

PHARMACOECONOMICS: THE MISSING LINK IN HEALTH CARE SYSTEM

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ABSTRACT

Pharmacoeconomics can be defined as the branch of economics that uses cost-benefit, cost-effectiveness, cost-minimization, cost-of-illness and cost-utility analyses to compare pharmaceutical products and treatment strategies. By understanding the principles, methods, and application of Pharmacoeconomics, health care practitioners including doctors, nurses and pharmacists will be prepared to make better, more-informed decisions regarding the use of pharmaceutical products and services, that is, decisions that ultimately represent the best interests of the patient, the health care system, and society.

Keywords: Health Care; Pharmacoeconomics; Cost and Consequences.

INTRODUCTION

Pharmacoeconomics research is an a process of identifying, measuring, and comparing the cost, risks, and benefit of programs, services or therapies and determining which alternative produces the best health outcomes for resource invested.^{1,2} Pharmacoeconomics has been the “missing link” in pharmacy, so the principles and methods can be successfully applied in the “real world” to be applied to any therapeutic area, using a variety of application strategies, enhances decision-making, a new dimension, challenge and opportunity for health care practitioners including doctors, nurses and pharmacists. The scientists, clinicians, pharmaceutical manufactures, drug developers, regulators, public policy makers, patients and general public all have their own complimentary roles in achieving “Good Pharmacoeconomics Practice by 2020”.^{3,4} By understanding the principles, methods, and application of Pharmacoeconomics, health care professionals will be prepared to make better, more-informed decisions regarding the use of pharmaceutical products and services, that is, decisions that ultimately represent the best interests of the patient, the health care system, and society. The Fig.1 depicts the various components of costs of health care and their interrelationships.

Global Historical Perspectives of Pharmacoeconomics

Economic evaluations started about 35 years ago as rather crude analysis, in which the value of improved health was measured in terms of increased labour production. Global Historical Perspectives of Pharmacoeconomics were described in the Table 1.⁵⁻⁷

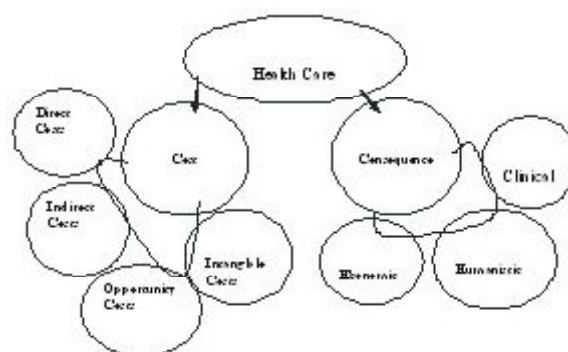


Fig. 1: Frame work of cost and consequences

Table 1: Global Historical Perspectives of Pharmacoeconomics

Years	Description
1960's	PE helps pharmacy evolve from distributive to clinical discipline Drug decisions based on safety, efficacy
1970's	CBA and CEA introduced into pharmacy literature 1979 first PE research article published
1980's	Cost containment strategies emerge Inclusion of economic outcomes in drug decisions Misuse of PE in biology AHCPR created in 1989 to conduct outcomes research (PORTS)
1990's	EC HO model PE components commonly included in Phase III RCTs Guidelines for conduct and reporting of PE studies widespread Improved quality/rigor of published PE studies "Applied Pharmacoeconomics" emerges
2000's	PE has wide spread application by clinicians and administrators Pharmaceutical manufacturers collaborate with MCO's to provide specific outcomes data

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Need of Pharmacoeconomics

The scope for this tool is very much appropriate under resource constraints, tight budgets and competing programs. However, some of the applications may be specific to the World environment for various reasons such as priorities of the populace, drug price controls, lack of specific product patents and the relatively limited spread of the concept of health insurance. Rational use of medicines requires that patients receive medications appropriate to their clinical needs in doses that meet their requirements for an adequate period of time and at the lowest cost to them and their community.⁸

Broadly the Pharmacoeconomics is applicable in following situations like,

- In Industry- Deciding among specific research and development alternatives.
- In Government- Determining program benefits and prices paid.
- In Private Sector- Designing insurance benefit coverage.⁹

Methods of Pharmacoeconomics

The various methods commonly used in variety of fields are summarized in Table 2.^{2,3}

Table 2: Pharmacoeconomics Methodologies

Method	Description	Basic formula	Cost Unit	Outcome Unit
COI	Estimates the cost of a disease on a defined population	$DC + IC$	\$	NA
CMA	Find the least expensive cost alternative	$\frac{[(DC + IC) - (DC + IC)]}{(DC + IC)}$	\$	Assume to be equivalent
CBA	Measures benefit in monetary units and computes a gain	$\frac{(B - E)(DC + IC) - (DC + IC)}{(DC + IC)}$	\$	\$
CEA	Compares alternatives with therapeutic effects measured in physical units; computes a C/E ratio	$\frac{[(DC + IC) - (DC + IC)](E - E)}{(DC + IC)}$	\$	Natural units
CUA	Measure therapeutic consequences in utility units rather than physical units; computes a C/U ratio	$\frac{[(DC + IC) - (DC + IC)](U - U)}{(DC + IC)}$	\$	QALYs

CBA = cost benefit analysis; CEA = cost effectiveness analysis; CMA = cost minimization analysis; COI = cost of illness evaluation; CUA = cost utility analysis; QALY = quality adjusted life year gained; DC = direct cost; IC = indirect cost.

