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Estimating the Cost-Effectiveness Threshold for the Philippines

A Supply-Side Approach

Mac Ardy J. Gloria, Justine Marie M. Mercado, Edrian L. Abagat, and Anne Julienne Genuino-Marfori

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"Philippine General Hospital COVID-19 ward."

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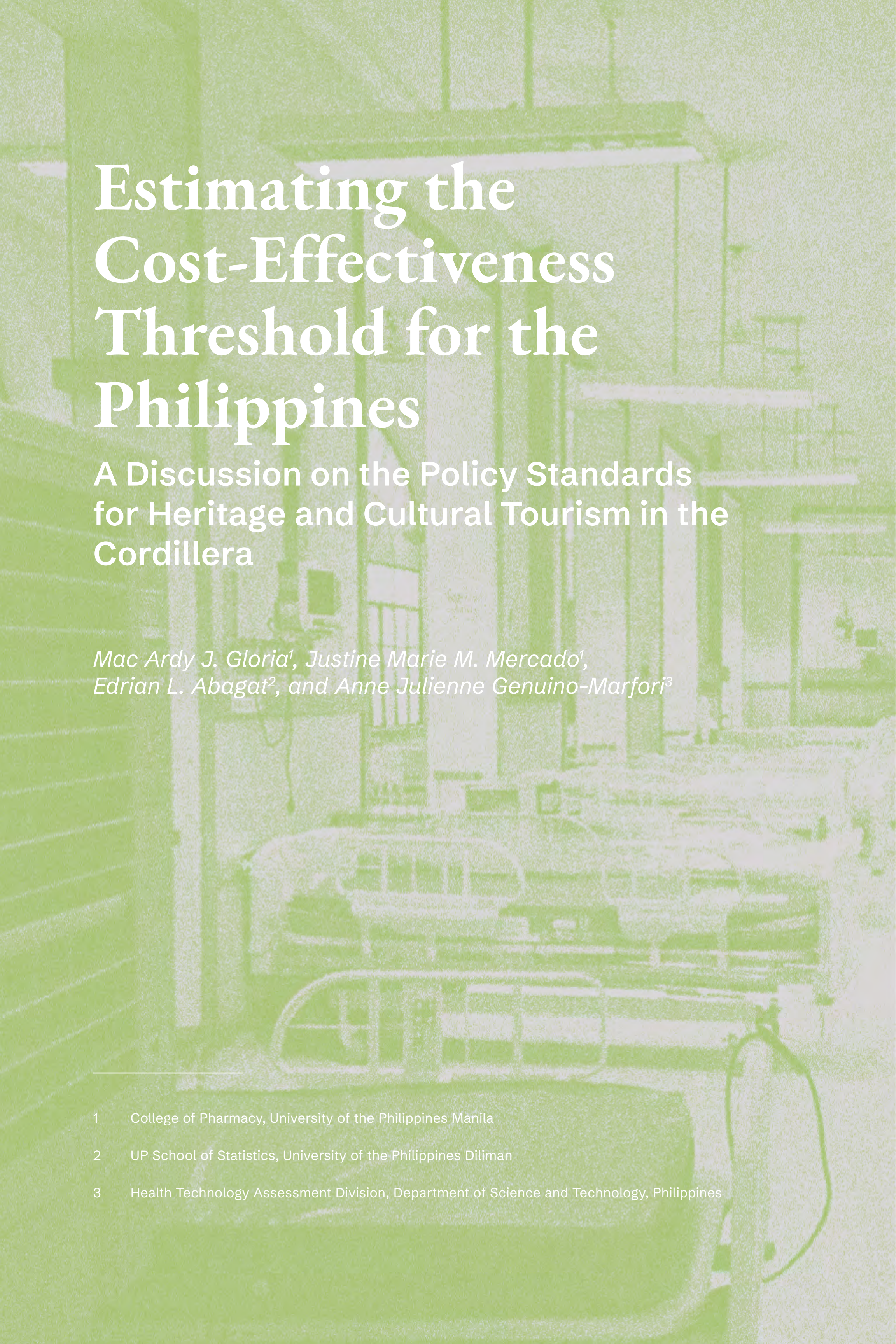

Estimating the Cost-Effectiveness Threshold for the Philippines

A Discussion on the Policy Standards for Heritage and Cultural Tourism in the Cordillera

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Key Highlights

- Background: Health technology assessments (HTA) play a critical role in informing evidence-based decision-making in healthcare. One dimension in HTA is economic impact assessment, which uses cost-effectiveness thresholds (CET) to determine the value for money invested in a health technology. In the Philippines, there is, however, no explicit CET by which decisions of cost-effectiveness can be made. Consequently, this opens the opportunity to develop a supply-side approach that anchors CET on the health system's budget and capacity to deliver services, making resource allocation more aligned with what the system can sustainably afford.

- Objective: This study aims to estimate the CET value for health technologies in the Philippines using a supply-side approach.

- Methodology: We employed a retrospective, cross-sectional design that involved the empirical estimation of the CET using country-specific data. To estimate the country-specific CET, the analysis adopted the methodological framework of Pichon-Riviere et al. (2023), which incorporates health expenditure per capita (HEpc), life expectancy at birth (LE), and gross domestic product (GDP) per capita. These data were obtained from the Philippine Statistics Authority (PSA). Historical costs were adjusted to 2024 values using the consumer price index (CPI) data from the World Bank-World Development Indicators to account for inflation. Health-adjusted life expectancy (HALE) values were sourced from published literature. These parameters were then applied to the equation developed by Pichon-Riviere et al. (2023) to generate an average CET estimate appropriate for the Philippine setting.

- Results: An estimate of the appropriate CET for the Philippines based on mean and median values of historical HEpc and LE data from 2010 to 2025 was also computed using the equation developed by Pichon-Riviere et al. (2023). Specifically, the mean and median CET estimates were ₱84,316.63 and ₱209,410.46 per QALY gained, respectively. These values correspond to 36 percent and 89 percent of the 2024 Philippine GDP per capita.

- Conclusion and Recommendations: This study provides a context-specific estimate of the CET for the Philippines using local economic and statistical data. Notably, the computed values were lower than the WHO's recommended benchmark of one to three times a country's GDP per capita. This suggests that many health technologies might appear cost-effective if a higher CET were applied, which could expand access to care

but at the same time place additional pressure on the limited healthcare budget. This highlights the importance of aligning CET values with actual costing and outcome data within a specific healthcare setting rather than relying on generalized global benchmarks. Further research and regular updates to the CET are encouraged to ensure that it remains responsive to changes in the health system and economic conditions.

