The 3rd Regional Workshop on Advanced Economic Evaluation

24 – 26 February 2025
Jakarta, Indonesia

Prepared by: Health Intervention and Technology Assessment Program Foundation (HITAP), Thailand

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List of Abbreviations

CEAC	: cost-effectiveness acceptability curve
CHEERS	: the Consolidated Health Economic Evaluation Reporting Standard
EVPI	: expected value of perfect information
GEAR	: Guide to Economic Analysis and Research
HTA	: health technology assessment
HITAP	: Health Technology and Assessment Program Foundatiton
ICER	: incremental cost-effectiveness ratio
InaHTAC	: Indonesia health technology assessment committee
KRT	: kidney replacement therapy
LMICs	: low- and middle-income countries
NXPO	: Office of National Higher Education Science Research and Innovation Policy Council
PMU-B	: Program Management Unit for Human Resources & Institutional Development Research and Innovation
REALISE	: Real World Data in Asia for Health Technology Assessment in Reimbursement
SAPPHIRE	: Strengthening Active Partnerships for Policy and Health Intervention Research and Evaluation
SHELF	: Sheffield Elicitation Framework
TSRI	: Thailand Science Research and Innovation
UHC	: Universal Health Coverage
VBA	: Visual Basic for Applications

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This workshop was organized by the Ministry of Health, Indonesia and the Health Intervention and Technology Assessment Program Foundation (HITAP) Thailand under the auspices of the Strengthening Active Partnerships for Policy and Health Intervention Research and Evaluation (SAPPHIRE) and the HTAsiaLink network. This workshop received support from the World Bank, the Gates Foundation, the Australian Government Department of Foreign Affairs and Trade, the Ministry of Public Health Thailand, the Ministry of Higher Education, Science, Research, and Innovation Thailand, the Office of National Higher Education Science Research and Innovation Policy Council (NXPO) Thailand, the Fundamental Fund fiscal year 2024 from the Thailand Science Research and Innovation (TSRI) and the Program Management Unit for Human Resources & Institutional Development Research and Innovation (PMU-B) Thailand.

The findings, interpretations, and conclusions expressed in this report do not necessarily reflect the views of the funding or participating agencies.

Executive Summary

The 3rd Regional Workshop on Advanced Economic Evaluation was conducted on 24-26 February 2025, in Jakarta, Indonesia. The workshop was co-organized by the Ministry of Health, Indonesia, and HITAP, under the aegis of SAPPHIRE and the HTAsiaLink network with support from partners.

The three-day workshop aimed to enhance participants' academic understanding and technical expertise in conducting model-based economic evaluations using real-world studies. The sessions incorporated a mix of lectures, hands-on exercises, technical group discussions, and policy-oriented discussions. Key topics covered include Markov Model construction for economic evaluation, deterministic and probabilistic modeling using Microsoft Excel, result interpretation for diverse audiences, and study reporting. The workshop was led by lecturers and facilitators from HITAP, with operational support from the Ministry of Health, Indonesia.

The event welcomed participants from the SAPPHIRE and HTAsiaLink networks, fostering cross-country knowledge exchange and regional learning opportunities. The workshop brought together a total of 45 participants and observers, with the majority being from Indonesia and others representing Brunei, Cambodia, Malaysia, the Philippines, and Thailand. A post-workshop survey indicated an average satisfaction rating of 4.81 for content delivery and 4.86 for content quality out of 5 over the three-day course. Qualitative feedback emphasized participants' overall positive experiences, with suggestions for future workshops including the incorporation of more exercises and the possibility of expanding the workshop with shorter daily sessions.

This report provides a summary of the workshop, highlighting key discussions, session overviews, and key takeaways from the event.

Introduction

Achieving Universal Health Coverage (UHC) by 2030 requires countries to ensure equitable access to high-quality and affordable healthcare services[1]. To support this goal, low- and middle-income countries (LMICs) are increasingly adopting Health Technology Assessment (HTA) as a key tool for guiding decisions on government-funded health benefit packages[2].

Despite this progress, variations in HTA capacity, institutional frameworks, and methodological approaches persist across the region[3]. The need for capacity building is particularly critical, as many countries face shortages of trained professionals and lack harmonized methodologies for economic evaluation[3,4]. Regional collaboration plays a vital role in addressing these gaps, fostering knowledge exchange, and promoting best practices to strengthen HTA systems[3].

Economic evaluations, including cost-effectiveness and cost-utility analyses, play a crucial role in HTA by assessing the costs and health outcomes of different interventions[5]. These evaluations help policymakers allocate limited resources efficiently, ensuring value for money in healthcare investments[6]. Despite the growing recognition of HTA's importance, many LMICs face challenges in its implementation, with a key barrier being the lack of expertise in conducting economic evaluations[6]. This skills gap can lead to suboptimal decision-making and inefficient resource allocation[4].

In response to this need, the 3rd Regional Workshop on Advanced Economic Evaluation was convened to enhance the capacity of HTA practitioners in LMICs. The workshop was hosted by the Ministry of Health, Indonesia, and co-organized by the Health Intervention and Technology Assessment Program (HITAP), Thailand, under the auspices of the Strengthening Active Partnerships for Policy and Health Intervention Research and Evaluation (SAPPHIRE) and the HTAsiaLink network. The workshop

[1] United Nations. Resolution adopted by the General Assembly on 10 October 2019: Political declaration of the high-level meeting on universal health coverage. In the United Nations General Assembly. 2019.

