

# Cost-Effectiveness Analysis of Infliximab, Adalimumab, and Certolizumab for Crohn's Disease: A Markov Model Study

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## Background

Biologic therapies, such as infliximab, adalimumab, and certolizumab, have revolutionized the management of Crohn's disease, offering effective treatment options for patients who do not respond adequately to conventional therapies. However, these biologics come at a substantial cost, prompting the need for rigorous cost-effectiveness analyses to inform healthcare decision-making.

## Purpose

This study focused on identifying the most cost-effective biologic medication for Crohn's disease among infliximab, adalimumab, and certolizumab, emphasizing economic viability in disease management.

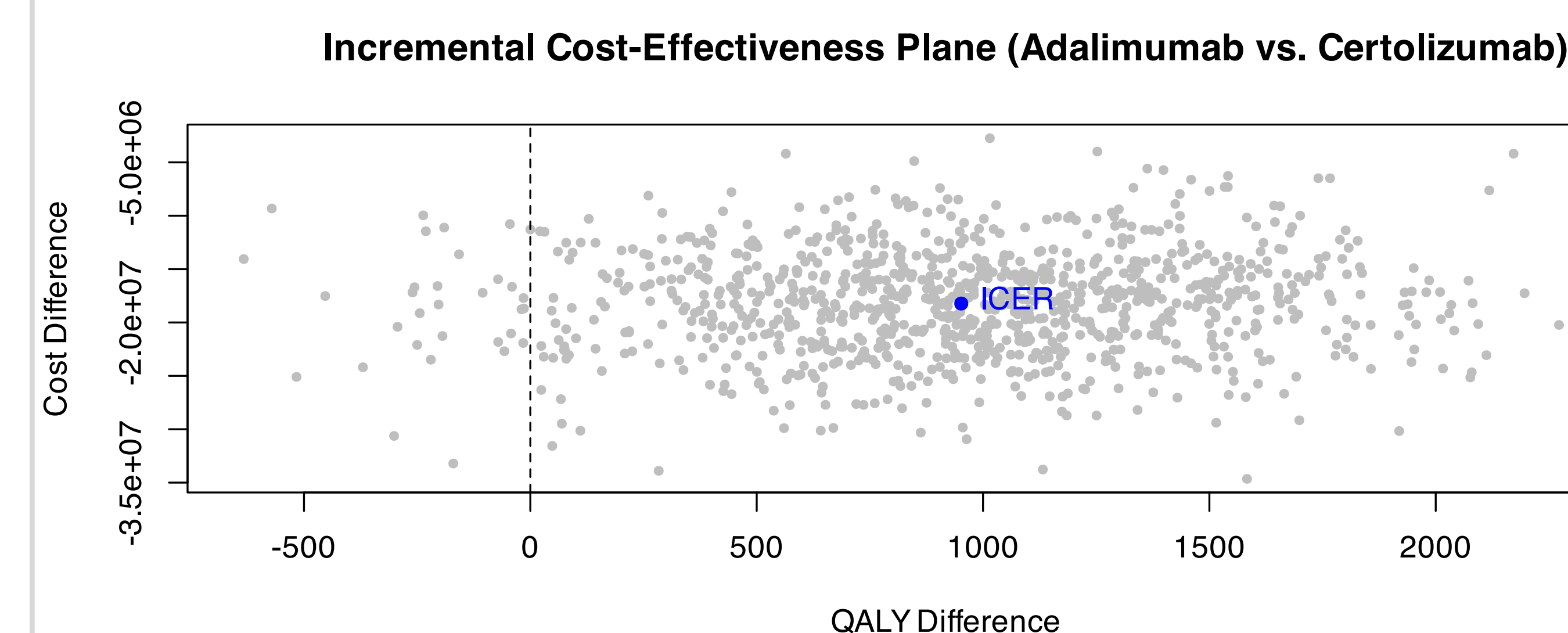
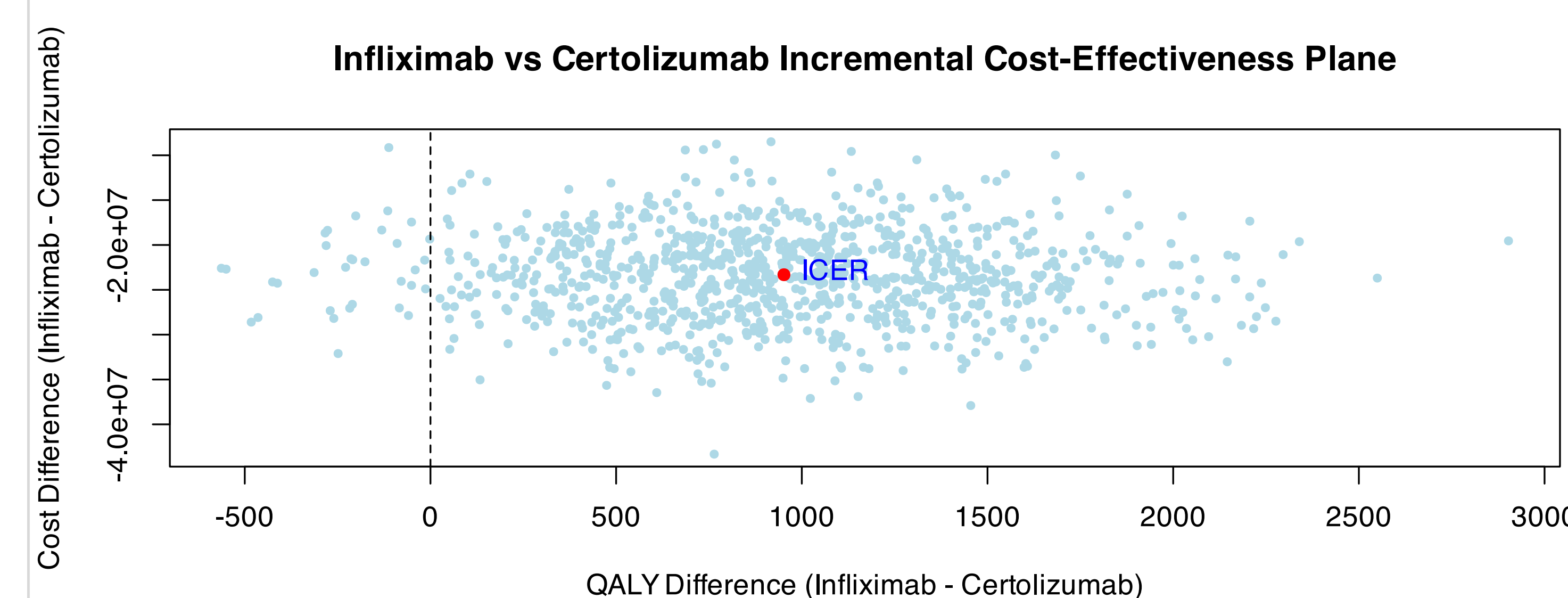
## Methods