Keywords: Cost-Effectiveness Threshold, Supply-side approach, Philippines

Introduction

Background

The Philippines is an archipelagic country in Southeast Asia with over 7,641 islands. It has maintained its classification as a lower-middle-income country (LMIC) for approximately 37 years, since the World Bank first categorized it as such in 1987 (World Bank, n.d.-a). This classification system is based on a country's gross national income (GNI) per capita during the previous calendar year. Countries, such as the Philippines, with a GNI per capita falling between $1,136 and $4,465 are classified accordingly as LMICs (Metreau et al. 2024; World Bank 2026a). Those within this income classification continue to face significant resource constraints negatively impacting the provision of basic necessities and essential services such as electricity, clean water, education, and quality healthcare (Sharma and Popli, 2023).

Universal health care was recently recognized as a priority in the Philippines. Domestic general government health expenditure (GGHE-D) as a percentage of general government expenditure (GGE) showed a 2.5 percent improvement from 6.5 to 9 percent from 2000 to 2022. This, however, is still below the average GGHE-D of 10.5 percent and 10.8 percent of the Western Pacific region and the world, respectively (WHO 2025a). Further, around 5.9 percent of the country's gross domestic product (GDP) is being allocated for health. However, household out-of-pocket payments still had the highest contribution of around 44.4 percent to the total current health expenditure in 2023 (PSA 2024). This underscores the significant resource constraints still faced by the Philippine health system and highlights the need for more efficient resource allocation to support universal healthcare.

Health technology assessments (HTA) play a critical role in informing evidence-based decision-making in healthcare. This concept was introduced in the Philippines by the implementation of Republic Act (RA) No. 11223, otherwise known as the Universal Health Care Act. In this context, HTA is defined as a "multidisciplinary process" that systematically evaluates the properties, effects, and impacts of health-related technologies, medicines, vaccines, procedures, and all other health-related systems that are meant to solve health problems and improve the quality of life and health outcomes of patients (RA No. 11223, 2019, §4(n)). One dimension in HTA is economic impact assessment. Cost-effectiveness analysis (CEA) is a specific type of economic evaluation that compares costs and outcomes of alternative health technologies (York Health Economics Consortium 2016). CEAs make use of cost-effectiveness thresholds (CET) to determine the value for money invested in a health technology. This typically represents the cut-off point for allocation of an activity in a budget-constraint context (Bertram et al. 2016). This implies that health technologies with ICER values below the threshold are deemed cost-effective, whereas those with ICERs exceeding the CET are considered not cost-effective.

There are three common methods of estimating the CET. The first and most common approach is based on the World Health Organization Choosing Interventions that are Cost-Effective (WHO-CHOICE) recommendation of using one to three times the country's per-capita gross domestic product (GDP) (Bertram et al. 2016). This method is based on the suggestion of the WHO Commission of Macroeconomics and Health. It states that the equivalent estimated value of a year of healthy life, per capita, is a reasonable amount to spend on a new health intervention that would provide an additional year of healthy life. Health interventions that avert one disability-adjusted life year (DALY) costing less than the average GDP per capita were considered very cost-effective, while those costing more than one but less than thrice the GDP per capita were still considered cost-effective. The other method that can be used to estimate CET values is the demand-side approach, which takes into account society's preferences and the value of health benefits. There are two general approaches to determining the CET using the demand-side method. The first method involves directly asking from a sample population how much their willingness-to-pay (WTP) threshold is for a particular health benefit. The second involves indirectly determining the value of a health benefit by estimating the WTP for the reduction of risk of death (Gloria et al. 2021). Finally, the supply-side method of determining CETs is anchored on empirical estimations based on the quantitative relationship between health expenditure and the health benefit of interest. Though this method provides a more objective threshold, it is often limited by data availability (Athanasakis et al. 2024).

Many criticisms were made regarding the GDP-based CET estimation suggested by the WHO-CHOICE team. In particular, it was noted that using one to three times the GDP per capita as a CET may have possibly resulted in the adoption of a higher proportion of health interventions due to the CET threshold being unreasonably high, leading to more health interventions being deemed "cost-effective" (Kazibwe et al. 2022). On the other hand, studies evaluating the use, application, and appropriateness of the supply- and demand-side methods remain limited. A previous review of published narratives and systematic reviews was done. It showed that there are significantly more studies using the demand-side approach (Cameron et al. 2018; Santos et al. 2018; Vallejo-Torres et al. 2016; Claxton et al. 2015; Nimdet et al. 2015; Ryen and Svenson et al. 2014; Mason et al. 2008) as compared to the supply-side method (Santos et al. 2018; Vallejo-Torres et al. 2016; Claxton et al. 2015; Ochalek et al. 2015). Notably, all the studies utilizing the supply-side method were conducted in high-income countries (HICs) only (Santos et al. 2018; Vallejo-Torres et al. 2016; Claxton et al. 2015). The majority of the studies making use of the demand-side approach also originated from HICs (Cameron et al., 2018; Santos et al., 2018; Vallejo-Torres et al. 2016; Claxton et al. 2015; Nimdet et al. 2015; Ryen and Svensson 2014; Mason et al. 2008). However, contrary to the supply-side method, a small number of demand-side studies have been conducted in LMICs. Currently, there is a scarcity of studies specifically addressing supply-side CET values in LMICs such as the Philippines.

Previous cost-effectiveness analyses (CEA) implemented in the Philippines were identified in the National Library of Medicine (NLM) and SCOPUS. Among the nine identified CEAs, four (44.44 percent) reportedly used the WHO-recommended CET value of 1–3× GDP per capita (Germar et al. 2017; Shim 2016; Tupasi et al. 2006; Zhang et al. 2014). Another three studies (33.33 percent) also followed the previous recommendation, albeit stricter, as they only used ≤1× GDP per capita as their CET values (Lam et al. 2018; Haasis et al. 2015; Guerrero et al. 2015). Finally, the two remaining studies (22.23 percent) compared their respective outcomes among each alternative option (Loevinshohn et al. 1997; Lansang et al. 1989). This highlights the inconsistency of CETs used for CEAs. This results in variability and inconsistency in assessing the potential cost-effectiveness of new health technologies.

In the Philippines, there is no explicit CET by which decisions of cost-effectiveness can be made (HTA-DOST 2020). Nevertheless, other decision criteria are also accounted for in possible coverage decisions, including responsiveness to magnitude, severity, and equity; effectiveness and safety; household financial impact; and affordability and viability. Consequently, this opens the opportunity to develop a supply-side approach that anchors CET on the health system's budget and capacity to deliver services, making resource allocation more aligned with what the system can sustainably afford. This study aims to estimate the CET value for health technologies in the Philippines using a supply-side approach. The results of this study may supply necessary evidence to inform policy and clinical decision-makers in support of the adoption of a country-specific CET value based on locally derived statistical data. Doing so will help promote more efficient health resource allocation and more equitable decision-making within the Philippine health system.

