



## Healthcare Modeling Course Agenda

- Learn how to build Decision Trees and Markov Models to accurately represent disease progression and treatment options.
- Compare strategies with Cost-Effectiveness Analysis.
- Assess the impact of uncertainty with Sensitivity Analysis.
- Build Patient Simulation and Partitioned Survival models.
- Validate your models with patient-level reporting and model calculation tracking.

### Agenda

#### 1. Introduction

- Why do we build models?
- To accurately represent diseases and treatments to make better health decisions.

#### 2. Decision Trees

- Set up your model to identify the most cost-effective option.
- Create treatment strategies and patient pathways.
- Enter and reference model input values.

#### 3. Cost-Effectiveness Analysis (CEA)

- Calculate the average cost and effectiveness per patient.
- Use those average values to determine the most cost-effective strategy (ICER/NMB).

#### 4. Markov Models

- Build Markov models to follow disease progression over time.
- Add key health states and events.
- Review disease progression and cost/utility accumulation over time through Cohort Analysis.
- Add factors that change over time (probabilities, costs, etc.)

#### 5. Sensitivity Analysis

- Study the impact of parameter uncertainty on model results through Sensitivity Analysis.
- See which parameters have the biggest impact on results through Tornado Diagrams.

#### 6. Probabilistic Sensitivity Analysis (PSA)

- Study the impact of combined parameter uncertainty on model results through Probabilistic Sensitivity Analysis.
- Assess confidence in your model conclusions.

#### 7. Model Sensitivity Analysis Exercise

- Run Cost-Effectiveness Analysis/Determine Optimal Strategy
- Run Tornado Diagram/Identify C-E Thresholds
- Run Probabilistic Sensitivity Analysis/Assess Confidence in Conclusions



## **8. Patient Simulation**

- Run simulated patients to model complex disease processes.
- Add patient characteristics and patient history to drive disease progression.
- Incorporate complex probability calculations and hazard ratios.
- Examine patient-level and cohort-level reporting.

## **9. Bootstrapping & Subgroup Analysis**

- Apply real patient characteristics to your simulated patients.
- Examine results isolated by subgroup to see if treatment should vary by patient.

## **10. Model Debugging**

- Debug your models by examining internal calculation details.

## **11. Partitioned Survival Analysis (PartSA)**

- Build a model where disease progression is driven by survival curves for progression-free survival (PFS) and overall survival (OS).

## **12. PartSA & CEA Exercise**

- Create the Second Strategy for a PartSA model.
- Send Distinct Inputs to Each Strategy.
- Perform Cost-Effectiveness Analysis.

## **13. Price Threshold Analysis**

- Add different sets of inputs to your model.
- Determine the maximum price that meets cost-effectiveness thresholds.

## **14. Budget Impact Analysis**

- Expand your patient-level model to a population-level model to assess budget impact.
- Export annual costs by strategy to incorporate population counts in Excel.