Cost-effectiveness Analysis of Aztreonam-avibactam (ATM-AVI) ± Metronidazole (MTZ) for the Treatment Of Complicated Intra-abdominal Infections (cIAI) and Ventilator-Associated/Hospital-Acquired Pneumonia (HAP/VAP) Caused by Suspected MBL-Producing Enterobacterales

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OBJECTIVE

Metallo-β-lactamases (MBLs) are a type of carbapenemase produced by bacteria that cause resistance to many antibiotics. Aztreonam-avibactam (ATM-AVI; EMBLAVEO®) is the first EU approved β-lactam/β-lactamase inhibitor combination indicated for serious infections due to Gram-negative bacteria, including MBL-producing multidrug-resistant pathogens. This analysis assesses the cost-effectiveness of ATM-AVI for complicated intra-abdominal infections (cIAI) and hospital- or ventilator-associated pneumonia (HAP/VAP).

METHODS

This study used a 38-day decision tree followed by a Markov model over a 5-year horizon to evaluate the medical costs and clinical outcomes of ATM-AVI ± metronidazole versus meropenem ± colistin (for cIAI) or meropenem-based therapy (for HAP/VAP) from a payer perspective.

Treatment effectiveness was based on the REVISIT trial, which included 38% Asian patients—some from Taiwan—supporting local relevance. Sensitivity and scenario analyses addressed input uncertainties. All costs and utilities were discounted at 3% annually.

RESULTS

- **Base-case results:**
  - For cIAI, ATM-AVI ± MTZ is associated with incremental cost of NTD 139,412 and incremental quality-adjusted life years (QALYs) of 0.45 vs MER ± COL, resulting in a cost-effectiveness ratio (ICER) of NTD 310,110 per QALY.
  - For HAP/VAP, ATM-AVI ± MTZ is associated with incremental costs of NTD 150,447 and incremental QALYs of 0.43 vs meropenem-based therapy, resulting in an ICER of NTD 351,586 per QALY.
- The probabilistic results are congruent with the deterministic base-case and 88% of simulations were cost-effective at a willingness to pay (WTP) threshold of NTD 1,150,478 per QALY for both cIAI and HAP/VAP.
- Key drivers of cost-effectiveness include the cure probabilities; the efficacy reduction associated with resistance and the cured/response utility values.

CONCLUSION

For patients with cIAI and HAP/VAP, and assuming a cost-effectiveness threshold of NTD 1,150,478 per QALY, treatment with ATM-AVI is considered a highly cost-effective use of healthcare resources in Taiwan.

Table 1. Base-case results for the suspected CRE population; cIAI

Outcomes	Intervention Sequence	Comparator Sequence	Incremental
Clinical Outcomes			
Discounted LYs	3.96	3.46	0.50
Discounted QALYs	3.72	3.27	0.45
Cost Outcomes			
Drug cost	NTD 202,390	NTD 16,071	NTD 186,319
Hospitalisation cost	NTD 107,683	NTD 128,996	-NTD 21,313
NTX cost	NTD 22,647	NTD 47,725	-NTD 25,077
Recurrence cost	NTD 6,009	NTD 5,327	NTD 682
Secondary surgery costs	NTD 4,212	NTD 5,411	-NTD 1,199
BSC cost	NTD 0	NTD 0	NTD 0
Total cost	**NTD 342,941**	**NTD 203,529**	**NTD 139,412**
ICERs			
Incremental cost per LY gained			NTD 281,194
Incremental cost per QALY gained			**NTD 310,110**
Net monetary benefit			NTD 377,792