Methodology

Study Design

This study employed a retrospective, cross-sectional study design involving a scoping review of all published economic evaluations from inception to June 2025, a scoping review of all published health technology assessments by the Health Technology Assessment Division of the Department of Science and Technology (HTA-DOST), and the empirical estimation of the cost-effectiveness threshold using the method adopted from Pichon-Riviere et al. (2023). The study was implemented throughout a period of three months from August to October 2025.

Search Strategy for Scoping Review

Two previously published systematic reviews of economic evaluations done by Gloria (2023) and Albania et al. (2025) were used as a reference to identify relevant studies that can be included in this analysis. These systematic reviews implemented a comprehensive literature search of all economic evaluations published from inception to December 2024. A new search was done on two databases, namely PubMed and SCOPUS, to search for studies published from January 2025 to June 2025. A summary of the search strings used for the two previously published SRs and the new literature search may be seen in table 1.

In addition, the Health Technology Assessment Division (HTAD) of the Department of Science and Technology (DOST) was contacted by the study team to ask for access to all available and published HTA reports. This was done to ensure that the study could draw from the most up-to-date and relevant assessments conducted at the national level. In response to this request, the study team was directed towards the Omnibus HTA Tracker, which is a consolidated, comprehensive, and up-to-date file that lists all the assessments being undertaken by the HTAD and the HTA Council. All HTA reports listed in the Omnibus HTA Tracker were considered for further screening (HTA-DOST 2024).

Table 1. Period Covered and Search Strings Used by Reference Studies and New Search

Study	Period Covered	Search String
Gloria 2023	Inception to January 2021	(“HTA” OR “cost-benefit” OR “economic evaluation” OR “cost-effectiveness” OR “cost-utility” OR “cost-minimization” OR “cost-consequence”) AND Philippine*
Albania et al. 2025	2020 to December 2024	(Cost benefit OR cost utility OR cost effectiveness OR cost minimization OR economic evaluation) AND Philippines
New Search	January 2025 to June 2025	(Cost benefit OR cost utility OR cost effectiveness OR cost minimization OR economic evaluation) AND Philippines

Eligibility Criteria for Scoping Review

Studies and reports were considered eligible for inclusion based on the following criteria: (1) implemented a cost-utility analysis (CUA); (2) reported the cost-effectiveness threshold (CET) and/or incremental cost-effectiveness ratio (ICER) with values expressed in monetary units per quality-adjusted life year (QALY) gained or disability-adjusted life year (DALY) averted; and (3) published from Inception to June 2025. Studies were deemed ineligible based on these exclusion criteria: (1) a duplicate of another study, and (2) not an original article.

Health Opportunity Cost

This study adopted the methodology developed by Pichon-Riviere et al. (2023), which determined the appropriate cost-effectiveness thresholds of one hundred and seventy-four countries around the world based on two publicly available pieces of information: (1) life expectancy and (2) health expenditure. Their methodology is based on the analysis of how the adoption and coverage of new health technologies will affect the rate of increase in life expectancy at birth at the population level and the health expenditure per capita. The relationship between these two parameters was quantified through an equation that, upon rearranging, can also be used to compute the appropriate CET value that ensures that the growth of life expectancy and health spending is within the predefined goal set.

$$m = \frac{ICER}{HEpc \times LE'}$$

Formula 1: Formula to derive vector of influence (*m*) (Pichon-Riviere et al. 2023)

Formula 1 shows the initial formula used to compute the vector of influence (m) of the implementation of a certain health intervention using the reported ICER value, the health expenditure per capita (HEpc), and the life expectancy at birth (LE) following the period in which the new intervention was introduced. The value computed reflects the possible effect of implementing a new health intervention on health spending and life expectancy at the population level during a given period. This initial equation can be used to compute an appropriate cost-effectiveness threshold per life year that corresponds to a targeted rate of growth in health expenditure and life expectancy. In this case, when formula 1 is rearranged, the computed ICER value can be used as the CET, as seen in formula 2.

$$CET_{LY}(ICER) = m \times HEpc \times LE'$$

Formula 2: Formula to CET per life-year gained (Pichon-Riviere et al. 2023)

$$CET_{LY}(ICER) = \frac{\%\Delta \times HEpc \times (LE + \Delta LE)}{\Delta LE}$$

Formula 3: Expanded Formula to CET per life-year gained (Pichon-Riviere et al. 2023)

$$CET_{QALY} = \frac{\%\Delta h \times HEpc \times (LE + \Delta LE)}{\Delta LE \times QYr}$$

Formula 4: Expanded Formula to CET per life-year gained (Pichon-Riviere et al. 2023)

Formula 3 presents an expanded version of formula 2. Since the vector of influence, m, is equal to the percent increase in health expenditure per capita ($\%\Delta h$) divided by the change in life expectancy in a given period (ΔLE), using this expanded formula allows for the computation of a CET value based on a more or less stringent target change in health expenditure and life expectancy. The result of this computation is the CET value per life year gained.

Incorporating the combined ratio of health-adjusted life expectancy (HALE) and life expectancy (LE) produces the QYr value. When applied in the formula, this enables the calculation of cost-effectiveness threshold (CET) values for combined health metrics such as QALYs and DALYs, resulting in the CET value per QALY gained or DALY averted. Formula 4 served as the basis for computing the appropriate CET value in this study.

Data Collection for Health Opportunity Cost

Country-specific data were used in the computation of the CET. Data collection involved formally contacting the PSA through email to request the datasets on current health expenditure, life expectancy at birth, and gross domestic product (GDP) per capita from 2000 to 2025. The Macroeconomic Accounts Service (MAS) provided data sheets containing current health expenditure per capita from 2014 to 2024 and the GDP per capita from 2000 to 2025. Data for Life Expectancy at birth at the population level were also requested from the PSA. However, PSA did not have disaggregated LE data. Instead, life expectancy was reported in five-year intervals. Because of this, the annual factsheet for women and men of the Philippines was considered to derive an annual measure of life expectancy. The five-year forecasted life expectancy, weighted by the population projections from the report, was used as an estimate to cover the years of interest, 2010 to 2024. The following quantities from the report are used to compute the LE of the i-th year: male initial life expectancy (x_i), female initial life expectancy (y_i), population projection of men (m_i), population projection of women (w_i), and lastly, total population projection for both sexes (t_i).

$$LE_i = \frac{\frac{m_i}{t_i}x_i + \frac{w_i}{t_i}y_i}{\frac{m_i}{t_i}x_i + \frac{w_i}{t_i}}$$

Formula 5: Formula for forecasting life expectancy weighted by the population projection