[2] Botwright, S., et al. Good Practices for Health Technology Assessment Guideline Development: A Report of the Health Technology Assessment International, HTAsiaLink, and ISPOR Special Task Force. Int J Technol Assess Health Care. 2025; 40(1): p. e74. [doi: 10.1017/S0266462324004719]

[3] Teerawattananon Y, Rattanavipapong W, Lin LW, Dabak SV, Gibbons B, Isaranuwatchai W, Toh KY, Cher BP, Pearce F, Bayani DBS, Nakamura R, Pwu RF, Shafie AA, Adhikari D, Prinja S, Babidge W. Landscape analysis of health technology assessment (HTA): systems and practices in Asia. Int J Technol Assess Health Care. 2019;35(6):416-421. [doi: 10.1017/S0266462319000667]

[4] Sharma, M., Teerawattananon, Y., Dabak, S.V. et al. A landscape analysis of health technology assessment capacity in the Association of South-East Asian Nations region. Health Res Policy Sys. 2021;19(19). [doi: 10.1186/s12961-020-00647-0]

[5] Williams, I., and Bryan, S. Using Economic Evaluation in Priority Setting: What Do We Know and What Can We Do?. In: Nagel, E., Lauerer, M. (eds) Prioritization in Medicine. Springer, Cham. 2016: p 261-71. [doi: 10.1007/978-3-319-21112-1_18]

[6] Teerawattananon, Y., et al. Tackling the 3 Big Challenges Confronting Health Technology Assessment Development in Asia: A Commentary. Value Health Reg Issues. 2020; 21: p. 66-68. [doi: 10.1016/j.vhri.2019.07.001]

received financial support from the World Bank, the Gates Foundation, the Australian Government Department of Foreign Affairs and Trade, the Ministry of Public Health Thailand, the Ministry of Higher Education, Science, Research, and Innovation Thailand, the Office of National Higher Education Science Research and Innovation Policy Council (NXPO) Thailand, the Program Management Unit for Human Resources & Institutional Development, Research and Innovation (PMU-B) Thailand, and the Thailand Science, Research and Innovation (TSRI). This workshop builds on the success of previous regional workshops in Singapore and the Philippines in 2019 and 2020, respectively.

This workshop took place in Jakarta from 24 to 26 February 2025, aiming to provide researchers with the necessary skills to perform model-based economic evaluations using the Markov Model in Microsoft Excel. Specifically, participants are expected to construct a Markov Model diagram for economic evaluation, understand the deterministic and probabilistic modeling using Microsoft Excel, interpret the results for a wide range of audiences, and report studies for peer-reviewed journals upon completion of this workshop. Ultimately, this workshop aims to support LMICs in generating robust evidence to inform the health priority-setting process and advance toward UHC.

Workshop summary

The workshop took place over three days, from February 24 to 26, 2025, at the Ministry of Health in Indonesia and Wyndham Casablanca Hotel in Jakarta. A total of twenty-three sessions featuring lectures, exercises, and sharing discussions were conducted, focusing on three main themes: Rewind and Refresh (Day 1), Ready to Go! (Day 2), and Relay to Policy (Day 3). The workshop included a combination of lectures, practical exercises, and discussions. The workshop was attended by 45 participants and observers, predominantly from Indonesia, along with a small number from Brunei, Cambodia, Malaysia, the Philippines. Attendees included representatives from academic and payment agency backgrounds, to advance HTA research in their countries. They have also completed a pre-test to assess their eligibility, given the advanced nature of the workshop. The agenda for the workshop and the attendee list can be found in Appendix 1 and Appendix 2, respectively.

Opening Session

On the morning of February 24, 2024, three Ministry of Health representatives, Dr. Lucia Rizka Andalusia, Apt, M.Pharm, MARS, the Director General for Pharmaceuticals and Medical Devices, Prof. Asnawi Abdullah, PhD, the Director General for Health Policy Agency, and Lupi Trilaksono, SF., MM., Apt., the Director of Center for Health Resources Systems Policy delivered opening remarks. They emphasized the vital role of HTA in guiding health decisions and encouraged participants to engage actively in the workshop, reflecting the vibrant spirit of Jakarta. They also commended the commitment and dedication of all partners involved in the workshop, which will contribute to establishing a network for HTA research both locally and internationally.

Figure 1. From left to right: Prof. Asnawi Abdullah, PhD, Dr. Lucia Rizka Andalusia, Apt, M.Pharm, MARS, and Lupi Trilaksono, SF., MM., Apt., gave an opening remark.

Day 1: Rewind and refresh

Day 1 focused on refreshing participants' knowledge of HTA, including the economic evaluation concepts, the Markov Model diagram, statistics, and data source considerations, along with their selection process. The day included four lectures presented in a traditional teaching style paired with interactive elements, alongside two exercises focused on constructing the Markov Model diagram and statistics. Saudamini Dabak and Lapad Pongcharoenyong from HITAP Thailand commenced the day with a "Bingo" game for participants to get to know one another and gave an overview of the workshop. Below is a summary of the lectures and exercises.

CTRL+R: Refresher to economic evaluation concept

Kinanti Khansa Chavarina from HITAP Thailand shared the fundamental concepts of health economic evaluation and its significance in policymaking. She began by addressing a common question faced by decision-makers regarding resource allocation and elaborated on the circumstances where economic evaluation can effectively guide decisions. She also introduced key terms commonly associated with economic evaluation, such as quality-adjusted life years, used to measure costs and benefits. Additionally, she clarified the incremental cost-effectiveness ratio (ICER) and its associated decision rules. To conclude her lecture, she provided an overview of the steps involved in conducting model-based economic evaluations, which would be further explored in the workshop.

Figure 2. Kinanti Khansa Chavarina gave a refresher lecture on the concept of economic evaluation.

