THE PRICE OF SUBSTITUTE TECHNOLOGIES

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INTRODUCTION

One important objective of price regulation in the drug market is to find an optimal trade-off between incentives for R&D, consumer protection and value for money [1]. Additionally, price regulation transparency is beneficial to pharmaceutical companies and consumers who become aware of the market rules [2]. In some countries, prices are determined by an international benchmarking approach, which uses the price of the same technology in other countries as a reference [3]. It has also been suggested that pharmaceutical companies use the price of other technologies that have already been approved for the same indication to induce higher prices for their products. This approach is known as reference pricing [4]. None of these methods, however, link the price of new technologies to an objective estimative of value. Health economic evaluations can be used to determine acceptable prices for the incorporation of new technologies through threshold pricing.

OBJECTIVE

The objective of this paper is to describe an appropriate threshold for substitute technologies and provide guidance for regulators to calculate the maximum acceptable price for the incorporation of substitute technologies in the health system.

MODIFIED COST-EFFECTIVENESS THRESHOLD FOR ME TOO DRUG PRICING

In the absence of dominance, the Incremental Cost-Effectiveness Ratio (ICER) is insufficient to provide a recommendation: for new technologies to be recommended, the ICER must be compared to a critical ratio, the Cost-Effectiveness Threshold (λ), which represents the maximum acceptable cost for an extra unit of benefit [2,5,6]. Through threshold pricing, the price of a technology is set to the maximum possible value for the product to be cost-effective when the ICER is compared to a defined λ. It is to be expected that producers will adopt a strategic behavior and define threshold prices to maximize their profit [7].

It has been postulated that the threshold calculated from opportunity costs (κ) represents its maximum possible value [8] and that there must be a threshold (β) that maximize consumer surplus [7]. For a technology to be listed, the relationship ICER≤λ (1) must be maintained. We can rewrite this inequality as:

$$\hat{p}_E \leq \hat{p}_C + \Delta E\lambda \ (2)$$

Therefore, λ values the difference in effectiveness between technologies. Substituting ΔE for Ee-Ec and Pc for Ec(CERc), it can be shown that the maximum cost of treatment with an entrant technology must be:

$$\hat{p}_E \leq E_E\lambda + E_C(CER_C - \lambda) \ (3)$$

in which CERc is the cost-effectiveness ratio of the comparator, an estimative of the efficiency of the technology. The lower the efficiency of the comparator, and the higher the threshold, the higher the market price of an entrant technology could be. Dividing Equation 3 by Ee, it can be shown that:

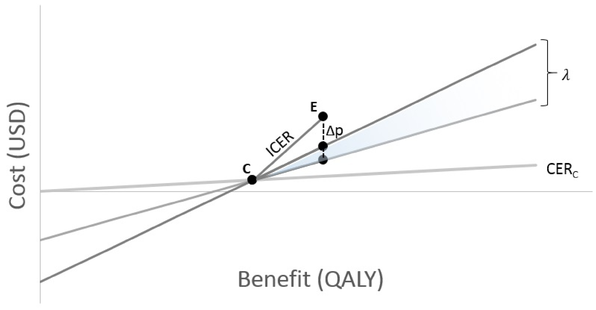
$$CER_E \leq \frac{E_C}{E_E}(CER_C - \lambda) + \lambda \ (4)$$

Considering Equation 5, and assuming that most new technologies are more effective that the listed comparators [12,13], it follows that:

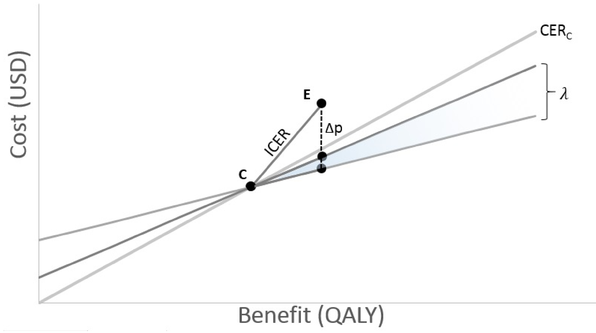
RESULT 1
CERe>CERc only if CERc<λ.
The cost-effectiveness ratio of the entrant technology can only be higher than the cost-effectiveness ratio of the comparator when the cost-effectiveness ratio of the comparator is lower than the threshold (**Graph 1**).

RESULT 2
If CERc>λ, then it is mandatory that CERe<CERc.
If the cost-effectiveness ratio of the comparator is higher than the threshold, then the cost-effectiveness ratio of the entrant technology must be lower than the cost-effectiveness ratio of the comparator (**Graph 2**).

Graph 1. CERe when the CERc is lower than the thresold.



Graph 2. CERe when the CERc is higher than the thresold.



That way, the CERc, when lower than κ, is shown through a deductive process to be a plausible estimate for λ that fulfills the objective of maximizing consumer benefit granting producers a part of the combined surplus to stimulate R&D; i. e. it would be between β and κ. In conclusion, the price of substitute technologies should be limited by the efficiency of the comparators:

$$\hat{p}_E \leq E_E(CER_E) \ (5)$$

REFERENCES

1. Levaggi R. Pricing schemes for new drugs: A welfare analysis. Soc Sci Med. 2014;102:69–73.
2. Santos et al. Cost-Effectiveness Thresholds: methods for setting and examples from around the world. Expert Rev Pharmacoecon Outcomes Res. 2018;18(9):277–88.
3. Paris V, Belloni A. Value in Pharmaceutical Pricing [Internet]. France: OECD; 2013.
4. Howard DH, Bach PB, Berndt ER, Conti RM. Pricing in the Market for Anticancer Drugs. J Econ Perspect. 2015;29(1):139–62.
5. Weinstein M, Zeckhauser R. Critical Ratios and Efficient Allocation. J Public Econ. 1973;2:147–57.
6. Leech et al. Use and Misuse of Cost-Effectiveness Analysis Thresholds in Low- and Middle-Income Countries: Trends in Cost-per-DALY Studies. Value Heal. 2018.
7. Paulden M. Strategic behavior and the cost-effectiveness threshold: a new conceptual model. Edmonton: Institute of Health Economics; 2018.

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