



# Assessing Health Inequality through Distributional Cost-Effectiveness Analysis (DCEA): Lessons from Kidney Replacement Therapy in Thailand

## Highlight

- This study marks Thailand's first application of **Distributional Cost-Effectiveness Analysis (DCEA)**, demonstrating that the concept of "equity" can be incorporated into economic evaluation. The analysis examines dialysis options, namely peritoneal dialysis (PD) and hemodialysis (HD), for patients with end-stage renal disease (ESRD). This study built on the landmark cost-effectiveness study by Yot Teerawattananon et al. (2007), which provided pivotal policy evidence supporting the adoption of the PD-first policy under Thailand's Universal Coverage Scheme.
- DCEA requires the integration of clinical and cost data with inequality-related variables, such as socioeconomic status, geographical location, gender, and other social determinants of health. The effective development and application of DCEA depends on multi-sectoral collaborations among government agencies, research institutions, and healthcare providers to support access to required data and to consider the incorporation of equity into policy decisions.
- Findings from this study underscored the importance of incorporating the equity dimension into economic evaluations as a key strategy for designing health policies that are not only "efficient", but also "equitable." Results from the DCEA of dialysis demonstrated that the "PD-first" policy was the cost-effective and equity-enhancing approach compared with an "HD-first" approach. The PD-first yielded better overall health outcomes while also reducing disparities.

## From CEA to DCEA: How Equity Complement Efficiency

### CEA (Cost-Effectiveness Analysis)

evaluates the value for money of health interventions by comparing their "costs" with their "health outcomes" between the interventions with the aim of identifying which intervention delivers the greatest health benefit relative to resources used (i.e., which intervention can give the biggest bang for your buck).

#### Intervention

- ✓ Cost
- ✓ Health outcome

#### Comparator

- ✓ Cost
- ✓ Health outcome

### DCEA (Distributional Cost-Effectiveness Analysis)

extends a traditional CEA by explicitly incorporating the dimension of "equity." DCEA examines "who benefits from such intervention" and "to what extent," as well as "how a policy affects health inequality".

- ✓ Cost

- ✓ Health outcome

- ✓ Epidemiological data (e.g., prevalence, uptake)\*

- ✓ Baseline health distribution (e.g., LE, QALE)\*

- ✓ Health opportunity cost

- ✓ Health effect (e.g., survival, utility)\*



These data are disaggregated by population groups that reflect equity dimensions, such as income or wealth quintiles, so that differences in health impacts across groups can be clearly identified.

\*LE = life expectancy, QALE = quality-adjusted life expectancy, survival = survival rate, utility = health-related quality of life weight, prevalence = disease prevalence, uptake = utilization of services and interventions

## Case Study: Dialysis Policy in Thailand

**Dialysis is an essential treatment for ESRD patients.** It plays a crucial role alongside kidney transplantation, which remains limited by shortages in organ donation and the availability of suitable organs. Currently, two dialysis modalities are available:

### Peritoneal Dialysis (PD)



Patients can administer treatment independently at home.

### Hemodialysis (HD)



Patients need to receive treatment at a dialysis center two to three times per week.

Based on the previously published CEA, **PD** resulted in lower total costs than **HD**, for both the health system and patients' perspective, as it is home-based and reduces patients' travel to dialysis centers, and provided similar QALY gained.

In 2008, the PD-first policy was incorporated into Thailand's Universal Coverage Benefit Package (UCBP). Although a study by Yot Teerawattananon et al. (2007) concluded that neither PD nor HD was cost-effective compared with palliative care (based on a threshold of 100,000 baht per QALY), **the government proceeded with the PD-first policy as it is a life-saving intervention and expands access to treatment across socioeconomic groups, therefore, promoting greater equity in Thailand's health system.**



## Exploring Inequality in Dialysis Policy

**If DCEA had been applied to evaluate the PD-first policy in 2008, how might it have revealed the equity impacts within Thailand's health system?**