Markov Model

Manit Sittimart from HITAP Thailand delivered an introductory lecture on Markov models, covering the fundamental concepts, methodological components, and limitations. He clarified ideas such as health states, transition probabilities, time horizon, cycle lengths, as well as time preference including discounting and inflation adjustment. Additionally, he discussed the significance of mutually exclusive and collectively exhaustive concepts in constructing a Markov model. To enhance understanding, he also demonstrated how the model operates using simple diagrams. The lecture was then followed by an exercise on constructing Markov Model diagram, led by Chittawan Poonsiri from HITAP Thailand.

Figure 3. Manit Sittimart delivered an introductory lecture on Markov Model.

Figure 4. Left: participants engaged in a discussion for the Markov Model diagram exercise; Right: Chittawan Poonsiri shared the Markov diagram by Group 1.

Crunching the numbers: statistics for economic evaluation

Dr. Yot Teerawattananon delivered a lecture on fundamental statistics for economic evaluation. He discussed the distinctions between rates and probabilities, as well as the processes for converting rates into probabilities and vice versa. He provided insights into inferential statistics and Bayesian statistics, commonly used in epidemiology and economic evaluation, respectively. Additionally, he covered survival analysis using patient-level data and introduced key concepts, including hazard function and cumulative hazard. The lecture concluded with an exercise led by Lapad Pongcharoenyong from HITAP Thailand, comparing varying and constant transitional probabilities using both patient-level data and literature-sourced survival data.

Figure 5. Dr Yot Teerawattananon gave a lecture on basic statistics and answered questions from participants.

Avoiding garbage in, garbage out

Dr. Brandon Chua discussed the factors to consider when selecting data inputs for economic evaluations. He emphasized the importance of using the best available evidence to influence policy decisions. He outlined three main guiding considerations: Quality of Evidence, Setting of Evidence, and Stakeholder Engagement. In assessing the quality of evidence, researchers should refer to the evidence pyramid, which illustrates the quality and associated risk of bias. Understanding the setting of evidence is essential for determining if it accurately reflects the context, which involves epidemiological and clinical factors, health system considerations, and population characteristics. Dr. Brandon Chua provided real-world data examples, detailing the benefits and drawbacks of using such evidence. Regarding stakeholder involvement, he highlighted the types of stakeholders that can enrich the study by presenting diverse perspectives on the decision-making issue, helping to identify data sources, and situating available evidence within the context of the study. He also addressed considerations for selecting utility and cost inputs and concluded the lecture by recommending resources like the Real-World Data in Asia For Health Technology Assessment in Reimbursement (REALISE) guidance[7] and the Guide to Economic Analysis and Research (GEAR) website[8].

Figure 6. Dr. Brandon Chua delivered a lecture on data sources.

Day 2: Ready to go!

Day 2 began with an overview of the day and a quiz to recap the previous day's material, led by Panupong Chaowanasawat from HITAP Thailand. The lectures focused on introducing deterministic

[7] Kc, S., et al. What, Where, and How to Collect Real-World Data and Generate Real-World Evidence to Support Drug Reimbursement Decision-Making in Asia: A reflection Into the Past and A Way Forward. Int J Health Policy Manag. 2023; 12: p. 6858. [doi: 10.34172/ijhpm.2023.6858]

[8] http://gear4health.com

and probabilistic modeling through lectures and exercises using the case study of Thailand's kidney replacement therapy (KRT)[9]. Below is a summary of the day.

That point value: deterministic modeling

Manit Sittimart provided a recap of how the Markov model functions, illustrating this with a simple diagram while also clarifying the concept of deterministic modeling. He discussed the limitations inherent in this approach and suggested how probabilistic models could address those gaps. Following his lecture, Chittawan Poonsiri led an exercise focused on structuring Markov health states and parameters using Microsoft Excel. The exercise commenced with an explanation of the Markov diagram based on the case study, where participants received an example demonstrating how to input one health state into Excel. They were then tasked with completing the remaining health states, including transitional probabilities, costs, and outcomes, in Microsoft Excel.

The second exercise, guided by Manit Sittimart, focused on constructing the Markov trace for deterministic modeling according to the parameters listed in the sheet for the case study. Participants were required to enter the appropriate formulas for transitional probabilities, costs, and outcomes into Excel. After completing this task, they calculated the ICER values for both the intervention scenarios and the comparator in the sheet.

Figure 7. Left: Chittawan Poonsiri guided participants in structuring Markov health states and parameters using Microsoft Excel. Manit Sittimart guided participants in assigning the formula for the Markov trace.

[9] Teerawattananon Y, et al. Economic evaluation of palliative management versus peritoneal dialysis and hemodialysis for end-stage renal disease: evidence for coverage decisions in Thailand. Value Health. 2007 Jan-Feb;10(1):61-72. [doi: 10.1111/j.1524-4733.2006.00145].

Luck of the draw: an introduction to probabilistic modeling

In the afternoon, Dr. Brandon Chua and Panupong Chaowanasawat conducted a lecture on uncertainty analysis for economic evaluations. They discussed various types of uncertainty analysis, including deterministic and probabilistic sensitivity analysis, and how the results are typically reported. Dr. Brandon Chua highlighted the importance of data distributions for conducting probabilistic sensitivity analysis and demonstrated how to fit different types of data into specific distributions, particularly when data is sourced from literature reviews with limited information.