- The research utilized a Markov Model, developed in R using 'hesim' and 'heemod' packages, to simulate the health outcomes and costs for a cohort of 1,000 Crohn's disease patients over a five-year period, with monthly cycles.
- The model considers four health states: Complete Remission (CR), Remission (R), Non-remission (NR), and Surgery (S).
- A 3% annual discount rate is applied to both costs and quality-adjusted life years (QALYs), with sensitivity analyses for different discount rates.
- A threshold of \$100,000/QALY is used to evaluate cost-effectiveness.

## Results

Table 1: "Cost and Quality of Life Outcomes of TNF- $\alpha$  Inhibitors in Crohn's Disease Management: A Comparative Analysis".

TNF- $\alpha$ Inhibitors	Total Cost	Total QALYs
Adalimumab	\$ 110,042,863	25,883.29
Certolizumab	\$ 128,268,045	24,931.42
Infliximab	\$ 104,951,911	25,883.29



ICER analysis finds infliximab more cost-effective than both adalimumab (-\$19,304.53 per QALY) and certolizumab (-\$24,495.04 per QALY), with adalimumab also more cost-effective than certolizumab (-\$19,146.68 per QALY).

## Discussion

- Infliximab is more cost-effective suggests that it may offer superior value for money compared to the other two TNF- $\alpha$  inhibitors.
- This observation aligns with previous research indicating the cost-effectiveness of infliximab in Crohn's disease management, potentially attributed to factors such as dosing frequency, administration method, or clinical efficacy.

## Conclusions

- Infliximab emerges as the most cost-effective option for Crohn's disease treatment among the three drugs, staying below the \$100,000/QALY threshold and providing the highest QALYs at the lowest cost.
- The findings are significant for healthcare decision-makers, emphasizing the integration of economic assessments in clinical decisions, particularly in Crohn's disease management.

## References

- Chen, Min, and Bo Shen. "Overview of diagnosis and medical treatment of inflammatory bowel diseases."
- Peng Yu, Andrew, et al. "The costs of crohn's disease in the United States and other Western countries: A systematic review."
- Sandborn, William J., et al. "Certolizumab Pegol for the treatment of crohn's disease."