



Making Bayesian Analyses Accessible through Visualization

Case Study: Meta-Evaluation of the Health Care Innovation
Awards

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Presentation Roadmap

- Why visualization makes sense for informing policy
- Walk through a case-study: Meta-evaluation of the Health Care Innovation Awards (HCIA)
 - Challenges and Ideas
- HCIA Dashboard demonstration

Why visualize?

- Increase the usefulness of Bayesian analyses for policy-making audiences
- Visualization can help to build intuition for understanding results from a Bayesian analysis
 - What exactly does a posterior density look like?
- Bayesian analyses are rich
 - Can and should go beyond “point estimates”
 - Allow policymakers to “brink their own risk tolerance” to the results
- Non-scientific, non-systematic Google search of “Bayesian data visualization”, “Bayesian analysis graphics”
 - Mostly for statisticians, mostly diagnostic

HCIA Meta-Evaluation Overview

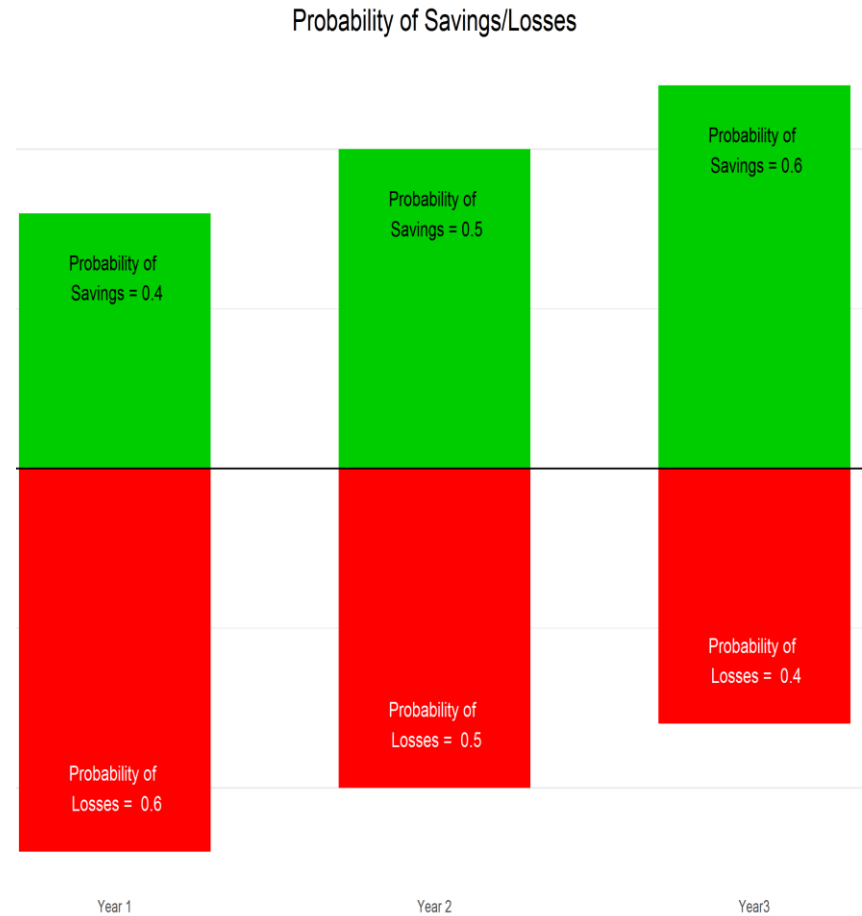
- In 2012, the Centers for Medicare & Medicaid Services (CMS) awarded \$1 billion in cooperative agreements to health care providers, community organizations, local government agencies, and other entities to improve care and lower costs, particularly for those with the highest health care needs.
- The performance of the 108 HCIA awardees was evaluated by seven front-line evaluation contractors (FLEs) with each FLE evaluating between 7 and 24 awardees
- RTI was selected to conduct a “meta-evaluation”

Data and Methods (Bayesian Analysis)

- Data
 - FLE Quarterly and Annual Reports
 - Summative effect estimates for expenditures and utilization
 - Frequentist, point estimates, errors, confidence intervals
- Methods
 - Frequentist random effects meta-analysis
 - Bayesian random effects meta-analysis

Visualization Challenge: What to visualize?

- Remember
 - Posterior = Likelihood * Prior
 - Prior = prior beliefs about parameters
 - Likelihood = how your data enters the model
 - Posterior = Updated prior after “seeing” the data
- Some choices
 - Just show the probabilities of increased or decreased costs/utilization
 - Show the posterior
 - Show the prior and the posterior
 - How much math?
- Dynamic or static?



Visualization Challenge: Helping with Interpretation

- How to be precise without being scary
 - We went for balance between the results and the rigorous math
- Guidance for using results to answer “new” questions
 - What are the questions?
 - E.g. What’s the probability of reducing hospital readmissions by 5 readmissions per 1000 beneficiaries per quarter?
 - What are the answers?

Demonstration of the HCIA Dashboard

More Information

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