Following the lecture, participants engaged in an exercise to configure probabilistic sensitivity analysis using Microsoft Excel. They were guided to decide on suitable data distributions for parameters in the spreadsheet, incorporating means with measures of uncertainty. Additionally, they learned to use Macro with Visual Basic for Applications (VBA) to automate the analysis steps. The exercise concluded with ICER calculation and an overview of the interpretation of the calculation, which was explained the following day.

Figure 8. Dr. Brandon Chua (left) and Panupong Chaowanasawat (right) gave a lecture on uncertainty analysis.

Day 3: Relay to policy

Day 3 commenced with a discussion revisiting the lectures and exercises from Day 2, facilitated by Chittawan Poonsiri and Manit Sittimart. This day featured a split in the lecture content: one half concentrated on the methodologies relevant to economic evaluation, while the other half centered on applying the findings to guide policy decisions. Additionally, the HITAP team presented lectures on the expected value of perfect information and expert elicitation, topics that participants requested on the previous day. Below is a summary of the lectures and exercises.

Ahead of the curve: constructing cost-effectiveness acceptability curves

Assoc. Prof. Wanrudee Isaranuwatchai delivered a lecture focused on visualizing results from probabilistic uncertainty analysis, introducing key concepts like net monetary benefit and the cost-effectiveness acceptability curve (CEAC). She discussed the limitations of the ICER and emphasized

the significance of reporting net monetary benefit as an alternative. Additionally, she elucidated the relationship between ICER plots and CEAC, guiding attendees on how to interpret the graphs. The lecture was followed by an exercise, led by Lapad Poncharoenyong and Saudamini Dabak, simulating the calculation of net monetary benefit and CEAC plotting, which concluded by analyzing the results from the generated graphs.

Figure 9. Dr. Wanrudee Isaranuwatchai delivered a lecture on the cost-effectiveness acceptability curve.

Reality check: model validation

Dr. Yot Teerawattananon discussed various means of validating models and emphasized the significance of performing these assessments for economic evaluations. He provided examples to illustrate different model validation methods and wrapped up the lecture by asking participants to validate the survival analysis in the KRT case study.

Telling the story of the numbers: reporting and communicating economic evaluation results

Dr. Brandon Chua discussed key principles for conveying the results of economic evaluations to various audiences. These principles encompass the purpose and messaging, audience type and language, as well as the formats for reporting these results, including research publications, policy briefs, media outlets, and reports or presentations. Additionally, he highlighted the necessary reporting format according to Indonesia's HTA guidelines, utilizing the Consolidated Health Economic Evaluation Reporting Standard (CHEERS) checklist.


Figure 10. Left: Dr. Brandon Chua delivered a lecture on how to report and communicate economic evaluation results; Right: participants listening to the lecture.

Thailand's KRT journey and guide to conduct model-based economic evaluation for KRT

Kinanti Khansa Chavarina briefly shared how Thailand's KRT policy was developed, including the use of a case study as part of the evidence in the decision-making process. She also discussed the changes in the policy after 14 years of implementation and the HITAP team's involvement in revisiting the new policy.

Dr. Panji Hadisoemarto from Universitas Padjajaran presented his research on creating guidelines for model-based economic evaluations for KRT. He led a discussion with participants to gather feedback on helpful information to include in the guidelines.

Expected value of perfect information

Dr. Yot Teerawattananon introduced the concept of expected value of perfect information (EVPI) to assist researchers in determining their maximum willingness to pay for acquiring new information that can minimize uncertainty. He discussed various types of analysis, such as population EVPI, partial EVPI, and sample EVPI. He illustrated how the population EVPI graph may resemble the cost-effectiveness acceptability curve (CEAC), even though the information conveyed by these two graphs differs. Regarding partial EVPI, he presented the visualized results of the analysis, demonstrating how it can clarify the value of additional information about specific parameters and aid in prioritizing which parameters to address.

Expert elicitation

Saudamini Dabak presented an overview of the Sheffield Elicitation Framework (SHELF), a method used in some early HTA studies. This approach quantifies expert opinions into a probabilistic distribution, helping to ascertain its expected true value. This is achieved by clearly defining the quantity of interest, providing experts with an evidence dossier containing baseline information, and

asking them to assess the likelihood of an event occurring on a scale from 0 to 1. Researchers have three guiding methods: 1) define the lower and upper plausible limits, 2) determine the tertile and quartile values, or 3) apply the roulette method. SHELF enables researchers to gather judgments from individual experts and facilitates discussions about their differing perspectives. Rather than seeking consensus, the framework encourages understanding the rationale behind various viewpoints. The lecture concluded with a discussion about the SHELF expert elicitation process, highlighting its advantages and disadvantages.

Thamonwan Dulsamphan from HITAP Thailand facilitated the final exercise on expert elicitation, employing a randomized approach to evaluate the clinical and economic implications of a diagnostic test. Participants in the workshop acted as clinicians, the target group for this expert elicitation. They were divided randomly into groups A and B, completing a different survey for each. This survey included multiple questions aimed at understanding their diagnostic choices and medication decisions for a given patient scenario. At the conclusion of the exercise, Thamonwan clarified how the survey results would aid the study in obtaining the clinical and economic input of the control and case group regarding a particular diagnostic test.

Figure 11. Left: Saudamini Dabak shared the roulette method during her lecture on SHELF for expert elicitation; Right: Thamonwan Dulsamphan explained the details of the exercise.

Closing remarks

Prof. Auliya Suwantika, the Head of the Indonesia HTA Committee (InaHTAC), delivered closing remarks at the workshop. He outlined the Committee's goals, which focus on providing recommendations regarding the value of investing in new health technologies, as well as how economic evaluations and budget impact analyses contribute to this aim. Additionally, he expressed gratitude for the workshop, noting that it marked an important first step in developing the HTA network in Indonesia in terms of both capacity and capability and highlighted the importance of teamwork in achieving goals.

