



Pharmacoeconomics-A Review

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ABSTRACT

Pharmacoeconomics is the branch of economics that applies cost-benefit, cost-effectiveness, cost-minimization, and cost-utility analyses to compare the economics of different pharmaceutical products or drug therapy to non-drug treatments. Pharmacoeconomics is the benchmark for practical authoritative reviews of the application of health economics and pharmacoeconomics to optimum drug therapy in disease management. Pharmacoeconomics has been defined as “the description and analysis of the costs of drug therapy to health care systems and society”. Pharmacoeconomics research identifies, measures, and compares the costs (i.e., resources consumed) and consequences (i.e., clinical, economics, humanistic) of pharmaceutical products and services. Within this framework are included the research methods related to cost – minimization, cost-effectiveness, cost-benefit, cost-of-illness, cost-utility, cost-consequences, and decision analysis, as well as quality –of-life and other humanistic assessments. In essence, Pharmacoeconomics analysis uses tools for examining the impact (desirable, undesirable) of alternative drug therapies and other medical interventions.

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Introduction

Pharmacoeconomics has been defined as the description and analysis of the costs of drug therapy to health care systems and society. Pharmacoeconomic research identifies, measures, and compares the costs (ie, resources consumed) and consequences (ie, clinical, economic, humanistic) of pharmaceutical products and services. Within this framework are included the research meth-ods related to cost-minimization, cost-effectiveness, cost-benefit, cost-of-illness, cost-utility, cost-consequences, and decision analysis, as well as quality-of-life and other humanistic assess-ments. In essence, pharmacoeconomic analysis uses tools for ex-therapies and other medical interventions. Pharmacoeconomics promotes the continuing development and study of health economics, pharmacoeconomics and quality-of-life assessment as applied to optimum drug therapy and health outcomes, providing a practical economic background to informed clinical prescribing decisions and allocation of healthcare resources. The demand for and the cost of health care are increasing in all countries as the improvement in and sophistication of health technologies. Cost of medicines are growing constantly as new medicines are marketed and are under patent law, preference of drug therapy over invasive therapy, discovering various off label uses of existing drugs. The pharmacoeconomic evaluation is essential to find the optimal therapy at the lowest price.

The use of economic evaluations of alternative healthcare outcomes and drug alternatives. Economic evaluation is a tool for assisting decision-making given assumptions about how society wishes to maximize the benefits from limited health care spending. Economic evaluation involves identification of the benefits and costs of such spending, where: the benefits include improvements in the maintenance of, or prevention of deterioration in, health status (including improvements in length of life, reductions in illness and improvements in quality of life);

and the costs are the resources that are used to generate the benefits.

Importance of Pharmacoeconomics

Pharmacoeconomics has become more important over the past 20 years, due to an increased emphasis on efficient drug therapies for disease, which increase health costs, etc.

1. Rising health expenditures have led to the necessity to find the optimal therapy at the lowest price. Pharmacoeconomics is an innovative method that aims to decrease health expenditures, whilst optimising healthcare results
2. Pharmaceutical expenditures, which constitute a large part of healthcare expenditures, have been increasing much faster than total healthcare expenditures.
3. Numerous drug alternatives and empowered consumers also fuel the need for economic evaluations of pharmaceutical products.
4. The increasing cost of healthcare products and services has become a great concern for patients, healthcare professionals, insurers, politicians and the public.
5. This increasing concern has prompted demand for the use of economic evaluations of alternative healthcare outcomes. This escalation in healthcare spending is due to increased lifeexpectancy, increased technology, increased expectations, increased standards of living and an increased demand in healthcare quality and services.
6. Healthcare resources are not easily accessible and affordable to many patients, therefore Pharmacoeconomic evaluations play an important role in the allocation of these resources.
7. Economic Evaluation Methods
8. The basic task of economic evaluation is to identify, measure, value, and compare the costs and consequences of the alternatives being considered. The two distinguishing characteristics of economic evaluation are as follows: A full economic evaluation encompasses both characteristics, whereas

apartial economic evaluation addresses only one. Pharmacoeconomic evaluations conducted in today's healthcare settings can be either partial or full economic evaluations.

9. *Partial economic evaluations* can include simple descriptive tabulations of outcomes or resources consumed and thus require a minimum of time and effort. If only the consequences or only the costs of a program, service, or treatment are described, the evaluation illustrates an outcome or cost description. A cost-outcome or cost-consequence analysis (CCA) describes the costs and consequences of an alternative but does not provide a comparison with other treatment options. Another partial evaluation is a cost analysis that compares the costs of two or more alternatives without regard to outcome.

