EVALUATING PHARMACOECONOMIC ANALYSES

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"Evaluating my first pharmacoeconomic analysis was more challenging than other studies that I presented previously. I realized that being able to analyze pharmacoeconomic analyses is an important skill to help ensure my patients receive optimal drug therapy in relation to the cost that they pay for their medical care."

—PGY1 Pharmacy Resident

LEARNING OBJECTIVES

- Describe types of pharmacoeconomic analyses and their applications.
- Understand data elements and methods that are required for pharmacoeconomic evaluations.
- Present relevant results from an economic evaluation to a clinical audience.
- Critically evaluate pharmacoeconomic evidence.

INTRODUCTION

Pharmacoeconomics is the science of valuing a pharmaceutical by weighing the costs and consequences of a given intervention with its clinical and therapeutic benefits.[1,2] It is a specific application of health economics, which is the broader field of studying the effectiveness, efficiency, value, and costs associated with various healthcare interventions, policies, and programs.

In an ideal world, we would have unlimited resources to provide healthcare services to anyone requesting them and in need of them. Unfortunately, healthcare in the United States is subject to budget and financial constraints within an increasingly complex healthcare system; therefore,

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pharmacoeconomics plays a crucial role in determining which health programs and/or pharmaceuticals provide the most value. A pharmacoeconomic evaluation can be used to estimate the overall financial impact of treating a given disease, adding a new drug to the formulary, or when developing policies and practice guidelines. Pharmacoeconomics also allows us to go beyond drug cost to determine the value of a given intervention by attaching a cost to the health benefits and consequences associated with that intervention. For example, consider two hypothetical drugs for weight loss. Drug A costs $100 and Drug B just $50, but Drug A leads to a weight loss of 20 pounds, while Drug B only yields a weight loss of 5 pounds over the same period. Therefore, the cost per pound of weight lost with Drug A is just $100/20 pounds = $5 per pound versus Drug B at $50/5 pounds = $10 per pound; so, Drug A offers better value at a lower cost per pound lost, even though its upfront cost is double that of Drug B.

Although this is a simple example to illustrate how one might determine the value of a given intervention, true economic evaluations are much more complex. Nonetheless, the results are useful for characterizing the financial and clinical impact of adopting or changing a given treatment, policy, or guideline. Specifically, pharmacoeconomics can be used to inform formulary management in a health-system setting, particularly for costly drugs with marginal clinical benefits. Pharmacoeconomics can also be used to help inform policy, institutional and national treatment guidelines, and treatment algorithms for both payers and providers. As with any discipline, pharmacoeconomics has its own vocabulary (**Table 9-1**).

TABLE 9-1. Commonly Used Terminology in Pharmacoeconomics[1,2]

Term	Definition	Example
Budget impact analysis (BIA)	A model that estimates the financial consequences of adding, removing, or changing a specific drug on formulary without explicitly accounting for clinical outcomes.	A budget impact model of hemophilia bypassing agent prophylaxis relative to recombinant Factor VIIa on-demand.[9]
Cost–benefit analysis (CBA)	A model that converts all outcomes into monetary terms to determine which intervention has the highest monetary benefits.	Cost–benefit analysis of in-hospital influenza vaccination of postpartum women.[10]
Cost-effectiveness analysis (CEA)	A model that accounts for the cost per given effect of a specific intervention.	Cost-effectiveness analysis of abiraterone and sipuleucel-T in asymptomatic metastatic castration-resistant prostate cancer.[11]
Cost-of-illness analysis (COI)	A model that evaluates the direct and indirect costs associated with a particular disease.	The cost of a diabetes diagnosis in the United States is $327 billion.[4]
Cost-minimization analysis (CMA)	A model that identifies the least costly alternative among interventions with equivalent benefits.	Cost-minimization analysis of paliperidone palmitate long-acting treatment versus risperidone long-acting treatment for schizophrenia in Spain.[12]
Decision tree	A framework for representing alternatives for use in an economic model.	Outcomes represented in a linear, branching fashion with terminal nodes and a finite start and endpoint (e.g., acute infectious diseases).
Discounting	The converting of future dollars and future health outcomes to present values.	Typically, an annual rate of 3% is used; for example, $100 today is only worth $97 in 1 year and $94.09 in 2 years.