Cost Adjustment

Historical costs extracted from both the scoping review and the health opportunity cost were adjusted to 2024 values using the consumer price index (CPI) data from the World Bank–World Development Indicators to account for inflation. CPI values used may be seen in appendix A. Additionally, both Philippine peso (PHP) and US dollar (USD) values of costing data were reported in this analysis. Values used for conversion from PHP to USD and vice versa may be seen in appendix B. Formulas used to adjust for inflation and convert USD to PHP and vice versa are shown in formulas 6 and 7, respectively.

$$\text{PHP}_{\text{year}} = \text{USD}_{\text{year}} \times \text{Conversion rate}_{\text{year}}$$

Formula 7: Formula for Price Conversion based on Conversion Rates

Assumptions

This analysis was based on two key assumptions. First, the ratio of the HALE and LE that will be used to compute the CET per QALY gained was based on estimates reported by Pichon-Riviere et al. (2023). This value came about by dividing the identified Philippine HALE value of 62 by the Philippine LE value of 71.2 (Pichon-Riviere et al., 2023). 0.87 QYr was used during the computation of CET. Second, following the assumption by Pichon-Riviere et al. (2023) that LE exhibits an increasing trend, absolute values of ΔLE were used in the CET calculations.

Reporting Format

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) were used to present the flow of the scoping review performed by this study. This PRISMA flow diagram was used to illustrate the number of records identified, screened, included, and excluded, along with the reasons for exclusion.

Data Analysis

Qualitative data, including incremental costs, incremental outcomes, and ICER values, were analyzed using frequency statistics and presented through a narrative summary of the evidence in both text and tabular forms. Similarly, the computed health opportunity cost was analyzed using frequency statistics and was tabulated and narratively synthesized.

Results

A scoping review was conducted in two parts. First, two previously published systematic reviews of cost-effectiveness analysis (CEA) by Gloria (2023) (*n* = 55) and Albania et al. (2025) (n = 26) were used as a reference to screen all the previously published CEAs from inception to December 2024. A new literature search for studies published from January 2025 to June 2025 in PubMed and Scopus (*n* = 216) was also conducted to extend the period of search covered. The articles from the first part of the scoping review were cost-effectiveness studies that reported ICER values per QALY gained or DALY averted. The included studies were not necessarily considered cost-effective. Second, a scoping review of all the HTA reports included in the Omnibus HTA Tracker (*n* = 142) from the HTAD-DOST was also done. A total of 439 studies were identified. One hundred ninety-six (196) were deemed ineligible for inclusion due to the studies not being the study design of interest (*n* = 194) or being identified as a duplicate study (*n* = 2). The remaining two hundred and forty-three studies underwent full-text review. Two hundred five (205) studies were further excluded due to them not being a cost-utility analysis (*n* = 140) or not reporting ICER values (*n* = 65). A total of 38 articles were deemed eligible for inclusion. The PRISMA Diagram is shown in figure 1.

Scoping Review

Among the 35 studies included in the scoping review, 14 studies (40 percent) reported ICERs per DALY Averted, while the other 21 studies (60 percent) reported ICERs per QALY gained. Historical ICER values were adjusted to 2024 values using the consumer price index (CPI) data from the World Bank-World Development Indicators to account for inflation. PHP and USD values of the reported ICERS and the reported CET values are shown in Appendix C. Further, the reported ICER values were benchmarked against the 2024 Philippine GDP per capita, with the comparison expressed as the ICER to GDP per capita ratio.

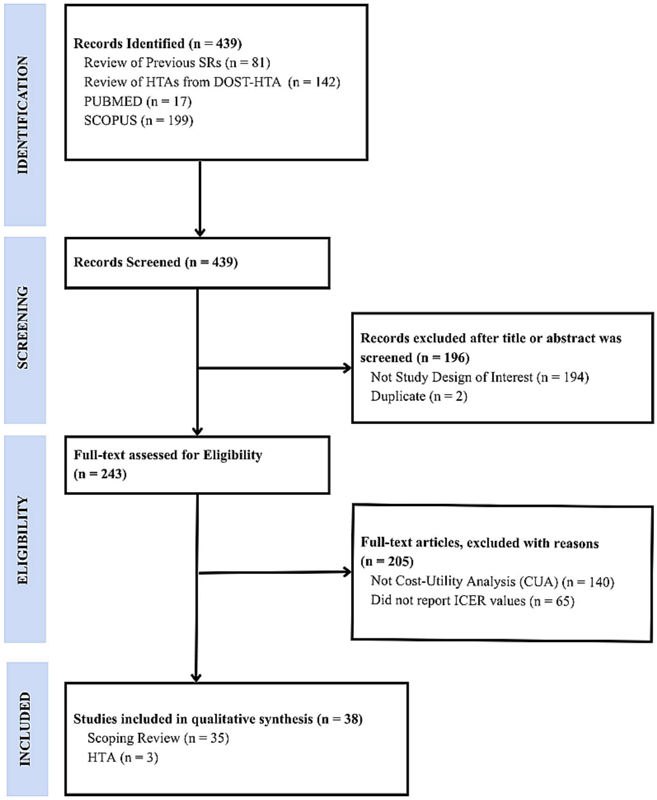

Figure 1. PRISMA Diagram

Among the studies reporting cost per DALY averted outcomes, nine (64.29 percent) presented ICERs below 1 GDP per capita (Genuino et al. 2025; Cheng and Estrada 2021; Vodicka et al. 2020; Brummer et al. 2024; Chye et al. 2025; Rivera et al. 2017; Fitzpatrick et al. 2017; Health Technology Assessment Council 2024; Villanueva-Uy et al. 2021). Two studies (14.29 percent) reported ICERs between 1 and 2 times the GDP per capita (Llave et al. 2022; Patikorn et al. 2022), while one study (7.14 percent) had an ICER below 2.5 times the GDP per capita (Zeng et al. 2018). The remaining two studies (14.29 percent) reported ICERs exceeding 20 times the GDP per capita (Bayani 2017; Emmett et al. 2019). These two studies by Bayani (2017a) and Emmet et al. (2019) studied the cost-utility of Japanese encephalitis vaccination and cochlear implantation, respectively.

