Cost-effectiveness of Sulopenem versus Ciprofloxacin for the Treatment of Uncomplicated Urinary Tract Infections in Women: A Decision Analysis

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INTRODUCTION

- Urinary tract infections (UTIs) are common bacterial infections in the United States (U.S.), accounting for almost 8 million physician visits per year. [1]
- UTIs are often broadly classified into complicated and uncomplicated. [2]
- Uncomplicated UTI can also be termed as acute cystitis or lower urinary tract infections, and affects the urethra and bladder.
- The emergence of antibiotic resistance has complicated treatment strategies for UTIs.
- Sulopenem has demonstrated promise in treating uncomplicated UTIs in women with limited treatment options with comparable efficacy to Ciprofloxacin.

OBJECTIVES

This study aimed to assess the cost-effectiveness of Sulopenem compared to Ciprofloxacin for managing uncomplicated UTIs using a decision tree model from the payer's perspective.

METHODS

- A decision-analytic model was developed using data from the SURE-1 trial (NCT03354598), which compared the efficacy and safety of Sulopenem and Ciprofloxacin for treating uncomplicated UTIs.
- This cost-effectiveness analysis is based on the Payer's perspective.
- The decision tree model also incorporated cure status (complete or incomplete), adverse drug reactions (mild or severe), and 28-day all-cause mortality.
- We used a 28-day time horizon for this study.
- Patients with incomplete clinical cure were assumed to require additional follow-up treatment with second-line antibiotics.
- A one-way sensitivity analysis was conducted, and the cost range used for Sulopenem was $500-$10,000.
- A two-way sensitivity analysis was also conducted by varying both the cost and the utility values associated with Sulopenem. The same cost range was used for the cost of Sulopenem and an exploratory range of QALY used was 0.85-0.96
- All costs were adjusted to 2024 USD using the medical component of the Consumer Price Index (CPI).
- Data analysis for the base case was conducted using Excel and sensitivity analysis was done using R Studio.
- The model input including transitional probabilities, utilities and associated costs, along with their sources are included in Table 1.

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RESULTS

Table 1: Model input and sources

PARAMETER	INPUT	SOURCES
Path probabilities		
Survival with complete cure		
Sulopenem	0.656	SURE 1 Trial [3]
Ciprofloxacin	0.679	
Survival with incomplete cure		
Sulopenem	0.3428	SURE 1 Trial
Ciprofloxacin	0.321	
Probability of mild S/E		
Sulopenem	0.242	SURE 1 Trial
Ciprofloxacin	0.138	
Probability of serious S/E		
Sulopenem	0.008	SURE 1 Trial
Ciprofloxacin	0.002	
Probability of no S/E		
Sulopenem	0.750	SURE 1 Trial
Ciprofloxacin	0.860	
28-day **all-cause mortality**		
Sulopenem	0.0012	SURE 1 Trial
Ciprofloxacin	0	
Health Utilities		
Survival with no S/E	0.90	Yen et al [4]
Survival with mild side effects	0.87	Yen et al
Survival with serious side effects	0.81	Yen et al
Death	0	
Cost in 2024 USD		
Sulopenem	$7865.60**	Adooq Biosciences [5
Ciprofloxacin	$1.35*	Red Book
Urine analysis	$12.53	Yen et al
Urine culture	$64.13	Yen et al
Office visit	$103.80	Yen et al
All-cause total health care		
In-patient	$16,614.90	Carreno et al [6]
Outpatient	$1,952.52	Carreno et al

*Drug costs are Wholesale Acquisition Cost (WAC) and represent total cost for the duration of treatment Ciprofloxacin 250 mg twice daily for 3 days) Ciprofloxacin WAC $22.50/100= $0.225 * 2*3= $1.35 (RED BOOK)

**Recommended dose for Sulopenem etzadroxil 500 mg/probenecid 500 mg bilayer tablet twice daily for 5 days. The price for Sulopenem has not been made publicly available as of March 2025, so we estimated the price based on the procurement price of the drug. This analysis will be updated once the exact WAC is made available.

S/E- Side effect

Table 2: Base Case for Sulopenem compared to Ciprofloxacin

Strategy	Sulopenem	Ciprofloxacin
Drug Cost	$7,865.60	$1.350
Total Expected Costs	$8,650.76	$484.49
Expected QALY	0.89	0.90
UTI cured	0.656	0.679