DCEA functions as a magnifying lens to assess how policies influence health inequality across multiple dimensions. One useful framework is the **"Staircase of Inequality,"** which consists of **four sequential steps:**

**4 Long-Term Outcomes**  
What are the long-term health impacts of the intervention?

**Overall survival**  
Overall survival differs across quintiles\*

**3 Short-Term Outcomes**  
What are the immediate effects of the intervention?

**Complications**  
Rates of complications differ across quintiles\*

**2 Uptake**  
Who actually receives the intervention?

**Intervention uptake**  
Access to dialysis varies across wealth quintiles\*

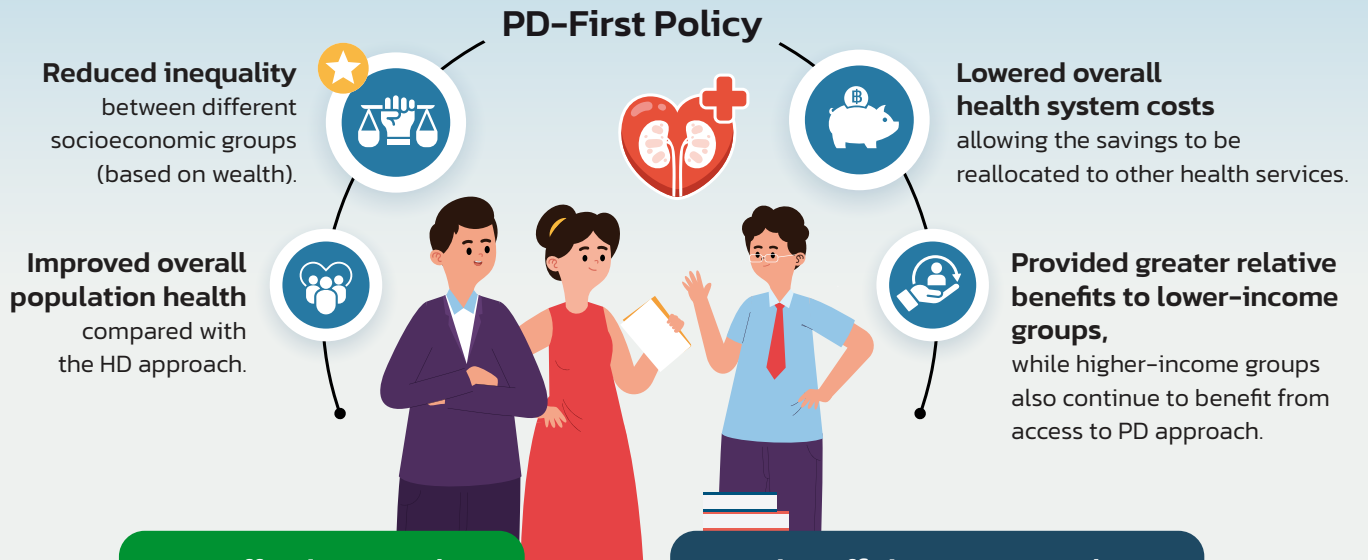
**1 Need**  
Who need the intervention?

**Disease prevalence**  
The prevalence of ESRD differs across wealth (socioeconomic) quintiles\*

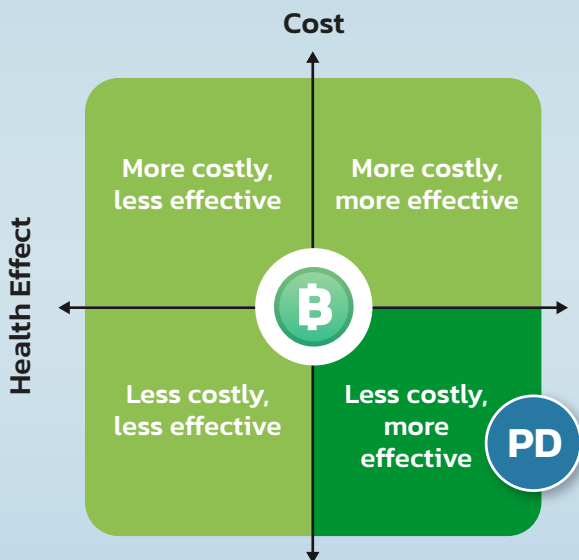
This framework helps identify at which stage of the treatment pathway inequality emerges, whether in disease prevalence, access to dialysis, short-term complications, or long-term survival. Differences in ESRD prevalence and dialysis uptake across socioeconomic groups underscore the importance of integrating the "equity dimension" into CEA. In a way, this framework allows us to review whether DCEA is suitable for the topic of interest.

