



## INTRODUCTION & OBJECTIVES

- Excel-based health economic models are widely used in health technology assessment to inform reimbursement and pricing decisions, but require advanced technical expertise, limiting their usability for broader stakeholder engagement and regulatory review<sup>1,2</sup>
- The complexity of these models often makes it challenging to extract insights efficiently. Running analyses and generating results can be time-consuming and resource-intensive, slowing down decision-making<sup>2</sup>
- This study aimed to develop a conversational AI assistant capable of interacting with the economic models, enabling natural language queries, input changes, scenario analysis, and output retrieval



## METHODS

- An AI-based conversational interface was developed to interact with Excel-based health economic models using natural language.
- The system was built using Claude 3.7 Sonnet and a Retrieval-Augmented Generation framework designed to process complex Excel files while preserving formulas, charts, and embedded logic (Figure 2)
- A data processing pipeline was implemented, including model upload, preserving formulas, embedded logic, and converting the content into a format readable by the AI system (Figure 2)
- To evaluate the tool, a five-state cost-effectiveness Markov model was uploaded, and 50 test prompts based on retrieval of parameter values, update of parameter values and interpretation of outcomes were tested by SMEs



- A set of 50 expert-developed prompts was executed to assess the system's ability to retrieve and interpret outputs from the CE model
- Parameter retrieval prompts (e.g., discount rates, transition probabilities, results) were answered with 100% accuracy (Table 1)
- Scenario-based prompts (e.g., modifying utility values, treatment costs) triggered correct recalculations in 92% of all the cases
- Sensitivity analysis prompts (e.g. most influential parameters, Economically Justifiable Price) were answered with 90% accuracy
- The tool also provided interpretable explanations for underlying calculations, supporting transparency
- Users were able to engage in follow-up queries for clarification or additional analysis (Figure 3)
- The average system response time was approximately 10 seconds, compared to 30-60 minutes for equivalent manual execution and validation