Figure 12. Right: Prof. Auliya Suwantika gave a closing remarks; Right: Prof. Auliya Suwantika gave a token of appreciation to Dr. Yot Teerawattananon.

Evaluation

A feedback form for each day featuring two sets of questions was distributed throughout the workshop. The first set required participants to rate the content delivery and quality of each session on a scale from 1 to 5 (lowest to highest). The second set consisted of an open-ended question inviting respondents to suggest ways to improve the sessions.

On the first day, the response rate reached 47% (21 responses from 45 attendees). All respondents provided their scores for each session, but only eight shared their feedback on the final question, 'How can we improve the session?' For this question, two respondents suggested including an exercise to extract survival data from literature, while one participant asked to change groups daily. The rest expressed their satisfaction with the day. Below is a summary of the average score for each session.

Table 1. The average score for the sessions on the 1st day.

Session name	Average score (n = 21, 47%)	
	Content delivery	Content quality
Ctrl+R: Refresher to economic evaluation concept	4.86	4.86
Markov Model	4.76	4.86
Draw to win: constructing Markov Model diagram	4.71	4.86
Crunching the numbers: statistics for economic evaluation (lecture)	4.71	4.86
Crunching the numbers: statistics for economic evaluation (exercise)	4.90	4.86
Avoiding garbage in, garbage out	4.57	4.71

On the second day, we received the same response rate as day 1. Three respondents did not provide scores for the lecture and exercise on probabilistic modeling. Only eight respondents addressed the final question, 'How can we improve the session?' Among those responses, respondents shared their positive experiences from the second day, with one noting that these sessions were the best they had attended in the past. The average score for each session is outlined below.

Table 2. The average score for the sessions on the 2nd day.

Session name	Average score (n=21, 47%)	
	Content delivery	Content quality
That point value: deterministic modeling (lecture)	4.90	4.90
That point value: deterministic modeling (exercise 1)	4.90	4.90
That point value: deterministic modeling (exercise 2)	4.86	4.86
Luck of the Draw: An introduction to probabilistic modelling and uncertainty analysis (lecture)	4.76	4.81
Luck of the Draw: An introduction to probabilistic modelling and uncertainty analysis (exercise 1)	4.83	4.89
Luck of the Draw: An introduction to probabilistic modelling and uncertainty analysis (exercise 2)	4.85	4.92

On day three, the response rate was 87%, with 39 responses out of 45 attendees. All respondents answered every question on the feedback form, except for the last question regarding ‘how can we improve the session?', for which we only received 29 responses. The feedback form did not include the extra sessions (EVPI and expert elicitation) since they were not initially part of the workshop. Six respondents suggested that the workshop could be enhanced by incorporating more exercises and homework, allowing more time for activities, and including an exercise for the model validation session. Three respondents requested that the workshop be extended over additional days (one participant suggested it be held over 5 days) with shorter daily sessions. The remaining respondents appreciated the workshop and noted its usefulness. The average score for each session is outlined below.

Table 3. The average score for the sessions on the 3rd day.

Session name	Average score (n = 39, 87%)	
	Content delivery	Content quality
Ahead of the Curve: Constructing cost-effectiveness acceptability curves (lecture)	4.87	4.92
Ahead of the Curve: Constructing cost-effectiveness acceptability curves (exercise)	4.85	4.90
Reality check: model validation	4.84	4.87

Session name	Average score (n = 39, 87%)	
	Content delivery	Content quality
Telling the story of the numbers: reporting and communicating economic evaluation results	4.82	4.87
Thailand's KRT Journey	4.79	4.79
Guide to conduct model-based economic evaluation for KRT	4.79	4.79

Outcomes

This workshop brought together researchers from Indonesia, Brunei, Cambodia, Malaysia, the Philippines, enhancing their technical abilities to perform model-based economic evaluations using Microsoft Excel. Eventually, they will aid in developing strong economic evaluations to inform health decisions in their respective countries, as participants were chosen for their potential to conduct evaluations for national HTA agencies. Additionally, the workshop has fostered and reinforced the HTA network among these nations, with several sessions designed to encourage participant engagement. The workshop also spurred interest in continuing such regional workshops and discussions are underway to plan the next one.

The outputs from this workshop include social media posts at HITAP accounts on the workshop activities and a brief blog was created in addition to this report.

Lessons Learned

An online after-action review took place on 7 March 2025, where the HITAP team and MOH Indonesia were invited to participate. Members unable to attend were encouraged to provide feedback via a prepared form. This form, as well as the meeting, posed three key questions for all organizing team members to address: 1) What went well?; 2) What did not go well?; and 3) What would you do differently next time?. Organizing members were expected to share constructive feedback as the goal of this review is to enhance future project and is not intended to grade the workshop's outcome.

Table 4. Summary of input from the after-action review form and meeting

What went well?	What did not go well?	What would you do differently?
Logistics		
• The travel pack was convenient for consolidating all travel-related information into one document. • Smooth transportation arrangements.	**Airport Transfer** The booking for the airport drop-off request was not successfully processed. **File naming/ terminologies** • Some files were renamed for improved printing flow, but the main slides were not updated by speakers until shortly before the session. • Possible formatting differences between Windows and Mac caused text misalignments and size discrepancies. • Consistent terminology was discussed during the dry run, but no comprehensive check across files was conducted. Discrepancies remained and were edited on day 0. Additionally, some exercise files were modified, but the solution files were not. **Screens** Screens with multiple lines that affect resolution of presentation **Materials** • Participants could initially edit Linktree documents; could be locked in the future. • Presentation file was corrupted a day before the session. **Sound/Microphone Issues** Wireless microphone sound output was unstable.	**Airport Transfer** Confirm the booking with the focal point before the return date. **File naming/ terminologies** Speakers to check files **Screen** Prepare Zoom/Teams as backup **Materials** • Ensure settings are configured properly prior to session • Speakers to check files and have backup **Sound/microphone** If possible, prepare a fresh set of batteries for microphones each day, or ensure they are in the charging port at the end of each day.