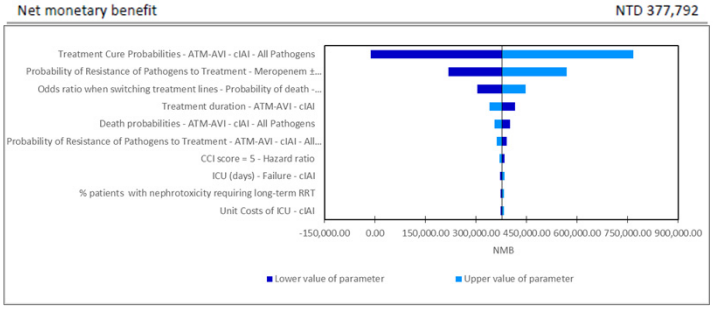

Figure 1. One-Way Sensitivity Analyses; cIAI

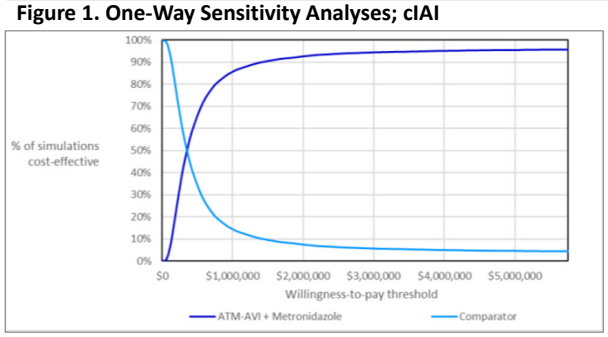

Figure 2. Cost-Effectiveness Acceptability Curve; cIAI

Table 2. Base-case results for the suspected CRE population; HAP/VAP

Outcomes	Intervention Sequence	Comparator Sequence	Incremental
Clinical Outcomes			
Discounted LYs	2.95	2.44	0.52
Discounted QALYs	2.78	2.35	0.43
Cost Outcomes			
Drug cost	NTD 274,401	NTD 22,362	NTD 252,039
Hospitalisation cost	NTD 135,232	NTD 152,466	-NTD 17,234
NTX cost	NTD 62,761	NTD 147,156	-NTD 84,395
Recurrence cost	NTD 196	NTD 739	-NTD 543
Secondary surgery costs	NTD 4,396	NTD 3,862	NTD 534
BSC cost	NTD 377	NTD 331	NTD 46
Total cost	**NTD 477,362**	**NTD 326,916**	**NTD 150,447**
ICERs			
Incremental cost per LY gained			NTD 291,889
Incremental cost per QALY gained			**NTD 351,586**
Net monetary benefit			NTD 341,853

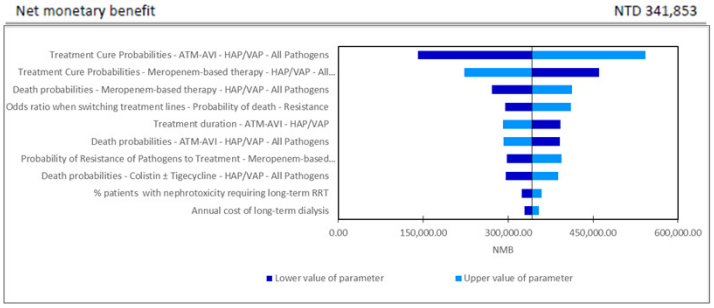

Figure 3. One-Way Sensitivity Analyses; HAP/VAP

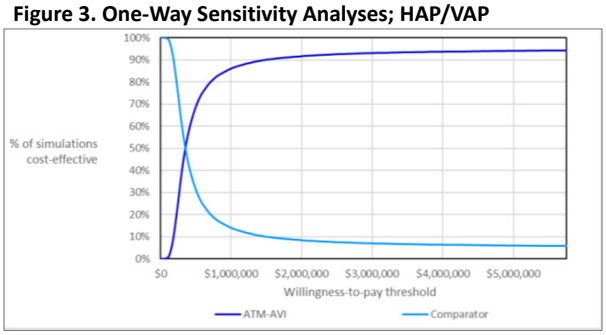

Figure 4. Cost-Effectiveness Acceptability Curve; HAP/VAP

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