10. *Full economic evaluations* include cost-minimization, cost-benefit, cost-effectiveness, and cost-utility analyses. Each method is used to compare competing programs or treatment alternatives. The methods are all similar in the way they measure costs (in dollars) and different in their measurement of outcomes. Although a full economic evaluation generally provides higher quality and more useful information, the time, resources, and effort employed are also great. Thus healthcare practitioners and clinicians also find it necessary to employ various partial economic evaluations.

11. Cost-of-Illness Evaluation

12. A cost-of-illness (COI) evaluation identifies and estimates the overall cost of a particular disease for a defined population. This evaluation method is often referred to as *burden of illness* and involves measuring the direct and indirect costs attributable to a specific disease. The costs of various diseases, including diabetes, mental disorders, and cancer, in the United States have been estimated.

13. Cost-Minimization Analysis

14. Cost-minimization analysis (CMA) involves the determination of the least costly alternative when comparing two or more treatment alternatives. With CMA, the alternatives must have an assumed or demonstrated equivalency in safety and efficacy (i.e., the two alternatives must be equivalent therapeutically). Once this equivalency in outcome is confirmed, the costs can be identified, measured, and compared in monetary units

15. Cost-Benefit Analysis

16. Cost-benefit analysis (CBA) is a method that allows for the identification, measurement, and comparison of the benefits and costs of a program or treatment alternative. The benefits realized from a program or treatment alternative are compared with the costs of providing it. Both the costs and the benefits are measured and converted into equivalent dollars in the year in which they will occur. Future costs and benefits are discounted or reduced to their current value.

17. Cost-Effectiveness Analysis

18. Cost-effectiveness analysis (CEA) is a way of summarizing the health benefits and resources used by competing healthcare programs so that policymakers can choose among them. CEA involves comparing programs or treatment alternatives with different safety and efficacy profiles. Cost is measured in dollars, and outcomes are measured in terms of obtaining a specific therapeutic outcome. These outcomes are often expressed in physical units, natural units, or nondollar units (e.g., lives saved, cases cured, life expectancy, or drop in blood pressure

19. Cost-Utility Analysis

20. Pharmacoeconomists sometimes want to include a measure of patient preference or quality of life when comparing

competing treatment alternatives. Cost-utility analysis (CUA) is a method for comparing treatment alternatives that integrates patient preferences. CUA can compare cost, quality, and the quantity of patient-years. Cost is measured in dollars, and therapeutic outcome is measured in patient-weighted utilities rather than in physical units. Often the utility measurement used is a quality-adjusted life year (QALY) gained. QALY is a common measure of health status used in CUA, combining morbidity and mortality data.

Benefits of Pharmacoeconomics

Pharmacoeconomic outcomes may be measured from three perspectives: societal, institutional, or individual. The perspective chosen is often determined by the nature of the query. For example, it may be desirable to determine the cost of a health care intervention to society as a result of an inquiry into a potential reduction in gross national product. Alternatively, managed care institutions need cost evaluations of health care interventions as a method of formulary development. Finally, individuals may want to know the cost of a health care intervention to determine the change in their quality of life; the cost of medications and other health care interventions may mean not having enough left over for other activities. Just as each of these perspectives asks a different question, each answer requires the evaluation of a different set of costs. There is a distinct relationship between pharmacoeconomics, outcomes research, and pharmaceutical care. Pharmacoeconomics is not synonymous with outcomes research. Outcomes research is defined more broadly as studies that attempt to identify, measure, and evaluate the results of healthcare services in general. Pharmacoeconomics is a division of outcomes research that can be used to quantify the value of pharmaceutical care products and services. Pharmaceutical care has been defined as the responsible provision of drug therapy for the purposes of achieving definite outcomes. By accepting this as the paradigm or vision for our profession, pharmacy is accepting responsibility for managing drug therapy so that positive outcomes are produced. Cost is defined as the value of the resources consumed by a program or drug therapy of interest. Consequences is defined as the effects, outputs, or outcomes of the program or drug therapy of interest. Consideration of both costs and consequences differentiates most pharmacoeconomic evaluation methods from traditional cost-containment strategies and drug-use evaluations.