What went well?	What did not go well?	What would you do differently?
Content (agenda development, session planning, session content, flow of content, time, and duration of session, etc.)		
• Experienced staff have effectively supported material refinement during program development. • The team benefited from a diverse presentation style • A recap session the following day effectively reinforces key concepts from the previous day's content. • The time management and regular check-ins with speakers have been beneficial as the program progressed. • Rehearsal sessions aided material development and presentation skills. • The Wednesday morning recap featured various formats, including Q&A and teaching name parameters, enhancing interest. • A flexible agenda addressed participants' needs. • Appreciate how the team members covered each other • A lot of questions revolved around experiences of Thailand, rather than the technical aspects of an evaluation. Having senior	• Consider not to schedule deterministic and probabilistic sessions on the same day to prevent participant fatigue in the afternoon. • Lower response after lunch/final session	**Lower response after lunch/final session** • Have multiple small breaks rather than fewer, longer ones. Organize more hands-on activities or short exercises, especially for after lunch or the last session of the day. **Handout** • Distribute handout documents with consecutive page numbers for easier reference during sessions. • Teach unblocking macros a day prior. **Materials** • Recheck materials (e.g., QR codes) and share with TAs beforehand. Print extra copies for potential loss. **Debrief** • Assign roles (e.g., timekeeper, photographer, note-takers) before the venue arrival. **Participant Engagement** • Use targeted survey questions to gauge participant interests, e.g., "What HTA topics are you interested in from HITAP?" Open-ended questions may complicate responses.

What went well?	What did not go well?	What would you do differently?
members in the team to address questions have been very helpful		• Share the survey before the workshop for preparation time. If possible, include a Q&A session during the workshop and engage with participants to better understand their needs.
Others		
• Having internal group chat to share information on WIFI, QR codes have been helpful to disseminate some of these information to participants		

Appendices

Appendix 1 – Agenda

Time (duration)	Module	Description	Facilitator(s)
Day 1 – Monday, 24 February 2025 Adhyatma Building, Ministry of Health Indonesia			
MC: Panupong Chaowanasawat			
08.30am – 09.10 am (45 mins)	**Session 1:** What's on our plate today?	Course overview and introductions	Saudamini Dabak Lapad Pongcharoenyong
9.10am-9.15am (5 mins)	**Session 2:** Opening remarks		MoH, Indonesia
9.15am-9.20am (5 mins)	**Photo taking**		
9.20am-10.00am (40 mins)	**Session 3:** Lecture Ctrl+R: Refresher to economic evaluation concept	Economic evaluation concepts	Khansa Chavarina
10.00am-10.30am (30mins)	**Session 4A:** Lecture - Markov Model	Overview of Markov model key concepts	Manit Sittimart
10.30am-10.45am (15 mins)	Coffee break		
10.45am-12.00pm (75mins)	**Session 4B:** Exercise Draw to win: constructing Markov Model diagram	Group exercise and presentation on constructing a Markov Model 40 minutes group exercise and 15 minutes presentation	Chittawan Poonsiri
12.00pm-1.00pm (60mins)	Lunch Break		
1.00pm-2.15pm (75 mins)	**Session 5A:** Lecture Crunching the numbers: statistics for economic evaluation	Concepts in survival analysis (survival function, hazard function, cumulative	Dr. Yot Teerawattananon

Time (duration)	Module	Description	Facilitator(s)
		distribution function, probability density function, cumulative hazard), transition probabilities, transforming rate into probability, est. survival curve	
2.15am-3.30pm (75 mins)	**Session 5B:** Exercise Crunching the numbers: statistics for economic evaluation	Exercise: calculating yearly probability of dying and cumulative survival	Lapad Pongcharoenyong Saudamini Dabak
3.30pm-3.45pm (15mins)	Coffee break		
3.45pm-4.45pm (60mins)	**Session 6:** Lecture Avoiding garbage in, garbage out	Data sources, considerations and selection process	Dr. Brandon Chua
4.45pm – 5.15pm (30 mins)	**Session 7**: Wrap up of Day 1 + Q&A		Saudamini Dabak
Day 2 – Tuesday, 25 February 2025 Adhyatma Building, Ministry of Health Indonesia			
MC: Saudamini Dabak			
8.30am – 9.00am (30 mins)	**Session 8:** What's on our plate today?	Day overview, recap of day 1, and pop up quiz	Panupong Chaowanasawat
9.00am-9.45am (45 mins)	**Session 9A:** Lecture That point value: deterministic modeling	Constructing Markov model in Excel, deterministic modeling, interpreting result	Manit Sittimart

