

Framework for Developing Cost-Effectiveness Analysis Threshold: The Case of Egypt

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INTRODUCTION & OBJECTIVE

Cost-effectiveness analysis (CEA) is an essential element in health technology assessment (HTA). CEA results do not provide useful information if not benchmarked against a monetary threshold. Cost-effectiveness threshold (CET) indicates the maximum acceptable monetary value for one Quality Adjusted Life Year (QALY) of health gains. The aim of this study was two-fold: first, to conduct a comprehensive screening of CET values and practices throughout the world, and second, to propose a country specific cost-effectiveness threshold framework for Egypt.

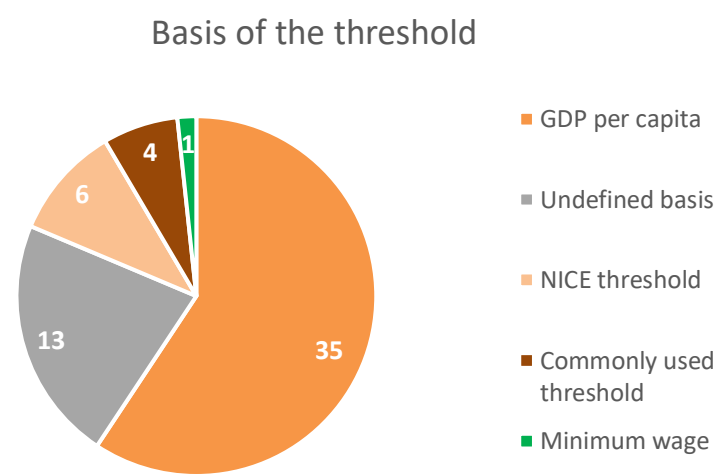
METHODS

A targeted literature review for cost-effectiveness thresholds was conducted. In addition, we critically appraised the topic (CAT) of multiple/differential thresholds. CETs of different countries were reviewed from secondary sources, including websites of HTA agencies, Ministries of Health websites, ISPOR database, or peer-reviewed publications. After converting CET values to USD (2019), summary statistics were calculated. To develop a national CET framework in Egypt, a national expert panel was convened to propose an initial design. This was followed by a multistakeholder workshop with representatives of different governmental bodies, to vote and finalize the recommended framework and consent upon the threshold values.

RESULTS

Basis of the threshold

Most of the countries (59%) tied their CET to the local gross domestic product (GDP), while others had their CET linked to either minimum wage, NICE threshold, a commonly used threshold or an undefined basis of the threshold.



CET value and CET as a ratio of GDP per capita

The absolute value of CET ranged from approximately 1,000 to 100,000 USD, with the lowest CET recorded in Ghana, and the highest in Switzerland. The mean absolute value across all countries was almost 24 thousand USD (Figure 1a).

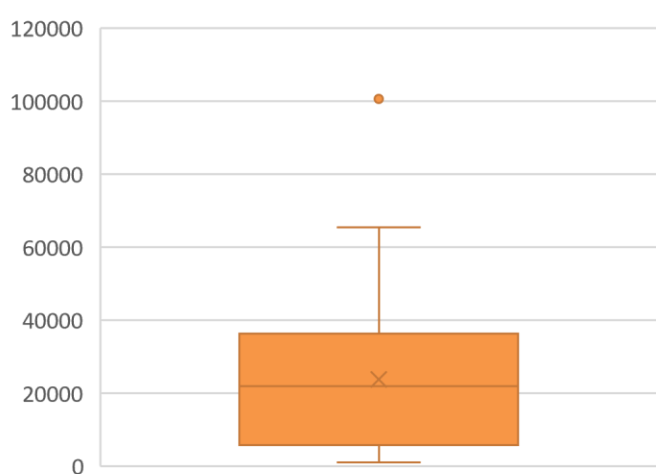


Figure 1a CET absolute value USD 2019

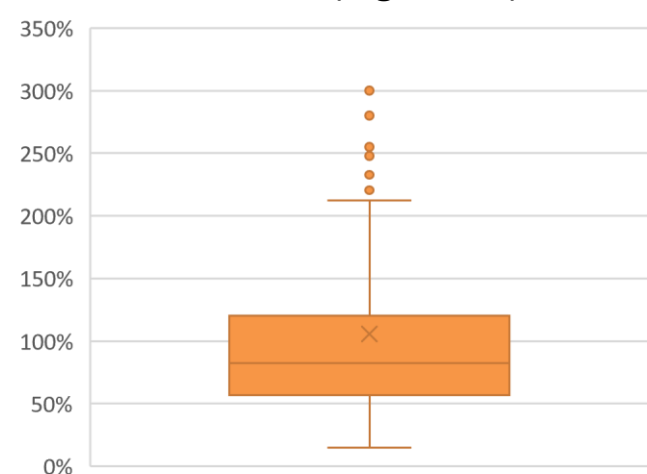


Figure 1b CET as a ratio of GDP per capita (nominal)

The average CET as a ratio of the GDP for all countries was 106%, ranging from 15% in Brazil and up to 300% in Tunisia. (Figure 1b).

CET values by income group

The mean threshold value was directly proportionate with the income level. Lower-middle income countries had the lowest mean of 15% compared to the mean absolute value of all countries (mean unstratified). Upper-middle income countries came next with an average of 43%, and finally, high-income countries with the highest mean of 153% compared to the mean of all countries as shown in Table 1.

CET values by region

Europe and central Asia had a mean of 142% compared to the mean of all countries, where Switzerland had the highest threshold value. On the other hand, Sub-Saharan Africa and South Asia had the lowest mean, which was 8% to the mean of all countries. Middle East & North Africa region averaged 94% compared to all countries as an absolute value of CET.