Figure 1: Pictorial presentation of process flow

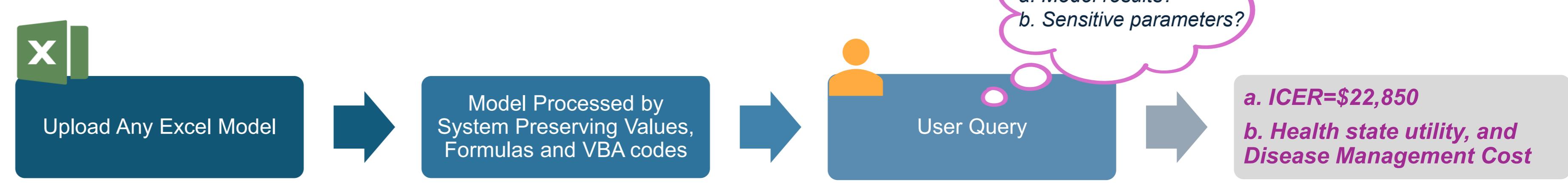


Figure 2: Pictorial presentation of Excel RAG engine

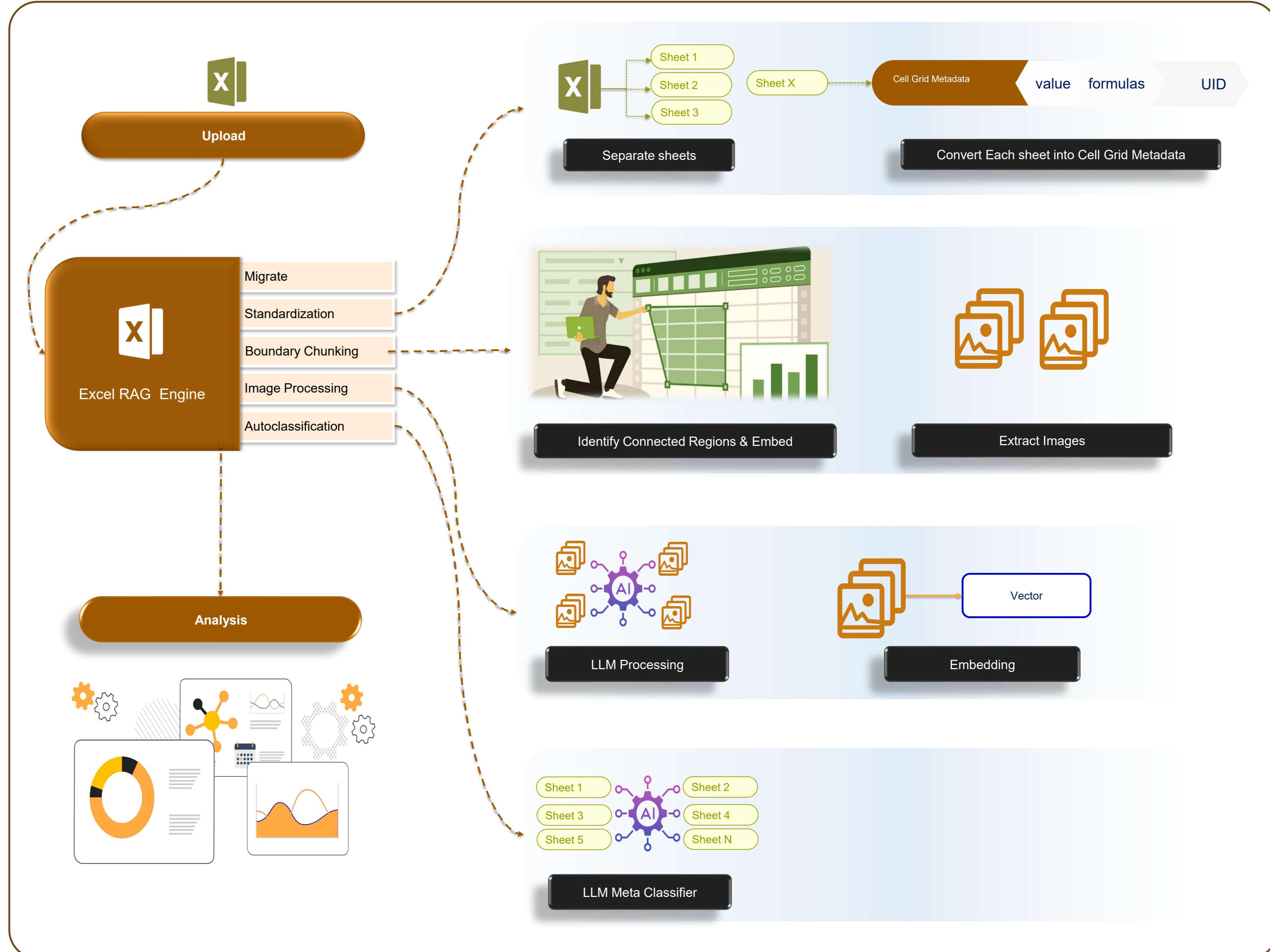


Table 1: Examples of Prompts Validated for Reliability and Accuracy

#	Example prompts
1.	Summarize the high-level results for all the comparators in the model
2.	What is the value that is being used in model for baseline characters and general settings like Time horizon, discounts and willingness to pay in the model
3.	Update time horizon to 20 years and provide the updated results along with proportion change in the updated results
4.	Show the highlight influential parameters in the model in terms of ICER and NMB
5.	Update the PFS fitting distribution to Exponential and then provide the updated numerical results
6.	If I increase the hospitalization cost to 2000 instead of 1100, what would be the impact on overall results, please provide numerical results
7.	Since the ICER is beyond WTP which is 150000, how much price discount do I need to apply to lower down the ICER and make it in range of WTP