Time (duration)	Module	Description	Facilitator(s)
9.45am – 10.15 am (30 mins)	**Session 9B:** Exercise That point value: deterministic modeling	Translating model into an Excel format	Chittawan Poonsiri
10.15am – 10.25am (10 mins)	Coffee Break		
10.25am–12.30pm (125 mins)	**Session 9C:** Exercise That point value: deterministic modeling	Constructing Markov model in Excel, inputting formula in the Excel	Manit Sittimart Chittawan Poonsiri
12.30pm – 1.45pm (75 mins)	Lunch break		
1.45pm–2.30pm (45 mins)	**Session 10A:** Lecture - Luck of the Draw: An Introduction to Probabilistic Modelling and Uncertainty Analysis	Turning deterministic model into probabilistic model and uncertainty Analysis	Dr. Brandon Chua Panupong Chaowanasawat
2.30pm – 3.30pm (60 mins)	**Session 10B:** Exercise - Luck of the Draw: An Introduction to Probabilistic Modelling	Exercise: choosing appropriate distributions for all parameters, calculate mean, standard error	Dr. Brandon Chua Panupong Chaowanasawat
3.30pm – 3.45pm (15 mins)	Coffee Break		
3.45pm – 4.15pm (30 mins)	**Session 10B (cont'):** Exercise Luck of the Draw: An Introduction to Probabilistic Modelling	Exercise wrap up	Dr. Brandon Chua Panupong Chaowanasawat
4.15.pm – 4.45 pm (30mins)	**Session 11:** Wrap up of Day 2 + Q&A		Khansa Chavarina
Day 3 – Wednesday, 26 February 2025 Wyndham Casablanca Jakarta			

Time (duration)	Module	Description	Facilitator(s)
MC: Manit Sittimart and Khansa Chavarina			
8.30am – 9.00am (30mins)	**Session 12:** What's on our plate today?	Day overview, recap of day 2, pop up quiz	Chittawan Poonsiri
9.00 am – 10.00am (60 mins)	**Session 13A:** Lecture Ahead of the Curve: Constructing cost-effectiveness acceptability curves	Cost effectiveness scatterplot, net monetary benefit, cost-effectiveness acceptability curve	Dr. Wanrudee Isaranuwatchai
10.00am – 10.15am (15 mins)	Coffee break		
10.15 am – 11.15am (60 mins)	**Session 13B:** Exercise Ahead of the Curve: Constructing cost-effectiveness acceptability curves	Exercise: constructing cost-effectiveness acceptability curve	Saudamini Dabak Lapad Pongcharoenyong
11.15am – 12.00pm (45 mins)	**Session 14 :** Lecture Reality check : model validation	Why and how to validate models	Dr. Yot Teerawattananon
12.00pm – 1.00pm (60 mins)	Lunch break		
1.00pm – 1.45pm (45 mins)	**Session 15:** Lecture Telling the story of the numbers: reporting and communicating economic evaluation results	Reporting standards and how to communicate the results to intended end-users and the public	Dr. Brandon Chua
1.45pm – 2.05pm (20 mins)	**Session 16:** Thailand's KRT Journey	Thailand's KRT policy: from 2008 to today	Khansa Chavarina
2.05pm – 3.05pm	**Session 18:** Lecture		Dr. Panji Hadisoemarto

Time (duration)	Module	Description	Facilitator(s)
(60 mins)	Guide to conduct model-based economic evaluation for KRT		
3.05pm – 3.20pm (15 mins)	Coffee break		
3.20pm – 3.40pm (20 mins)	**Session 19:** Expected value of perfect information		Dr. Yot Teerawattananon
3.40pm – 4.00pm (20 mins)	**Session 20:** Experts elicitation		Saudamini Dabak
4.00pm – 4.50pm (50 mins)	**Session 21:** Experts elicitation pt 2		Dr. Yot Teerawattananon, Thamonwan Dulsamphan, Dr. Brandon Chua
4.50pm – 5.10pm (20 mins)	**Session 22:** Ngopi darat: ask all the questions you want!	QnA session	Khansa Chavarina
5.10pm – 5.20pm (10 mins)	**Session 23:** Closing remarks and photo taking		Dr. Auliya A. Suwantika

Appendix 2 – List of Attendees

No	Full Name	Affiliation
Participants and observers		
1	Apriliya Prihayati	Ministry of Health, Indonesia
2	Arbiansyah Priyastama	Ministry of Health, Indonesia
3	Dr. Dhite Bayu Nugroho	Center for Health Financing Policy and Health Insurance Management, Faculty of Medicine, Public Health, and Nursing, Gadjah Mada University, Indonesia
4	Dr. Lubna binti Haji Abdul Razak	Ministry of Health, Brunei Darussalam
5	Dr. Dyg Ong Hui Ling	Ministry of Health, Brunei Darussalam
6	Erie Gusnellyanti	Directorate of Pharmaceutical Production and Distribution, Ministry of Health, Indonesia
7	Dr. Eva Herlinawaty	Ministry of Health, Indonesia
8	Haidee A. Valverde	Institute of Health Policy and Development Studies, National Institutes of Health, UP Manila
9	Hermawati Setiyaningsih	Center for Health Financing Policy and Health Insurance Management, Faculty of Medicine, Public Health, and Nursing, Gadjah Mada University, Indonesia
10	Dr. I Gusti Ayu Trisna Dewi	Ministry of Health, Indonesia
11	Kurnia Sari	University of Indonesia, Indonesia
12	Lambang Wahyu Nugroho	Center for Health Financing Policy and Health Insurance Management, Faculty of Medicine, Public Health, and Nursing, Gadjah Mada University, Indonesia
13	Liew Ai Chi	University Sains Malaysia, Malaysia
14	Dr. Lukman Hilfi	Center of Health Technology Assessment, Padjajaran University, Indonesia
15	Lusiana Siti Masytoh	Ministry of Health, Indonesia
16	Ly Phagnanoch	National Payment Certification Agency, Cambodia
17	Miftahusaadah	Ministry of Health, Indonesia
18	Mutia A. Sayekti	University of Indonesia, Indonesia
19	Nur Atika	Airlangga University, Indonesia
20	Popy Yuniar	University of Indonesia, Indonesia
21	Putri Listiani	Center for Health Financing Policy and Health Insurance Management, Faculty of Medicine, Public Health, and Nursing, Gadjah Mada University, Indonesia
22	Rano Kurnia Sinuraya	Padjajaran University, Indonesia
23	Reise Manninda	Pancasila University, Indonesia
24	Riki Relaksana	Padjajaran University, Indonesia
25	Dr. Rizki Tsalatshita Khair Mahardya	Center for Health Financing Policy and Health Insurance Management, Faculty of Medicine, Public Health, and Nursing, Gadjah Mada University, Indonesia
26	Rohayati Rahafat	Ministry of Health, Indonesia
27	Sabarudin	Halu Oleo University, Indonesia
28	Septri Suzana	Ministry of Health, Indonesia

