Modeling and Cost-Effectiveness: Synthesis

Protecting Health, Saving Lives—*Millions at a Time*

Modeling: Summary Points

- **1. The purpose of modeling is to inform decision-making, not tell the future.**

- Models serve as the link between epi data (usually individual-level) and population-level decision-making.
  - Without a quantitative structure for this, the process is subjective.

- Projections of future impact are the means, not the end.
  - Decision-makers generally can't process model results without projections.
  - But an appropriate decision-making process involves the modelers discussing strengths and weaknesses of the approach.

Modeling: Summary Points

- **2. Modeling of TB is an uncertain business.**

- Much of our data is weak, and can strongly influence results.
  - For example, we estimate natural history from pre-chemotherapy era.

- Model structure introduces as much uncertainty as the parameters.
  - Example of including a "pre-clinical infectious" stage for diagnostics

- Uncertainty is difficult to convey appropriately.
  - Do you want a confidence interval that includes every possibility?
  - Is the goal to provide precise projections in the first place?

Modeling: Summary Points

- **3. Challenges of Modeling TB Diagnostics**

- Diagnostics are part of a larger **health system**.

- Impact of diagnostics depends on **patient behavior**.

- There are many uncertainties in TB **natural history**.

- **Heterogeneities** in TB transmission are important to consider in designing smart diagnostic strategies.

Cost-Effectiveness: Summary Points

- **1. Basic Economic Concepts**

- Opportunity costs, not financial costs

- Unit costs (fixed & variable) – not straightforward

- Discounting, inflation, currency conversion
  - $1 is not always $1

- Perspective of the analysis
  - Costs from one perspective may not be important from another

Cost-Effectiveness: Summary Points

- **2. Challenges of CEA for TB Diagnostics**

- TB treatment is so effective that even bad diagnostics can look very cost-effective.

- Assumptions that more sensitive diagnosis = more people treated and more lives saved may not be accurate.

- Difficult to incorporate transmission effects and impacts on the health system
  - Though we are improving in this regard

Final Summary Point

Integrating Epidemic-Economic Models into Frameworks for Targeted, Data-Driven Decision Making

- Users want to be able to adapt results to their settings but may not have the expertise to use models appropriately.

- Modeling expertise in TB diagnostics is limited (and largely confined to academia) – must be realistic about how best to use that expertise in practice.

- Decision makers must first understand both the power and limitations of models in order to advance this discussion.