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# Cost Effectiveness of Novel Antibiotic Imipenem/Cilastatin/Relebactam in Gram-Negative Infections in Greece

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## INTRODUCTION

- **Antibiotic Resistance** is one of the biggest threats to global health and poses a significant burden on healthcare systems.[1] **, especially in Greece[2]** .
  - **An EARS-NET ECDC based data analysis found higher burden due to carbapenem- & CMS+IMI-resistance in Greece than in Italy among higher antibiotic resistance than other EU and EEA countries [3] .**
  - "COVID-19 may have exacerbated the challenges of antimicrobial resistance in Greece [4] .
- Call for prudent use of novel antibiotics against carbapenem resistance in Greece may be timelier than ever.

## AIM

This study assesses the cost-effectiveness of imipenem/cilastatin/relebactam (Imi/Rel) for the treatment of complicated intra-abdominal infections (cIAI), complicated urinary tract infections (cUTI) including pielonephritis, and hospital-acquired and ventilator-associated bacterial pneumonia (HABP/VABP) caused by carbapenem resistant (CR) Gram-negative (GN) bacteria in Greece. The comparator for this analysis is colistin+imipenem (CMS+IMI).

## METHODS

### Description of the model structure

- The model compares IMI/REL to CMS+IMI.
- The cause is assumed confirmed carbapenem-resistance.
- **In the long-term model,** patients cured in the short-term are either cured or dead.
  - Cured patients in the long-term model follow general population mortality.
- Patients who remain alive but uncured following the treatment period are assumed to die in hospital within a year (in line with expert clinical opinion).

### Data sources

- . Disease distribution data: RESTORE IMI 1 clinical trial (mITT population) after validation by a clinical specialist [5] **.**
- Time horizon: 45 years. Costs and health outcomes discounted at 3.0% annually. The model has been adapted from the payer's perspective.

**Table 1:** Percentage of Patients with each type of Infection

| Percentage of Patients with each Infection type | | |
|---|---|---|
| Proportion of HABP/VABP | 35.5% | Source: RESTORE –IMI 1 |
| Proportion of cIAI | 12.9% | Source: RESTORE –IMI 1 |
| Proportion of cUTI | 51.6% | Source: RESTORE –IMI 1 |

**Figure 1:** Treatment Setting in the model

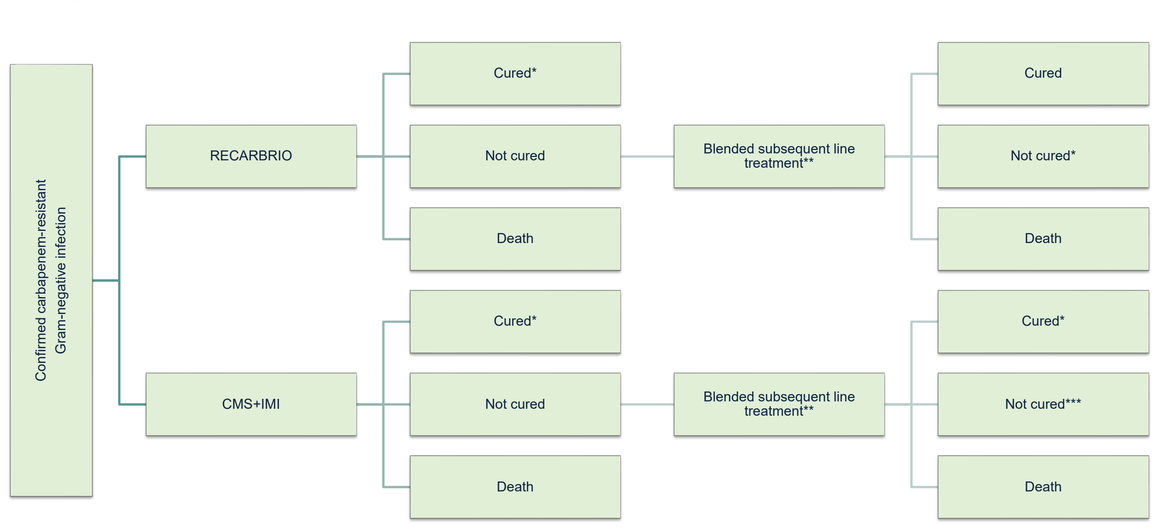
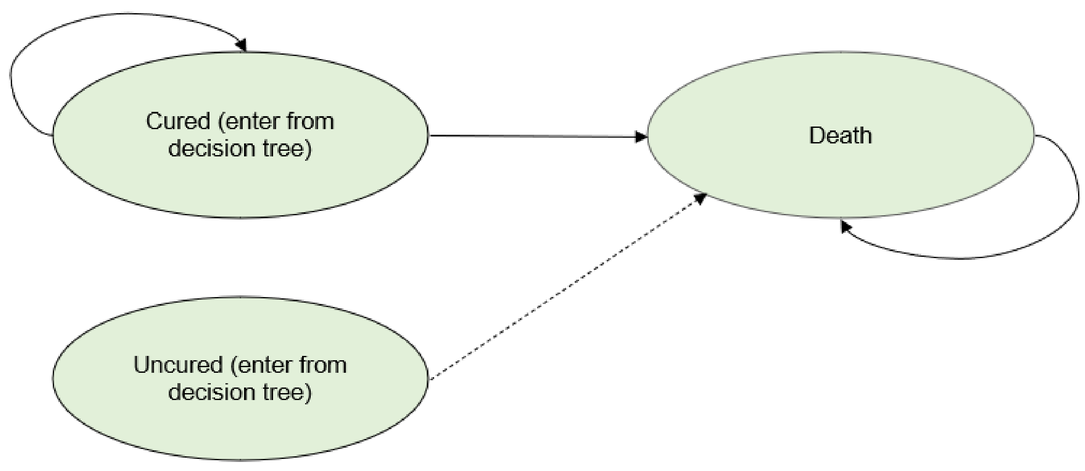