On the other hand, 14 (66.67 percent) out of the 21 studies reporting cost per QALY gained reported ICER values that were less than 1 GDP per capita

(Pilones et al. 2024; Lee et al. 2014; Quiambao et al. 2020; Santiaguel et al. 2025; Briones, Ceria-Pereña et al. 2020; Avanceña et al. 2019; Ahmed et al. 2025; Zhang et al. 2014; Haasis et al. 2015; Guerrero et al. 2015; Gervacio et al. 2023; Martin et al. 2013; Ilaiwy et al. 2025; Mendoza et al. 2021). One (4.76 percent) study had an ICER value less than 2 GDP per capita (Uy et al. 2020). Two (9.52 percent) other studies reported ICER values not exceeding 3 GDP per capita (Nazareno et al. 2025; Genuino et al. 2019). While the remaining four studies (19.05 percent) had ICER values per QALY gained greater than 3 GDP per capita (Montilla et al. 2025; Bayani et al. 2017; Briones, Talungchit et al. 2020; Bayani 2017). Three out of these four studies had medicines as their intervention of interest. In particular, Montilla et al. (2019), Briones, Talungchit et al. (2020), and Bayani (2017) studied the cost-utility of empagliflozin vs standard of care for heart failure, carbetocin vs. standard of care for prevention of postpartum hemorrhage, and indicatrol/glycopyrronium vs. standard of care for chronic obstructive pulmonary disease, respectively.

The median ICER among studies reporting cost per DALY averted was ₱200,833.62, equivalent to approximately 0.74 times the 2024 Philippine GDP per capita. Similarly, the median cost per QALY gained was ₱222,152.19, representing roughly 0.95 times the 2024 GDP per capita. These findings provide an overview of the cost-effectiveness of health interventions evaluated in the Philippine context and serve as a reference point for contextualizing local cost-effectiveness thresholds.

Only one out of the 35 studies (3 percent) failed to report the CET value used in their analysis (Briones, Ceria-Pereña et al. 2020). This demonstrates increasing transparency in how CEAs report cost-effectiveness criteria being used. The results also highlight how most studies (82.86 percent) lean towards the use of the GDP-based CET recommended by WHO, indicating that the majority of the researchers still use a generalized threshold when determining the cost-effectiveness of new health interventions.

Table 2. Median ICER Values in Scoping Review

	Median value in ₱	ICER to GDP ratio*	Remarks
Cost per DALY Averted	₱200,833.62	0.74	< 1 GDP per capita
Cost per QALY gained	₱222,152.19	0.95	< 1 GDP per capita

*2024 Philippine GDP value was used as comparison (₱234,277.00) (PNHA–PSA 2025)

A total of one hundred and forty-two EE reports were included in the initial screening. Of these, only three assessments reported ICERs expressed as cost per QALY gained or DALY averted. Specifically, two reports presented costs per QALY gained, while one reported costs per DALY averted. All three health interventions of interest in these assessments received a positive recommendation from the HTA Council. Notably, all three reported ICER values were less than 1 GDP per capita (as shown in appendix D).

Health Opportunity Cost

An empirical estimate of the CET was computed through the formula created by Pichon-Riviere et al. (2023) using publicly available country-specific data. The calculated CET value represents the monetary value at which health gains measured either by QALYs gained or DALYs averted due to the implementation of new health interventions can be considered appropriate and cost-effective within the Philippine health system. The input parameters applied to the equation developed by Pichon-Riviere et al. (2023) to generate an average CET estimate appropriate for the Philippine setting are shown in appendix E.

The analysis yielded CET estimates that varied depending on the values used. Following Pichon-Riviere et al.'s (2023) use of median values, the computed CET value was approximately ₱209,410.46, which corresponds to around 0.89 of the 2024 Philippine GDP per capita. Using the average HEpc and LE value yields a lower computed CET of around ₱84,316.63 or 0.36 of the 2024 GDP per capita. Both computed CET values fell below one GDP per capita and are significantly less than the WHO recommended use of one to three times GDP per capita.

Table 3. Results of CET computation

	Amount per QALY (₱)	**ICER to GDP ratio***	**Remarks**
CET 1 Average Values	84,316.63	0.36	< 1 GDP per capita
CET 2 Median Values	209,410.46	0.89	< 1 GDP per capita

*2024 Philippine GDP value was used as comparison (₱234,277.00) (PNHA–PSA 2025)

Discussion

To achieve universal healthcare in resource-limited countries like the Philippines, it is essential to allocate resources efficiently and effectively toward health interventions and services that deliver the maximum benefit to the population. Policymakers and health decision-makers must have access to a reliable benchmark for evaluating the potential cost-effectiveness of new health technologies to accomplish this. This will support informed and appropriate decisions and recommendations in health technology assessments. However, it is challenging to determine the appropriate CET value. This is probably the reason why the WHO recommendation of using one to three times the GDP per capita of a country remains to be the most widely used CET in CEAs (Kazibwe et al. 2022). Unfortunately, following generalized global guidelines may cause more harm than good. This is especially true in LMICs, where there are still challenges in providing even basic necessities and essential services to their citizens (Sharma and Popli 2023). One to three times the GDP per capita as a CET may be unreasonably high for resource-constrained countries such as the Philippines. Consequently, setting the CET too high can lead to the approval of a larger number of health interventions deemed "cost-effective," placing additional strain on the already limited healthcare system and further limiting its capacity to offer more appropriate and needed service (Kazibwe et al., 2022). This highlights the need to establish more appropriate CET values anchored on country-specific data and contexts to ensure that health economic evaluations accurately reflect local priorities and resource constraints.

This study implemented a scoping review and health opportunity cost estimation of the CET value using country-specific data. A total of 35 cost-utility analyses were included in the analysis. Fourteen (40 percent) studies reported cost per DALY averted, while the other twenty-one (60 percent) studies reported cost per QALY gained. Median ICER values were ₱200,833.62 per DALY averted and ₱222,152.19 per QALY gained. These median values correspond to 0.74 and 0.95 times the 2024 Philippine GDP per capita. Among the three HTA reports included in this analysis, two (66 percent) presented the ICER per QALY gained, while the remaining study reported the ICER per DALY averted. Notably, the lowest ICER value reported was −₱321,297.17 per QALY gained, equivalent to −1.38 times the GDP per capita, whereas the highest ICER was ₱188,236.75 per DALY averted, or 0.81 times the GDP per capita. Results of the empirical computation of the CET value yielded different results depending on the variables used. Using the median values of the HEpc and LE, the computed CET was 0.89 times the 2024 Philippine GDP per capita. This is equivalent to ₱209,410.46 per QALY gained. The

CET value derived from average values yielded a lower result of ₱84,316.63, representing 0.36 times the GDP per capita. All reported ICER values in the reviewed studies were below one GDP per capita for the Philippines. This suggests that applying the commonly used threshold of one to three times GDP per capita may result in a substantial overestimation of the country's actual and appropriate CET. Such overestimation may have contributed to the approval and positive recommendation of numerous health technologies that were inaccurately classified as "cost-effective," potentially leading to inefficient resource allocation within the health system.

