



Challenges of calculating cost-effectiveness thresholds

Health systems around the globe use cost-effectiveness analysis to support health funding decisions. Cost-effectiveness analysis compares benefits associated with new technologies with benefits necessarily forsaken when resources are displaced to pay for the new technologies. Systems aiming to improve the health of their populations but facing a budget constraint should use cost-effectiveness thresholds (CETs) that reflect the health opportunity costs of funding decisions.¹

In their Article (June, 2023), Andres Pichon-Riviere and colleagues² derive CETs based on aspirational targets on the growth in life expectancy and on the growth in health expenditure. Because most countries do not have such explicit targets, the study suggests using the historical median evolution observed for these two variables in countries with similar incomes. The authors claim this approach is based on current health system efficiency and has the opportunity cost as a core principle.

We would like to highlight caution in using these values as CETs. First, we question whether the goal of achieving the historical median evolution is a reasonable target. The direction and magnitude of the efficiency paths, as described in this study, are sensitive to economic crises (when health spending declines but life expectancy grows) and health crises (when health spending is expanded but life expectancy declines), risking counterintuitive values as CETs. These examples, linked to our recent history, illustrate our second concern: the large degree of confounding and reverse causality between health and health spending implies that the proposed CETs are unlikely to reflect the health opportunity costs of funding

decisions. Health spending is only one among several determinants of health, and the relationship between health spending and health outcomes is strongly affected by changes in health-care needs. The causes and direction of changes in needs for health care should be incorporated in analyses aiming to estimate health opportunity costs.³ Using the values proposed by Pichon-Riviere and colleagues as CETs based on health opportunity costs implies the assumption that observed changes in life expectancy are due solely to changes in health expenditure and that observed historical relationships between health expenditure and health outcomes are achievable prospectively. Both assumptions imply that the need for health care remains constant over time.

The use of causal inference methods in previous studies could represent a barrier for non-specialist audiences. However, basing impactful estimates on assumed relationships could be misleading. Therefore, health systems aiming at improving population health given available resources should make efforts to ensure that their CETs truly reflect the opportunity costs of funding decisions.

We declare no competing interests.

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1 Claxton K, Martin S, Soares M, et al. Methods for the estimation of the National Institute for Health and Care Excellence cost-effectiveness threshold. *Health Technol Assess* 2015; **19**: 1–503.

- 2 Pichon-Riviere A, Drummond M, Palacios A, Garcia-Marti S, Augustovski F. Determining the efficiency path to universal health coverage: cost-effectiveness thresholds for 174 countries based on growth in life expectancy and health expenditures. *Lancet Glob Health* 2023; **11**: e833–42.
- 3 Edney LC, Lomas J, Karnon J, et al. Empirical estimates of the marginal cost of health produced by a healthcare system: methodological considerations from country-level estimates. *Pharmacoeconomics* 2022; **40**: 31–43.