Cost-Effectiveness of Umeclidinium/Vilanterol Combination Therapy for Group B COPD Patients

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BACKGROUND

- Thailand is striving to improve clinical outcomes for chronic obstructive pulmonary disease (COPD) by reducing exacerbations, hospitalizations, and mortality through the increased use of inhaled medications.
- Group B patients experience high symptoms but have a lower risk of exacerbations, significantly affecting their quality of life.
- The combination of a long-acting muscarinic antagonist (LAMA) and a long-acting beta2 agonist (LABA), recommended in the 2023 Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines for Group B COPD patients, has not been included in the National List of Essential Medicines (NLEM).

OBJECTIVE

- To evaluate the cost-effectiveness of umeclidinium/vilanterol (UMEC/VI) compared to tiotropium (TIO) monotherapy for Group B COPD patients in Thailand.

METHODS

Model structure

- A Markov model with a one-year cycle was developed to simulate lifetime costs (in 2024 US$) and quality-adjusted life years (QALYs), incorporating both the GOLD classification for COPD based on the ABCD assessment tool and severity stages according to airflow limitation.
- The hypothetical base case cohort included individuals aged 40 years with Group B COPD, modeled over a 40-year time horizon.
- COPD progression was modeled based on forced expiratory volume in one second (FEV1) and the annual rate of FEV1 decline of the Thai patients.
- Both costs and QALYs were discounted annually at 3%.

Data sources

- A network meta-analysis (NMA) was conducted to assess the effectiveness of treatments.
- Utility scores were derived from St George's Respiratory Questionnaire total score (SGRQ) scores from 281 Thai COPD patients.
- Utility decrements were applied during periods of exacerbation to reflect the reduced quality of life associated with these events.
- Drug costs were obtained from the Drug and Medical Supply Information Center, Ministry of Public Health. The monthly cost of UMEC/VI was US$25.8, while that of TIO was US$14.2.
- Costs of treatment were based on hospital and claim data.

Analyses

- Cost-effectiveness was evaluated from a societal perspective.
- Probabilistic sensitivity analysis was performed using Monte Carlo simulations to randomly select values within plausible ranges for each parameter and calculate costs and quality-adjusted life years over 1,000 iterations.

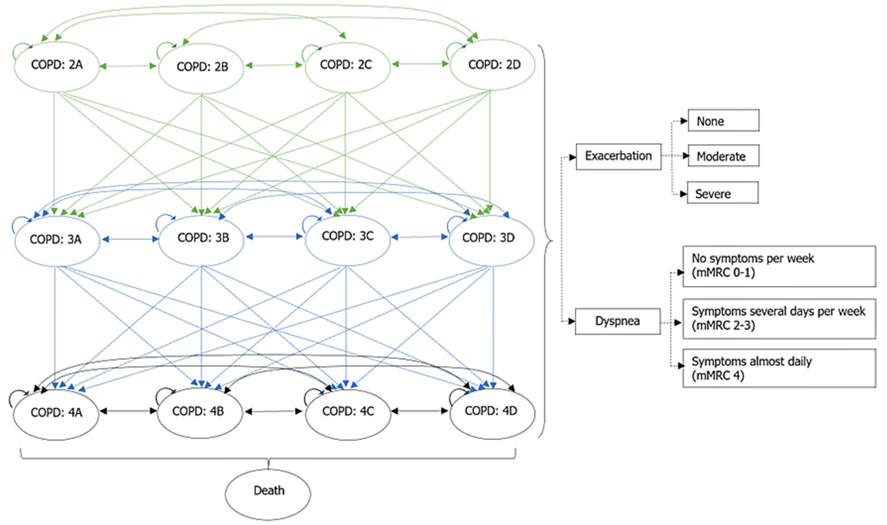

Figure 1 Markov model

RESULTS

- UMEC/VI provided a gain of 0.25 QALYs compared to TIO monotherapy.
- The incremental costs associated with UMEC/VI was US$1743, resulting in incremental cost-effectiveness ratios (ICERs) of US$7020 per QALY which exceeded the willingness-to-pay (WTP) threshold established for Thailand (US$4533).
- The ICERs showed robustness to parameter changes in the probabilistic sensitivity analysis.
- At Thailand's WTP threshold (US$ 4533), the probability of UMEC/VI being cost-effective is 34%.
- UMEC/VI would be cost-effective if its price were reduced by 16%.

Table 1 Effectiveness, cost, and incremental cost-effectiveness ratios (ICERs)

Options	Cost (US$)	LYs	QALYs	ΔCost (US$)	ΔLYs	ΔQALYs	ICER (US$/QALY)
TIO (Base case)	5834	12.46	8.45				
UMEC/VI	7577	12.59	8.70	1743	0.13	0.25	7020

ICER, incremental cost-effectiveness ratio; LYs, life year; QALYs, quality-adjusted life years; TIO, tiotropium; UMEC/VI, umeclidinium/vilanterol; Δ, difference

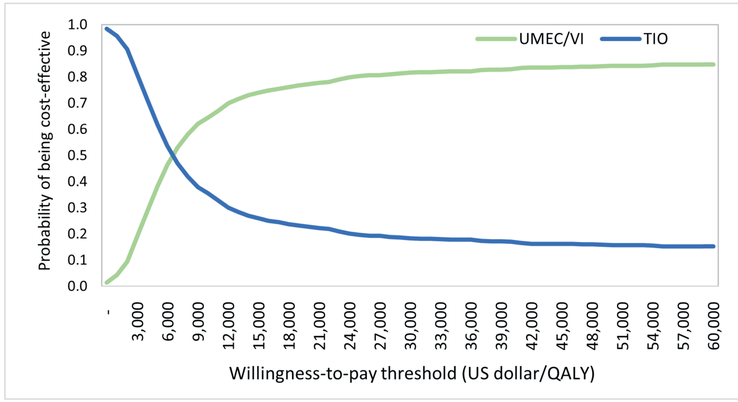

Figure 2 Cost-effectiveness acceptability curve

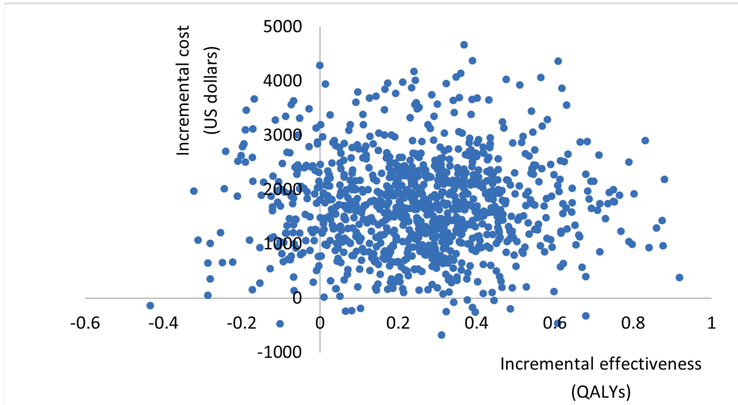

Figure 3 Cost-effectiveness plane

DISCUSSION AND CONCLUSION

- The results demonstrated the feasibility of UMEC/VI aligning with Thailand's WTP threshold and being included in the NLEM through price negotiation
- This could increase access to necessary medicine and subsequently improve clinical outcomes for Group B COPD patients.
- It should be noted that our model specifically represented the Group B COPD patients and the model also assumed 100% treatment adherence.

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