The approach of estimating the CET value adopted by the current study has also received criticism. Vallejo-Torres et al. (2023) cautioned the use of these values, especially when based on the goal of achieving the historical median evolution in countries with similar income categories. Moreover, efficiency paths may also be sensitive to economic crises (i.e., declining health spending but increasing life expectancy) and health crises (i.e., increasing health spending but decreasing life expectancy), leading to counterintuitive values as CETs. This introduces confounding and reverse causality between health and health spending, which may influence health opportunity costs of funding decisions. Changes in healthcare needs also strongly affect health spending and health outcomes, so the causes and directions of changes in healthcare needs should be incorporated in estimating health opportunity costs. Overall, Vallejo-Torres et al. (2023) mentioned that basing estimates on assumed relationships could be misleading.

Further, the majority of the studies included in the scoping review reported ICER using cost per QALY gained. Although both DALYs and QALYs are widely accepted metrics for measuring health outcomes, there remains a lack of consensus on which is generally preferred for use in economic evaluations. In general, DALYs are meant to be used for broader CEAs implemented in developing countries. Since disability weights are more readily available, it is easier and less costly to use DALYs as the outcome measure. It mainly attempts to quantify the burden of disease by reflecting the years of life lost due to premature mortality and/or years of life lived with disability. On the other hand, QALYs are generally preferred in clinical decision-making. This metric is more commonly used in high-income countries, where sufficient resources are typically available to collect the primary data needed for accurate QALY estimation (Deshmukh et al. 2013). In comparison to DALYs, QALYs capture the quality of life gained because of a particular treatment or intervention over time.

In the Philippines, the Health Technology Assessment (HTA) Methods Guide does not specify a preferred health outcome measure for reporting. Similarly, there is no officially recommended CET value. However, the guide does acknowledge that the traditional threshold range recommended by WHO, referring to one to three times the GDP per capita, may be used as the CET (HTA–DOST 2020). While it is good that the Philippines has a published HTA Methods guide and a Philippine reference case for conducting EE that provides mandatory guidance in its conduct, there are still limitations with not having a standard CET, whether explicit or not. These can lead to inconsistencies in how cost-effectiveness analysis findings are interpreted across studies. Addressing these limitations is essential to enhance the clarity, comparability, and policy relevance of HTA outputs in the Philippine context.

Strengths

To the knowledge of the authors, this is the first study to attempt to provide a cost-effectiveness threshold (CET) estimate based on local statistical data, such as health expenditure per capita, life expectancy at birth at the population level, and GDP. Integrating these country-specific data ensures that the computed CET estimate offers a more appropriate and relevant benchmark upon which health interventions can be assessed. This enhances the precision of economic evaluations by reflecting the unique economic and health system context of the Philippines. This ultimately supports more effective and equitable decision-making in healthcare resource allocation.

Limitations

This study has several limitations. First, it did not implement a systematic search of all relevant literature on the topic of interest. The scoping review was instead based on already existing systematic reviews on the same topic of interest, supplemented by a new targeted search. As a result, there is a risk that some relevant literature may have been missed, potentially limiting the comprehensiveness and representativeness of the findings. Subsequently, no EE appraisal was conducted for this study. This analysis assumes that all included EE studies met an acceptable level of methodological quality, especially given that many were published during the period when the HTA Methods Guide was being implemented. Caution must be taken when interpreting the results of this study. Annual life expectancy data used in the computation of the health opportunity cost were extrapolated from aggregated five-year intervals released by the PSA. This may introduce potential estimation bias since it relies on the assumption that there is a uniform increase in life expectancy for people. Therefore, this may not accurately capture the actual life expectancy value and cause over- or underestimation of the results.

Conclusion and Recommendation

This study provides a context-specific estimate of the CET for the Philippines using local economic and statistical data. Notably, the computed values were lower than the WHO's recommended benchmark of one to three times a country's GDP per capita. This suggests that many health technologies might appear cost-effective if a higher CET were applied, which could expand access to care but at the same time place additional pressure on the limited healthcare budget. This highlights the importance of aligning CET values with actual costing and outcome data within a specific healthcare setting rather than relying on generalized global benchmarks. The DOST-HTA Philippines should consider the use of a CET value that considers the government's capacity to pay as influenced by health expenditure per capita to ensure the appropriateness of their decisions and recommendations regarding health technology assessments. Further research and regular updates to the CET are encouraged to ensure that it remains responsive to changes in the health system and economic conditions.

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Appendices

Appendix A. Consumer Price Index Values (World Bank Group 2025)

Year	Philippine Peso (PHP)	US Dollar (USD)
2010	100.0000000	100.0000000
2011	104.7184170	103.8561124
2012	107.8882057	106.5285741
2013	110.6746211	108.9698539
2014	114.6564986	110.5511374
2015	115.4295041	110.9580174
2016	116.8766424	112.0769373
2017	120.2113525	114.9435916
2018	126.5937898	117.5790642
2019	129.6219960	119.6227113
2020	132.7241000	118.6905000
2021	137.9364000	124.2664000
2022	145.9659000	134.2112000
2023	154.6917000	139.7358000
2024	159.6614000	143.8573000

Appendix B. Conversion Rates (Exchange Rates UK, n.d.)

Year	Exchange Rates
2010	Did not use
2011	Did not use
2012	42.2171
2013	42.4616
2014	Did not use
2015	45.5236
2016	47.492
2017	50.3799

Year	Exchange Rates
2018	52.662
2019	51.7675
2020	49.6076
2021	49.2756
2022	54.5054
2023	55.6188
2024	Did not use

Appendix C. Reported ICER and CET Values

Author, Year	Health Technology	ICER Values *(PHP Adjusted)*	ICER Values *(USD Adjusted)*	ICER to GDP ratio*	CET value reported *(USD Adjusted)*	Format and basis for CET used	Outcome
Genuino et al. 2025	Oral Ivermectin + Topical Permethrin vs Oral Ivermectin	−2,629,657.39	−53,373.34	−11.22	205,310.38	GDP per capita	Cost per DALY averted
Cheng and Estrada 2021	2019 Cigarette Excise Tax vs version of a policy	−715,816.77	−14,538.50	−3.06	198,378.36	GDP per capita	Cost per DALY averted
Vodicka et al. 2020	(1) National routine vaccination only, (2) sub-national campaign followed by national routine, and (3) national campaign followed by national routine vs No vaccination	3,814.05	71.34	0.02	186,068.84	GDP per capita	Cost per DALY averted
Brummer et al. 2024	Low-complexity Screening Tests for TB vs standard of care	38,461.78	689.76	0.16	60,752.09	GDP per capita	Cost per DALY averted
Chye et al. 2025	ACT Now intervention vs standard of care	70,342.44	1,271.10	0.30	137,557.96 to 250,478.67	GDP per capita	Cost per DALY averted
Rivera et al. 2017	Community-based universal hearing screening (UNHS) program vs no screening program	145,755.52	3,105.01	0.62	162,187.22	GDP per capita	Cost per DALY averted