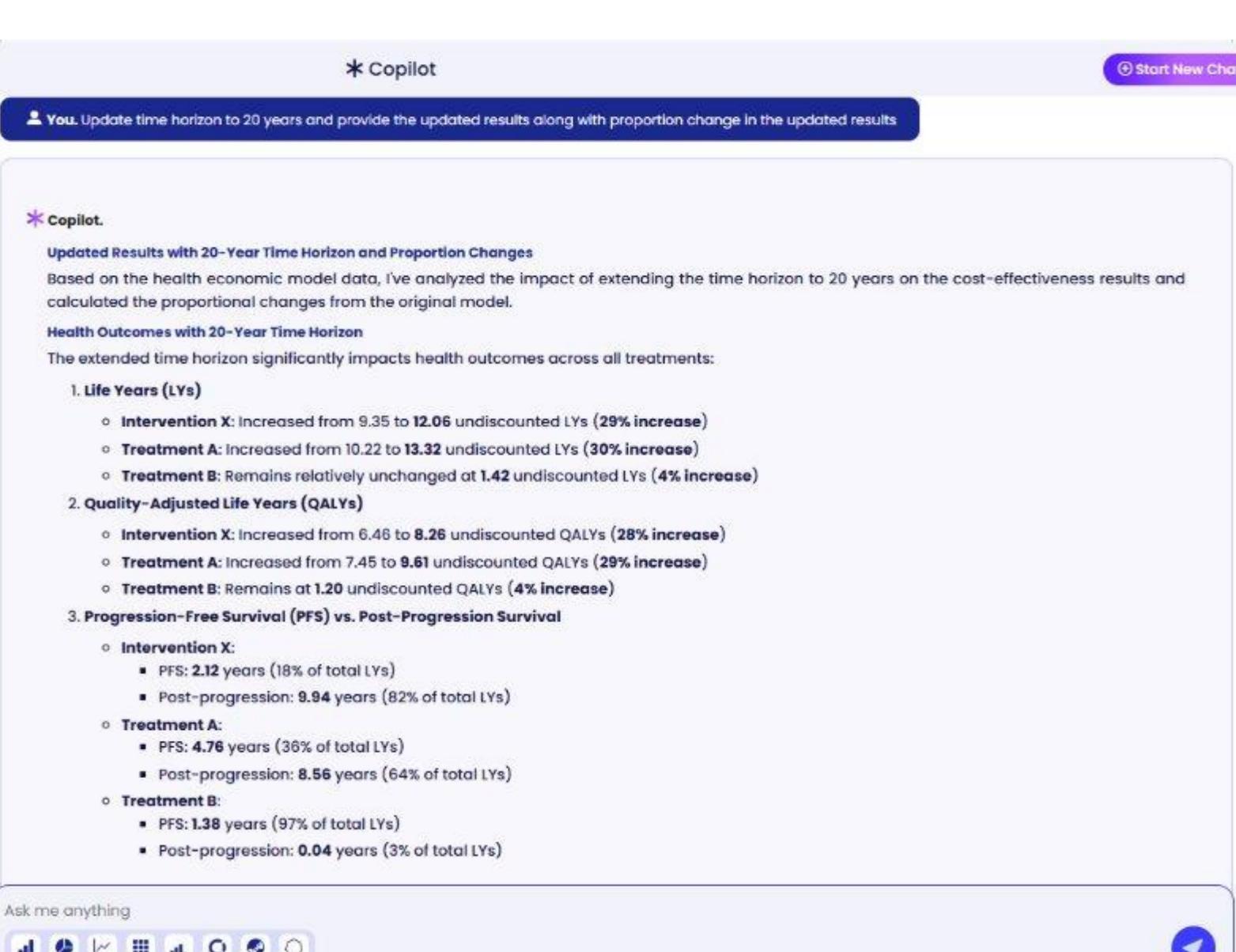
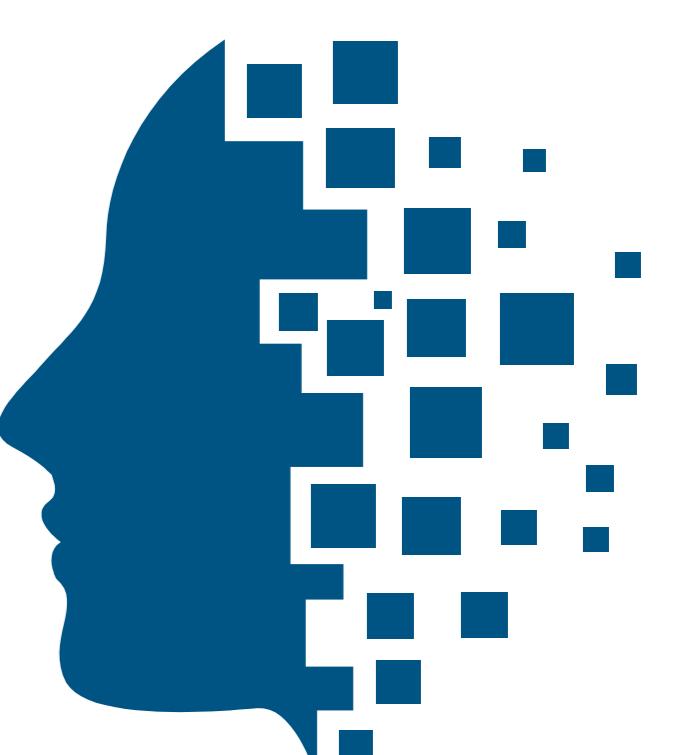


Figure 3: Screenshots of tool's user interface

GenAI has the potential to accelerate HEOR decision-making by handling and adapting complex economic models with speed and clarity while preserving every formula and logic



## CONCLUSIONS

- The conversational AI assistant demonstrated strong potential to enhance efficiency and accessibility in health economics and outcomes research workflows by enabling interaction with Excel-based models
- By facilitating natural language queries and dynamic scenario analysis, the tool reduces reliance on technical expertise while maintaining analytical integrity, supporting broader stakeholder engagement, and promoting transparency in decision making