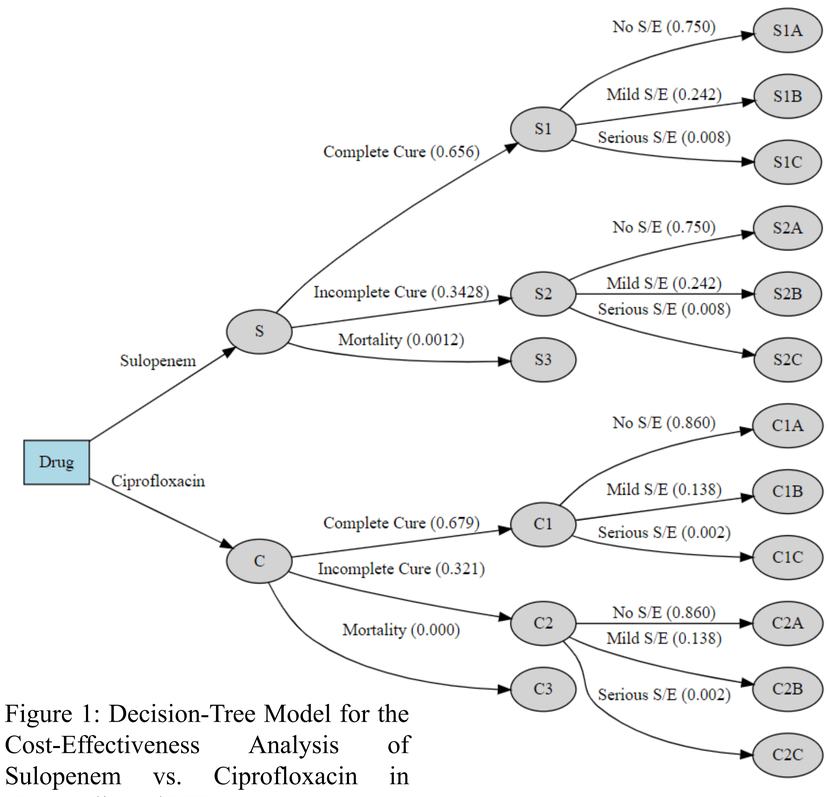
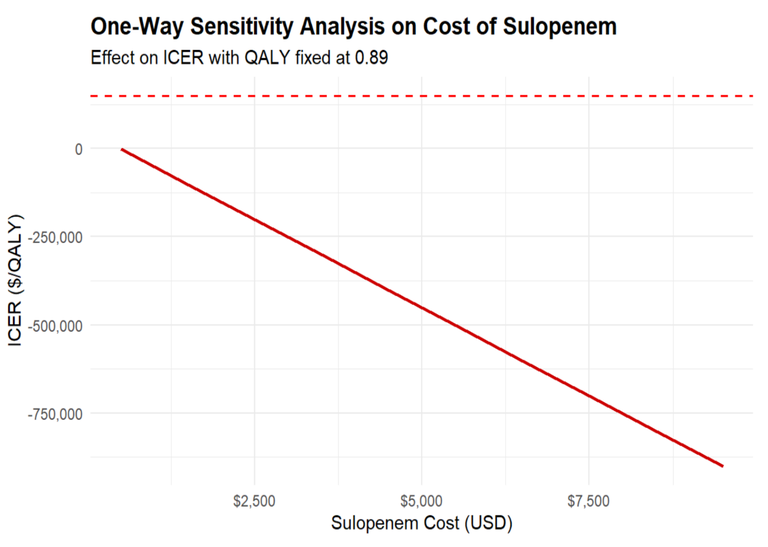
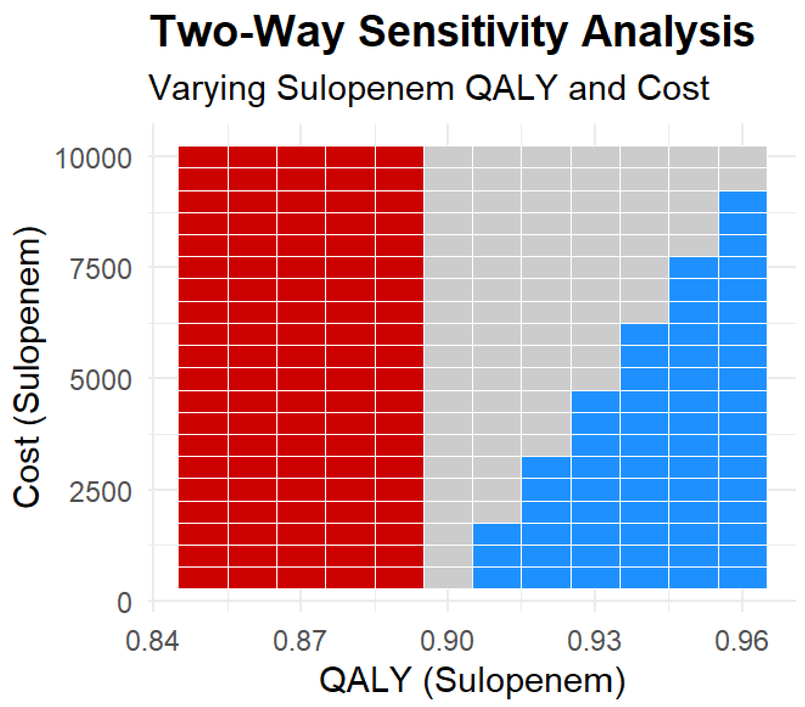


Figure 1: Decision-Tree Model for the Cost-Effectiveness Analysis of Sulopenem vs. Ciprofloxacin in Uncomplicated UTIs





- Table 2 summarizes the results obtained from the cost-effectiveness analysis.
- The total expected cost for treatment was $8,650.76 for Sulopenem and $484.49 for Ciprofloxacin, while the total expected QALY for Sulopenem was 0.89 and for Ciprofloxacin was 0.90.
- Because of its lower price and slightly higher QALY, ciprofloxacin is considered a dominant therapy.
- Results from a two-way sensitivity analysis suggest that Sulopenem would have to result in QALY values higher than 0.90 with a cost less than $2,000 to be considered cost-effective at a willingness to pay of $150,000.

CONCLUSION

- Sulopenem adds value in cases involving resistant infections or severe ADRs to Ciprofloxacin.
- Ciprofloxacin was found to be the cost-effective choice for treating uncomplicated UTIs in women under typical clinical scenarios.
- Future research could explore specific patient populations/ subgroups where Sulopenem might have additional value, such as cases involving multi-drug-resistant infections or severe ADRs to Ciprofloxacin.

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