**Figure 2:** Long-term model structure




## RESULTS

### Results of the model's base-case analysis

- 29.9% of patients who received CMS+IMI are projected to die within 1 year.
- 14.9% of patients who will received Imi/Rel to die within 1 year (Table 3).
- Patients in the CMS+IMI treatment arm: 18.14 LY's at a cost of 23,874€.
- Patients in the Imi/Rel arm: 22.00 LY's at a cost of 24,690€.
- The ICER for Imi/Rel was 211€ per LY gained compared to Meropenem.

### Deterministic Sensitivity Analysis

- A Deterministic Sensitivity Analysis was run to estimate the parameters with the biggest impact on the ICER (Figure 5).
- The biggest impact on ICER and DSA: in-hospital mortality and response rate for patients on the CMS+IMI treatment arm.

### Probabilistic Sensitivity Analysis

Imi/Rel had a 94.5% probability of being cost effective at a threshold of 52,770 € per QALY (3x Greece GDP per capita).

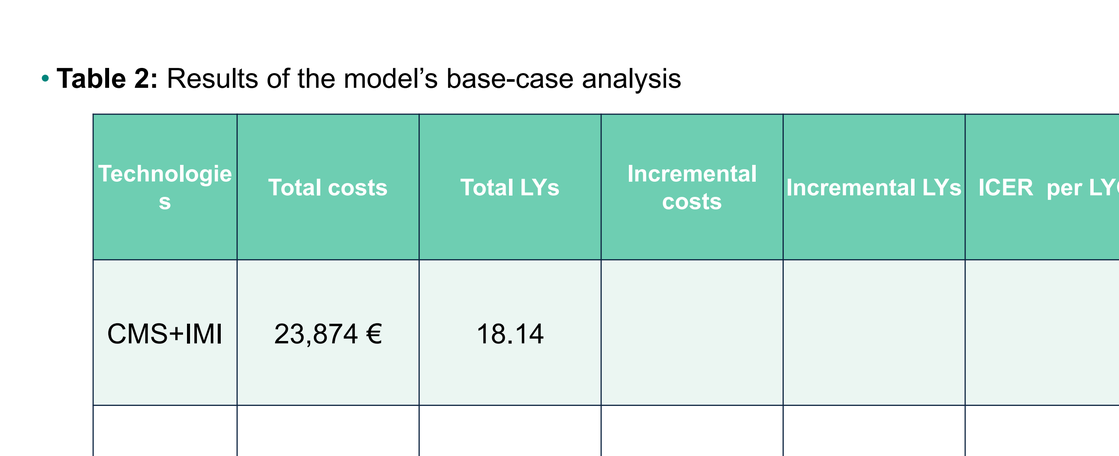
• **Table 3**:Infection-Related Deaths within 1 year

| Technologies | A. During Initial hospitalization | B. Uncured (1 year) | C. 1 year total (A+B) |
|---|---|---|---|
| CMS+IMI | 28.9% | 1.0% | 29.9% |
| Imi/Rel | 14.3% | 0.6% | 14.9% |

• **Table 2:** Results of the model's base-case analysis

| Technologies | Total costs | Total LYs | Incremental costs | Incremental LYs | ICER per LYG |
|---|---|---|---|---|---|
| CMS+IMI | 23,874 € | 18.14 | | | |
| Imi/Rel | 24,690 € | 22.00 | 813 € | 3.86 | 211 € |

• **Figure 3:** Deterministic Sensitivity Analysis Results




## CONCLUSIONS

- The results of our analysis indicate that IMI/REL is a cost-effective treatment option for patients with **(cIAI), (cUTI) including pielonephritis, and (HABP/VABP) caused by carbapenem resistant (CR) Gram-negative (GN) bacteria in Greece.**
- **IMI/REL could help Greece to address the high burden of** carbapenem-resistant bacteria, given that it has the highest incidence in CR-resistant bacteria in the EU and EEA countries [3] .

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