29	Seshiana Sebti Pramesti	Ministry of Health, Indonesia
30	Sroy Longyin	National Payment Certification Agency, Cambodia
31	Ully Adhie Mulyani	Health Policy Agency, Ministry of Health, Indonesia
32	Dr. Wayan Citra Wulan Sucipta Putri	Department of Public Health and Preventive Medicine, Faculty of Medicine, Udayana University
33	Prof. Auliya A. Suwantika	Indonesia HTA Committee
34	Dr. Panji Hadisoemarto	Center of Health Technology Assessment, Padjajaran University, Indonesia
35	Prof. Mardiati Nadjib	Indonesia HTA Committee
36	RR. Harshinta	Ministry of Health, Indonesia
37	Fatma Rahmi	Ministry of Health, Indonesia
38	Dr. Farida Trihartini	Ministry of Health, Indonesia
39	Hendra Tri Widodo	Ministry of Health, Indonesia
40	Hendrik Rudiansyah	Ministry of Health, Indonesia
41	Rina Tankudung	Ministry of Health, Indonesia
42	Happy Chandraleka	Ministry of Health, Indonesia
43	Narendro Arifia	Ministry of Health, Indonesia
44	Jakkapan Sakornchaijaroen	Program Management Unit for Human Resources & Institutional Development, Research and Innovation (PMU-B), Thailand
45	Nutsupar Noiparsee	Program Management Unit for Human Resources & Institutional Development, Research and Innovation (PMU-B), Thailand
Facilitators		
46	Dr. Yot Teerawattananon	Health Intervention and Technology Assessment Program Foundation, Thailand
47	Assoc. Prof. Wanrudee Isaranuwatchai	Health Intervention and Technology Assessment Program Foundation, Thailand
48	Waranya Rattanavipapong	Health Intervention and Technology Assessment Program Foundation, Thailand
49	Saudamini Dabak	Health Intervention and Technology Assessment Program Foundation, Thailand
50	Kinanti Khansa Chavarina	Health Intervention and Technology Assessment Program Foundation, Thailand
51	Manit Sittimart	Health Intervention and Technology Assessment Program Foundation, Thailand
52	Dr. Brandon Chua	Health Intervention and Technology Assessment Program Foundation, Thailand
53	Chittawan Poonsiri	Health Intervention and Technology Assessment Program Foundation, Thailand
54	Panupong Chaowanasawat	Health Intervention and Technology Assessment Program Foundation, Thailand
55	Thamonwan Dulsamphan	Health Intervention and Technology Assessment Program Foundation, Thailand
56	Lapad Pongcharoenyon	Health Intervention and Technology Assessment Program Foundation, Thailand

57	Parntip Juntama	Health Intervention and Technology Assessment Program Foundation, Thailand

Appendix 3 – Letter of request from the Ministry of Health, Indonesia to the Ministry of Public Health, Thailand

Ministry of Health
Republic of Indonesia
Health Policy Agency
Percetakan Negara Street Nomor 29
Jakarta Pusat 10560
(021) 4261088 (hunting)
https://badankebijakan.kemkes.go.id

Ref number : JP.03.01/H/113/2025 3 February 2025
Subject :Request for collaboration on HTA between Ministry of Public Health, Thailand and Ministry of Health, Indonesia

The Permanent Secretary of the Ministry of Public Health Thailand
Tiwanon Road, Mueang Nonthaburi District, Nonthaburi 11000,
Thailand

Dear Sir,

The Ministry of Health, Indonesia presents its compliments to the Ministry of Public Health, Thailand.

Indonesia is currently undertaking significant initiatives to advance its healthcare system through innovative research and collaborative efforts. A key focus of these initiatives is exploring and strengthening the role of Health Technology Assessment (HTA) in informing healthcare policies.

In this regard, we are reaching out to the Ministry of Public Health of Thailand to seek your valuable support and collaboration in addressing these shared priorities. We believe that working together will greatly enrich our collective understanding and foster the exchange of insights between our nations.

As part of these efforts, we kindly request the support of the Health Intervention and Technology Assessment Program (HITAP) in **the 3rd Regional Workshop on Advanced Health Economic Evaluation Modeling and the HTA Sharing Session**, which is scheduled to take place from **24 to 27 February 2025**, in Jakarta, Indonesia. Your expertise and active participation would greatly enhance the discussions and outcomes of this event.

We deeply appreciate your attention to this invitation and are hopeful for a positive response. Together, we can drive meaningful progress in healthcare systems that will benefit not only our countries but also the broader region. We look forward to a fruitful collaboration and the opportunity to work closely with HITAP on this important initiative.

Sincerely,

Asnawi Abdullah
Director General for Health Policy Agency