Author, Year	Health Technology	ICER Values *(PHP Adjusted)*	ICER Values *(USD Adjusted)*	ICER to GDP ratio*	CET value reported *(USD Adjusted)*	Format and basis for CET used	Outcome
Fitzpatrick et al. 2017	Medical Case Management Only, Outbreak Response, Sustained Vector Control (Medium Efficacy Technology), Sustained Vector Control (High Efficacy Technology) vs no intervention	175,008.23	3,771.69	0.75	156,508.28	GDP per capita	Cost per DALY averted
Health Technology Assessment Council 2024	Rotavirus Vaccine vs no vaccination	200,833.62	3,601.17	0.86	200,321.57	GDP per capita	Cost per DALY averted
Villanueva-Uy et al., 2021	Rotavirus Vaccine vs no vaccination	207,970.22	782.98	0.89	209,540.00	GDP per capita	Cost per DALY averted
Llave et al. 2022	HPV vaccination vs no vaccination	235,659.79	4,786.33	1.01	208,137.65	GDP per capita	Cost per DALY averted
Patikorn et al. 2022	Snake antivenom vs standard of care	373,595.74	7,045.99	1.59	144,245.24	GDP per capita	Cost per DALY averted
Zeng et al. 2018	Consisted of three injections administered at six-month intervals used in the substudy-3 trials vs no vaccination	491,699.26	3,971.19	2.10	168,606.21	GDP per capita	Cost per DALY averted

Author, Year	Health Technology	ICER Values *(PHP Adjusted)*	ICER Values *(USD Adjusted)*	ICER to GDP ratio*	CET value reported *(USD Adjusted)*	Format and basis for CET used	Outcome
Bayani 2017	Single dose CD.JEVAX, double dose CD.JEVAX and IMOJEV vs No vaccination	4,701,546.51	89,105.05	20.07	183,117.97	GDP per capita	Cost per DALY averted
Emmett et al. 2019	Cochlear implantation (CI) with mainstream education and deaf education with sign language vs No intervention	5,634,826.85	105,394.02	24.05	493,009.92	GDP per capita	Cost per DALY averted
Pilones et al. 2024	Bevacizumab, Ranibizumab, and Aflibercept	9,661.70	173.71	0.04	150,000.00	HTA committee recommendation	Cost per QALY gained
Lee et al. 2014	Universal Mass Vaccination with Rotarix and No vaccination program	18,516.03	399.05	0.08	136,459.33	GDP per capita	Cost per QALY gained
Quiambao et al. 2020	PrEP and the PEP program vs PEP alone	25,494.92	504.44	0.11	180,025.49	GDP per capita	Cost per QALY gained
Santiaguel et al. 2025	PCV13 vs 2 dose 23-valent pneumococcal polysaccharide vaccine (PCV23)	31,846.26	571.12	0.14	195,604.04	GDP per capita	Cost per QALY gained
Briones, Ceria-Pereña et al. 2020a	PCV10 and PCV13 vs No vaccination	35,613.55	723.32	0.15	Not reported	Not reported	Cost per QALY gained

Author, Year	Health Technology	ICER Values *(PHP Adjusted)*	ICER Values *(USD Adjusted)*	ICER to GDP ratio*	CET value reported *(USD Adjusted)*	Format and basis for CET used	Outcome
Avanceña et al 2019	DTTB's impact on pediatric pneumonia and diarrhea outcomes vs A scenario without DTTB	36,115.66	675.51	0.15	188,550.55	GDP per capita	Cost per QALY gained
Ahmed et al. 2025	10-valent PCV (PCV10-SII) vs PCV10-SII vs No vaccination	59,671.53	1,072.81	0.25	221,967.65	GDP per capita	Cost per QALY gained
Zhang et al. 2014	Universal mass vaccination (UMV) program with a 2 + 1 schedule of a 10-valent pneumococcal polysaccharide non-typeable Haemophilus influenzae protein D conjugate vaccine (PHiD-CV) vs no-vaccination and PCV13 2 + 1 strategy in the Philippines	75,345.04	1,631.94	0.32	139,586.53	GDP per capita	Cost per QALY gained
Haasis et al. 2015	PCV10 and PCV13 vs No vaccination	78,637.21	1,694.75	0.34	158,418.82	GDP per capita	Cost per QALY gained
Guerrero et al. 2015	Three-dose vaccination with or without booster doses, conventional Pap smear alone and VIA alone vs Pap Smear at 8 % coverage for women aged 35–55 years old at 5-year intervals	88,084.92	1,904.99	0.38	158,418.82	GDP per capita	Cost per QALY gained

Author, Year	Health Technology	ICER Values *(PHP Adjusted)*	ICER Values *(USD Adjusted)*	ICER to GDP ratio*	CET value reported *(USD Adjusted)*	Format and basis for CET used	Outcome
Gervacio, et al. 2023	Radiofrequency ablation vs standard of care	102,132.90	1,836.30	0.44	490,000.00	GDP per capita	Cost per QALY gained
Martin et al. 2013	Quadrivalent HPV Vaccination vs no vaccination	124,718.81	2,687.88	0.53	156,167.96	GDP per capita	Cost per QALY gained
Ilaiwy et al. 2025	Tuberculin Skin Test (TST) vs Interferon Gamma Release Assay (IGRA) vs No testing or treatment for TBI	130,784.72	2,654.50	0.56	Not reported	WHO Guide to Cost-Effectiveness Analysis	Cost per QALY gained
Mendoza et al. 2021	Add-on dapagliflozin vs standard of care	232,122.57	4,375.03	0.99	217,067.83	GDP per capita	Cost per QALY gained
Uy et al. 2020	Rotavirus vaccination vs no vaccination	358,647.86	6,764.07	1.53	180,388.78	Philippine National Formulary Guidelines	Cost per QALY gained
Nazareno et al. 2025	Maternal RSV vaccination vs No vaccination	565,327.69	10,413.99	2.41	510,924.67	GDP per capita	Cost per QALY gained
Genuino et al. 2019	1 year of adjuvant trastuzumab combined with standard chemotherapy vs chemotherapy alone	602,332.82	12,226.85	2.57	150,186.00	GDP per capita	Cost per QALY gained