Patient Perspective

Patient perspective is paramount because patients are the ultimate consumers of healthcare services. Costs from the perspective of patients are essentially what patients pay for a product or service—that is, the portion not covered by insurance. Consequences, from a patient's perspective, are the clinical effects, both positive and negative, of a program or treatment alternative. For example, various costs from a patient's perspective might include insurance copayments and out-of-pocket drug costs, as well as indirect costs, such as lost wages. This perspective should be considered when assessing the impact of drug therapy on quality of life or if a patient will pay out-of-pocket expenses for a healthcare service. Healthcare practitioners, regardless of practice setting, can benefit from applying the principles and methods of pharmacoeconomics to their daily practice settings. Applied pharmacoeconomics is defined as putting pharmacoeconomic principles, methods, and theories into practice to quantify the value of pharmacy products and pharmaceutical care services used in real-world environments. Today's practitioners increasingly are required to justify the value of the products and services they provide.

Applied pharmacoeconomics can provide the means or tools for this valuation.

Application In Pharmacy

1. The application of pharmacoeconomics also can be useful for making a decision about an individual patient's therapy.
2. Pharmacoeconomic principles and methods have been applied commonly to assist clinicians and practitioners in making more informed and complete decisions regarding drug therapy.
3. Selecting the most cost-effective drugs for an organizational formulary is important. However, it is equally important to determine the most appropriate way to use and prescribe these agents.
4. The most recent application of pharmacoeconomic principles and methods has been for justifying the value of various healthcare services, particularly pharmacy services.
5. Pharmacoeconomic data can be a powerful tool to support various clinical decisions, ranging from the level of the patient to the level of an entire healthcare system.
6. One of the primary applications of pharmacoeconomics in clinical practice today is to aid clinical and policy decision making. Through the appropriate application of pharmacoeconomics, practitioners and administrators can make better, more informed decisions regarding the products and services they provide.
7. Healthcare practitioners, regardless of practice setting, can benefit from applying the principles and methods of pharmacoeconomics to their daily practice settings. Applied pharmacoeconomics is defined as putting pharmacoeconomic principles, methods, and theories into practice to quantify the value of pharmacy products and pharmaceutical care services used in real-world environments.
8. Cost-benefit analysis is a method that allows for the identification, measurement, and comparison of the benefits and costs of a program or treatment alternative. The benefits realized from a program or treatment alternative are compared with the costs of providing it.
9. Cost-minimization analysis involves the determination of the least costly alternative when comparing two or more treatment alternatives.

Challenges of Pharmacoeconomic Research

In the future, we will be routinely challenged to do pharmacoeconomic research, although merely performing the research will not solve all of the problems all of the time. To be useful, appropriate pharmacoeconomic evaluations must be tailored to the specific problem and decision at hand. Our challenge, therefore, begins with looking beyond the obvious and easy solutions. Cost-minimization analysis is useful when comparing interventions with identical clinical and humanistic outcomes, but this can be the exception rather than the rule for many clinical applications outside of true generic substitution. Cost-benefit analysis would, at first glance, be the answer to more complex problems in that it would allow for evaluation of various interventions with multiple and dissimilar outcomes.

Pharmacoeconomics and Drug Development

The pharmaceutical industry spends billions of dollars annually for development of new drugs. As a percentage of pharmaceuticals, certainly higher than those found in other industries.² The large number of compounds that must be evaluated to bring one drug to market contributes to the high R & D costs of drug development. This percentage is also higher than that found in other industries. It has been estimated that it takes \$802 million and 14 years to bring a new drug to the market. Because pharmacoeconomic data are becoming increasingly important to practitioners making drug formulary

decisions, it is important to have these data as soon as possible after Food and Drug Administration approval. To do this, discussion and planning for pharmacoeconomic evaluation should begin during the early stages of drug development. A major question arises as to the ideal time to conduct pharmacoeconomic studies and the best process by which to do so. Pharmacoeconomic studies may be planned and conducted at the clinical development and Phase IV stages of postmarketing research. Basic research and development activities may be partially guided by preliminary pharmacoeconomic analyses. Therefore, studies may need to be conducted at several stages of pharmaceutical research. The following is a summary of the research activity for each phase.

Conclusion

A pharmacoeconomic study evaluates the cost and effects of a pharmaceutical product. There are several types of pharmacoeconomic evaluation: cost-minimization analysis, cost-benefit analysis, cost-effectiveness analysis and cost-utility analysis. Pharmacoeconomic studies serve to guide optimal healthcare resource allocation, in a standardized and scientifically grounded manner.

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