Table 1 average CET per income group and region

Income Group	Mean Average CET	Mean/Mean unstratified
Lower-middle income countries	3,437	15%
Upper-middle income countries	10,250	43%
High income countries	36,157	153%
Region	Mean Average CET	Mean/Mean unstratified
South Asia	1,896	8%
Europe & Central Asia	33,676	142%
Middle East & North Africa	22,170	94%
East Asia & Pacific	18,071	76%
Sub-Saharan Africa	1,859	8%
Latin America & Caribbean	6,841	29%
North America	43,842	185%
All regions	23,701	100%

CET and CET/GDP per capita vs GDP per capita

Although CET absolute value was directly proportionate to country income level, the average CET/GDP per capita was inversely proportionate.

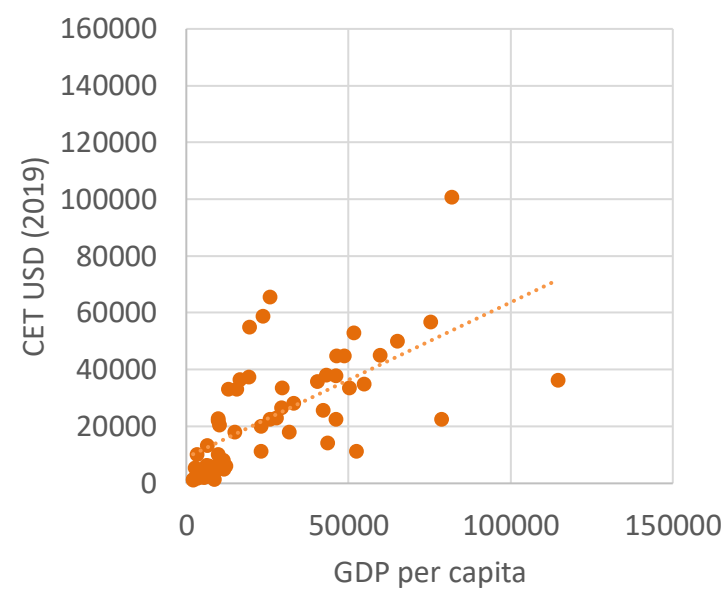


Figure 2 CET USD VS GDP per capita

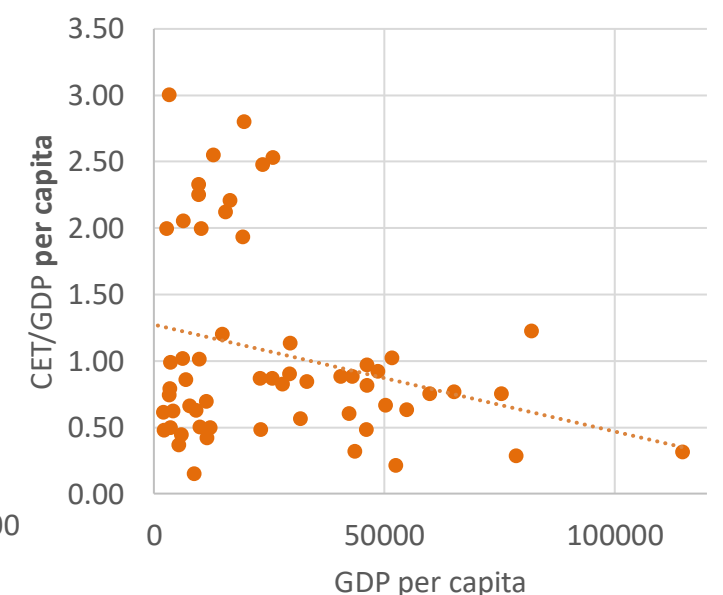


Figure 3 CET/GDP per capita VS GDP per capita

Multiple thresholds

Netherlands and Norway based their differential threshold values on disease severity. Netherlands applied a threshold of 80,000 EUR (8 times its lower threshold) for the most severe conditions. Other countries like France, Italy, Canada, the United States (USA) and the United Kingdom (UK) had a special threshold for oncology drugs which ranged from a minimum of 1.5 times the lower threshold in Canada up to six times in France and the USA. South Africa had a lower public reimbursement threshold compared to the private while, USA and the UK adopted a threshold up to 10 times the normal limit for ultra-rare diseases.

Egyptian CET

The national expert panel concluded that multiple thresholds should be established in Egypt with reference to the GDP per capita. The consensus workshop recommended a threshold of 1-3 times GDP per capita based on the Incremental Relative QALY Gain (IRQG). For orphan medicines, a CET multiplier between 1.5-3.0 based on the disease rarity was recommended on top of the previous formula. A two times multiplier was recommended for the private reimbursement compared to the public. Participants recommended an implicit one-year pilot period for the implementation.

Table 2 Public and Private cost-effectiveness threshold

CET (GDP 2019)	IRQG	Public Reimbursement CET	Private Reimbursement CET (2X)
1.0 x GDP per capita	0.00 – 0.10	50,648 EGP	101,295 EGP
2.0 x GDP per capita	0.10 – 0.25	101,295 EGP	202,591 EGP
2.5 x GDP per capita	0.25 – 0.50	126,619 EGP	253,238 EGP
3.0 x GDP per capita	0.50 – 1.00	151,943 EGP	303,886 EGP

CONCLUSION

The CET in most of the countries is closely related to the GDP per capita. Higher income countries tend to use a lower threshold as a ratio of their GDP per capita compared to lower income countries. Defining a CET can be considered one of the milestones of HTA implementation. Egypt opted for a multiple CET framework to judge the value of health technologies, for reimbursement and pricing.