\*quintile = the division of the population into five groups based on wealth status.

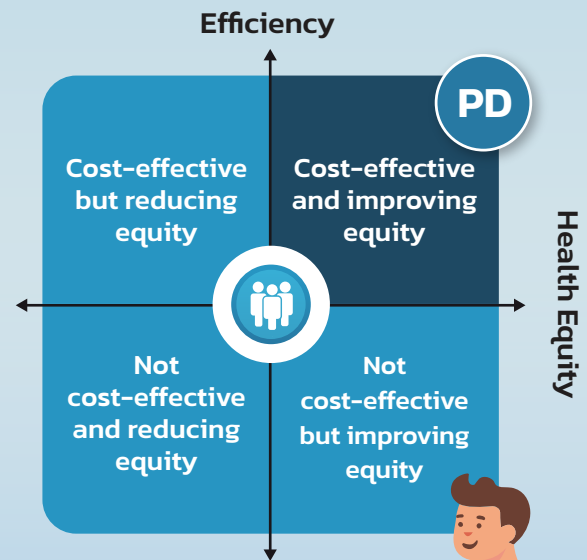
## Results from DCEA



### Cost-Effectiveness Plane



### Equity-Efficiency Impact Plane



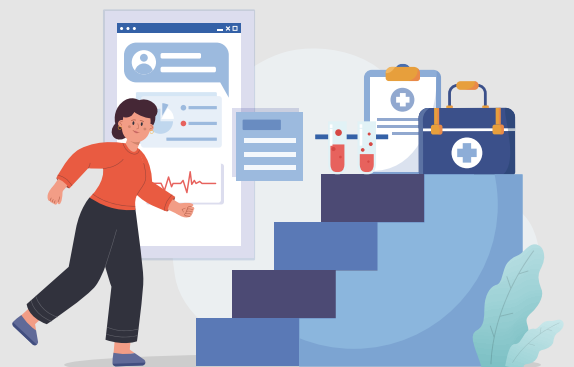
This study provided empirical evidence that **DCEA** can be successfully implemented in Thailand. The findings can generate policy-relevant evidence to inform decision-making processes.



## Policy Recommendations

In future decision-making processes, policymakers could consider incorporating equity evidence from DCEA when evaluating interventions that may create or exacerbate health inequalities. The concept of the staircase of inequality can serve as a practical framework for identifying policy areas where equity considerations should be included.

To support this approach, stronger data infrastructure is essential. DCEA requires integrated datasets that link clinical outcomes with socioeconomic information (e.g., wealth, income). Relevant agencies should therefore consider establishing systematic data collection and linkage mechanisms to enhance the accuracy of modeling and the reliability of evaluation outcomes to, ultimately, improve health inequity gap in our society.



## About the Study

In conducting this Distributional Cost-Effectiveness Analysis (DCEA), the research team used the original economic evaluation of dialysis options for patients with ESRD as a case study. The objective was to examine how incorporating equity considerations into an economic evaluation model could influence the study outcomes. This study was carried out through collaborations among subject matter experts and research teams from both domestic and international institutions.



### Scan the QR code to access the full research study.

This document forms part of the project entitled "Distributional Cost-Effectiveness Analysis (DCEA) in Thailand: Phase 2."

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