Author, Year	**Health Technology**	**ICER Values** *(PHP Adjusted)*	**ICER Values** *(USD Adjusted)*	**ICER to GDP ratio***	**CET value reported** *(USD Adjusted)*	**Format and basis for CET used**	**Outcome**
Montilla et al. 2025	Empagliflozin vs Standard of Care	742,604.00	13,385.08	3.17	535,704.00	WHO recommendation	Cost per QALY gained
Bayani et al. 2017	Sitagliptin vs Gliclazide and Isophane insulin	767,669.03	14,358.51	3.28	183,117.97	GDP per capita	Cost per QALY gained
Briones, Talungchit et al. 2020	Carbetocin vs standard of care	840,861.42	15,858.58	3.59	180,388.78	Recommendation from the DOH HTA Council	Cost per QALY gained
Bayani 2017b	Indacaterol/glycopyrronium (INDGLY) vs Tiotropium (TIO) and salmeterol/fluticasone (SFC)	1,655,353.00	30,693.66	7.07	183,117.97	GDP per capita	Cost per QALY gained

*2024 Philippine GDP value was used as comparison (₱234,277.00) (PNHA–PSA 2025)

Appendix D. Health Technology Assessments by HTAD

Health Technology in PHP	ICER value	ICER to GDP Ratio	Remarks	HTAC Recommendation
Fecal immunohistochemical test as screening tool for colorectal cancer among asymptomatic healthy adults, aged 45 years old and above	−321,297.17 per QALY gained	-1.38	< 1 GDP per capita	Positively Recommended
Pneumococcal Conjugate Vaccine [0.5mL solution for injection]	29,605.00 per QALY gained	0.13	< 1 GDP per capita	Positively Recommended
Rotavirus vaccine [2.5mL, Freeze-dried Powder for Oral Suspension] for immunization of children less than one year old against rotavirus infection	188,236.75 per DALY averted	0.81	< 1 GDP per capita	Positively Recommended

*2024 Philippine GDP value was used as comparison (₱234,277.00) (PNHA PSA, 2025)

Appendix E. Input Parameters to CET Computation

Year	HEpc	LE	Year Interval	Δ %h	ΔLE	m
2010	4,315.73	70.32563137	2010–2011	0.10	2.13E−05	4.84E+03
2011	4,761.69	70.32561003	2011–2012	0.04	4.38E−05	8.41E+02
2012	4,937.11	70.32556623	2012–2013	0.14	3.43E−05	3.95E+03
2013	5,606.03	70.32553197	2013–2014	0.07	3.35E−05	2.18E+03
2014	6,016.37	70.32549842	2014–2015	0.14	4.52E−01	3.21E−01
2015	6,888.72	69.87323515	2015–2016	0.10	3.47E−05	2.93E+03
2016	7,589.80	69.87326983	2016–2017	0.06	1.65E+00	3.92E−02
2017	8,081.50	71.5255355	2017–2018	0.09	1.20E+00	7.67E−02
2018	8,823.47	72.72201605	2018–2019	0.03	4.03E−05	7.27E+02
2019	9,082.37	72.72205639	2019–2020	0.21	4.14E−05	5.06E+03
2020	10,985.74	72.72209783	2020–2021	0.29	1.65E+00	1.74E−01
2021	14,125.76	74.36951408	2021–2022	-0.12	9.70E−02	−1.29E+00
2022	12,363.55	74.46654987	2022–2023	0.03	9.67E−04	3.24E+01

Year	HEpc	LE	Year Interval	Δ %h	ΔLE	m
2023	12,750.53	74.46751640	2023–2024	0.28	9.58E−02	2.94E+00
2024	16,344.91	74.37172725		0.10	3.67E−01	
	8,844.89	71.91609042		0.05	0.362951235	
	8,081.50	71.5255355				

Supplementary Materials

Supplement 1. Gross Domestic Product

National Accounts of the Philippines Unit: In Philippine Peso As of April 2025 Current Health Expenditure per Capita, 2014–2024*			
LEVELS (IN ₱)			
Year	**Current Health Expenditure Per Capita**	**Year**	**Current Health Expenditure Per Capita**
2014	4,932	2020	8,520
2015	5,391	2021	10,536
2016	5,837	2022	10,356
2017	6,295	2023	10,840
2018	6,829	2024	12,751
2019	7,580		
GROWTH RATES (IN PERCENT)			
Year Interval	**Current Health Expenditure Per Capita**	**Year Interval**	**Current Health Expenditure Per Capita**
2014–15	9.3	2019–20	12.4
2015–16	8.3	2020–21	23.7
2016–17	7.8	2021–22	-1.7
2017–18	8.5	2022–23	4.7
2018–19	11.0	2023–24	17.6

*Data sets were received through email from Macroeconomic Accounts Service

Supplement 2. Gross Domestic Product

National Accounts of the Philippines Unit: In Philippine Peso As of April 2025 Per Capita: Gross Domestic Product, Gross National Income, and Household Final Consumption Expenditure Annual 2000 to 2024*			
AT CURRENT PRICES			
	Per Capita Gross Domestic Product	**Per Capita Gross National Income**	**Per Capita Household Final Consumption Expenditure**
2000	48,054	52,584	34,463
2001	51,193	56,095	37,321
2002	54,200	59,367	39,622
2003	57,595	63,015	42,335
2004	63,722	69,666	46,899
2005	69,474	76,254	51,379
2006	75,477	82,420	55,308
2007	81,438	88,752	58,844
2008	89,465	97,846	65,475
2009	91,635	102,217	67,067
2010	100,923	112,246	70,840
2011	107,129	118,691	77,274
2012	114,920	127,601	83,380
2013	123,235	137,726	88,742
2014	132,979	148,304	94,780
2015	138,289	154,093	100,222
2016	147,590	163,980	107,081
2017	158,940	176,474	114,725
2018	172,712	191,124	125,290
2019	181,920	200,135	133,177
2020	164,388	176,845	123,404
2021	176,329	182,601	132,706
2022	198,561	210,228	150,758

2023	217,255	241,065	166,241
2024	234,277	264,804	178,391
At constant 2018 prices			
	Per Capita Gross Domestic Product	**Per Capita Gross National Income**	**Per Capita Household Final Consumption Expenditure**
2000	90,782	99,734	69,612
2001	91,567	100,653	70,823
2002	93,011	102,244	72,899
2003	95,779	105,208	75,278
2004	100,074	109,794	78,163
2005	103,018	113,363	80,080
2006	106,478	116,525	81,878
2007	111,362	121,646	84,260
2008	114,144	125,052	85,957
2009	113,796	127,374	86,610
2010	120,082	134,064	88,206
2011	122,660	136,260	91,569
2012	129,007	143,531	96,219
2013	135,548	151,769	100,215
2014	141,933	158,668	104,380
2015	148,670	165,841	109,433
2016	156,663	174,219	115,317
2017	164,885	183,204	120,264
2018	172,712	191,124	125,290
2019	180,661	198,522	130,746
2020	160,599	172,688	118,233
2021	168,421	174,229	122,228
2022	179,788	189,974	131,336
2023	188,061	207,909	137,404
2024	197,054	221,958	142,837

*Data sets were received through email from Macroeconomic Accounts Service

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