, 2024). Implied thresholds allow flexibility of decision-making and may prevent gaming by manufacturers, amongst other benefits (Gafni and Birch, 2006; Thokala *et al.*, 2018). However, ensuring transparency and aligning policy thresholds with empirical evidence to ensure decisions maximise population health is likely to offer greater benefits to society as opposed to the risks associated with arbitrariness or neglecting opportunity costs.

We identified a number of HTA guidelines that specify the inclusion of some OOP payments in the CEA to inform HTA decisions. Belgium, Japan, Poland and Singapore include patient co-payments as well as costs falling on the public healthcare funder. This conflates payers and the perspective does not align with who the opportunity cost falls upon ie. individuals and public funders. In such cases *k* may not represent a policy relevant estimate of the health opportunity cost as OOP is rarely addressed in empirical estimation (Ochalek *et al.* this special issue). Kim *et al.*, (2020) made the distinction between a healthcare payer perspective and a healthcare sector perspective. The former includes only those monetary healthcare costs incurred by a (typically third party) healthcare payer, the latter is similar to the healthcare payer perspective but accounts for all monetary costs of healthcare, regardless of who bears the cost. Our results show in practice this is not reflected in HTA guidelines as some healthcare payer perspectives, as in the case of Belgium and Japan, include OOP payments in the form of patient co-payments. We recommend

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HTA guidelines follow the taxonomy described in Kim *et al.* to improve the interpretation of the policy relevance of empirical estimates of *k*.

The sole objective of the healthcare system may not, however, be to maximise health. Some justify policy-threshold ranges or allow for deliberative processes to reflect values beyond efficiency such as equity, severity or disease burden (Minister of Health of the Republic of Lithuania, 2020; National Institute for Health and Care Excellence, 2022; Zorginstituut Nederland, 2024). Similar arguments are made about the role the policy threshold plays in incentivising future innovation or attracting industry funding, yet it is important this approach does not overlook the opportunity cost and the health implications of decisions. In such cases estimates of the health opportunity cost, and thereby empirical estimates of *k*, are required in order to quantify the trade-offs being made between maximising net health and other aspects of value.

Similarly, 12 HTA guidelines in our study recommended evaluations adopt a societal perspective either solely or alongside a health perspective. These factor in labour market productivity or the reduction in OOP payments resulting from healthcare. In these contexts, the role of *k* remains important for determining the net impact on population health. However, it is important to note that the incremental cost per QALY calculated from a societal perspective cannot be directly compared with *k* to assess the net health effect of a technology; such comparisons must instead be based on estimates from the healthcare system perspective. The reason being that *k* (as defined in this paper) measures the changes in health outcomes due to changes in healthcare expenditure, and not due to changes in other broader non-healthcare costs. If costs fall on other budgets (including household OOP payments), then estimation of consequences would require an estimate of the health opportunity costs associated with those other budgets. Ensuring net health effects are measured based only on the analysis that takes the healthcare system perspective alone maintains consistency.

It is important to highlight that HTA guidelines change over time. We include the second edition of the South African HTA guidelines which states an explicit policy threshold of ZAR38,500 (Republic of South Africa Department of Health, 2022). Yet, the first edition did not make explicit the policy threshold (Republic of South Africa Department of Health, 2013). Cost-effectiveness thresholds are unlikely to remain constant over time with a growing number of determinants explaining the temporal changes (Paulden *et al.*, 2016). As HTA processes mature, the basis for the choice of threshold may change, so consideration is needed when comparing nascent processes with those which are well established.

4.1. Limitations

This study is not an exhaustive list of HTA guidelines, but a pragmatic review based on HTA guidelines identified in a recent study (Breslau *et al.*, 2023). Several important features of the guidelines included in our study are worth noting. First, there are no HTA guidelines for low-income countries. Although there is growing evidence on health opportunity costs in these settings (Ochalek et al., 2018; Woods *et al.*, 2016), the absence of formal HTA guidelines makes it difficult to assess how such evidence is used in decision-making or to scrutinise the health implications of HTA decisions. Second, we excluded implicit policy thresholds, which may have important implications. Many countries do not have an explicitly stated threshold in guidance documents (for example, the Philippines), yet if decisions are being made, an implicit threshold is likely applied in practice. Third, we used HTA guidelines as a proxy for HTA processes; however, even when such thresholds are included in guidelines or technical manuals, they are not always binding in final decision-making. In some contexts, such as Colombia, they function primarily as technical or scientific inputs. Finally, approving new technologies at the policy threshold does not always equate to financing them at the price underpinning the cost-effectiveness estimate compared to that threshold. The approved ICER may not represent the actual incremental costs and effects in the health system if changes occur after appraisal, including following price

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negotiations or if the recipient patient population differ from that in the appraisal. We do consider that the HTA recommendation on cost-effectiveness compared to the stated threshold is of relevance to decision making, even if the potential impacts post-decision require consideration of the processes within each country.

4.2. Policy recommendations

This study highlights important implications for policy. For researchers and analysts, it is important to specify thresholds ex-ante in protocols, and we recommend citing both the policy threshold and the empirical estimate of k in economic evaluations to inform HTA (Lomas *et al.*, 2022). Comparing against both (and ideally calculating net health effects using the empirical estimate of k) would present all available evidence to end users. Furthermore, the perspective of the analysis should align with that of the k estimate in order to compute net health effects.

For HTA organisations, we encourage guidelines to explicitly acknowledge k estimates, even if a higher/lower policy threshold is adopted for other reasons. There are health implications of failing to have a policy threshold related to k when the purpose of the analysis is to inform decisions about the allocation of publicly financed health care resources under a fixed or effectively constrained budget, as demonstrated in this study and previous literature (Naci *et al.*, 2025). We also encourage clarity and transparency regarding what the policy threshold is and what it represents; the lack thereof can have consequences for millions of people.

At the global level, norm-setting bodies such as the WHO play a critical role in shaping priority setting processes across countries. Whilst cost-effectiveness analyses in LMICs have often referenced GDP per capita–based policy thresholds (Leech *et al.*, 2018), the WHO and others have made a clear case that multiples of GDP per capita should not form the basis of policy thresholds (Bertram *et al.*, 2016). Despite its role and aims in leading global norm-setting around evidence-informed priority-setting (EIPS) and universal health coverage (World Health Organization, 2025), WHO has, however, not issued clear guidance on what should be used instead (Chi *et al.*, 2020). Instead, its guidance has increasingly emphasised that countries should develop context-specific approaches grounded in empirical evidence of health opportunity costs and aligned with national budget constraints and decision-making processes (World Health Organization, 2021). Moving forward, there is an important role for WHO and other norm-setting bodies to clarify the importance of empirical estimates of k for informing EIPS and strengthening the link between global methodological guidance and national implementation.

Finally, we advocate that policy thresholds be regularly reassessed, and any divergence between the policy threshold and estimate of opportunity cost be justified transparently. A standard periodicity for updating k could be proposed (eg. every 5 or 10 years). Several factors would need to be considered, including the availability of funding for estimating k (which requires a highly specialised team), the quality of underlying data sources and the lack of estimation of health state preference values, particularly for LMICs, among others (Espinosa *et al.*, 2024b).

5. Conclusion

This paper provides a go-to reference for the policy thresholds used in HTA processes across countries. Our comparative mapping shows that fewer than half of HTA guidelines assessed have explicit policy thresholds, and among these there is a lack of alignment between the policy threshold and empirical estimates of the health opportunity cost.

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Competing interests. The authors have no competing interests to declare.

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