Different perceptions of Pharmacoeconomics

The application of pharmacoeconomics depends on for whom the analysis is performed. For example it may be for an individual patient, or may be for a hospital or for a country. A complex and vital relationship exists between wide ranges of partners in the practice of economic evaluation. These partners must jointly anticipate, understand and respond to the continually increasing demands and expectations of the public, health administrators, policy officials, politicians and health professionals (Fig.2) .



Fig. 2: Different perceptions of Pharmacoeconomics

Government

Governments globally are concerned with cost containment in the context of health care. This task is made difficult by process of globalization which is reducing the powers of the nation state and they need to meet the rising expectations of an enfranchised and educated work.^{10,11}

Hospitals and Academia

A number of medical institutions have developed economics watch systems in their clinics, wards and emergency rooms. Cost benefit analysis, cost effectiveness analysis, cost minimization analysis, cost of illness evaluation, cost utility analysis, quality of life assessment and quality adjusted life year gained. Methods have increasingly been used to estimate and compare drugs programs that differ in clinical outcomes and use same unit of benefit. Most application of Pharmacoeconomics with common uses such as formulary and disease management, funding, comparison studies to rationalize price in the hospitals.¹² Academic centers of pharmacology and pharmacy have played an important role through teaching, training, research, policy development, clinical research, ethics committees (institutional review boards) and the clinical services they provide.¹³

Health Professionals

Health Professionals aim to deliver health actions by using resources efficiently and in a manner that promotes equity in health care. A counter argument to this position, however, is that physicians' decisions have consequences for the use of limited resources affecting other patients suffering from common diseases subsidized from the drug quota in public sector hospitals. Hence, the role of economic evaluation in clinical medicine may be justified on the grounds that medical decisions on health care professionals have opportunity costs that fall upon all patients as a whole.¹⁴

Patients

Only a patient knows the actual benefit and harm of a medicine taken. Direct patient participation in the reporting of drug related problems will increase the

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efficiency of the Pharmacoeconomics system and compensate for some of the shortcomings of systems based on reports from health professionals only.

Quality Assurance

The team is a part of the Department of Essential Drugs and Medicines Policy, within the WHO Health Technology and Pharmaceuticals cluster. The purpose of the department is more high-quality economic analyses will be carried out by commercially motivated suppliers of such data (i.e. *pharmaceutical industry*) when customers (i.e. *Health care Professionals*) are confident in their ability to evaluate the quality of the underlying economic analysis. poor quality biased analysis will be of little value once health care professionals become more aware of the distinguishing characteristics of high quality studies. Once this occurs prescribers will come to demand higher quality analysis to help inform (rather than distort) their decision making.^{15,16}

International Society for Pharmacoeconomics and Outcomes Research (ISPOR)

The mission of the International Society for Pharmacoeconomics and Outcomes Research is to translate Pharmacoeconomics and outcomes research into practice to ensure that society allocates scarce health care resources wisely, fairly, and efficiently. Toward this mission, ISPOR, supported by grants from the U.S. Department of Health and Human Services, Agency for Health Care Policy and Research, and the Health Outcomes Work Group of the Pharmaceutical Research Manufacturer's Association.¹⁷

National institute for clinical excellence (NICE)

It is a special UK NHS health authority charged with among other activities, evaluating new and existing health technologies including medicines and making recommendations. NICE requests that economic evaluations should take the form of cost-utility analysis although other methods of analysis are acceptable if appropriate.¹⁸

News Broadcast Related to Pandemic Pharmacoeconomics Update

The benefit and risk balance of the pandemic vaccines and antiviral used for the current H1N1 influenza pandemic continues to be positive. Population pre-pandemic vaccination strategies were effective at containing an outbreak of pandemic influenza until the arrival of a matched vaccine. Because of the uncertain nature of many parameters, were used a probabilistic approach to determine the most cost-effective strategies.¹⁹

Another pandemic update about, HIV infection, particularly multidrug-resistant HIV, continues to be a

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major societal and economic challenge worldwide. Economic evaluations showed that the addition of efavirine to other antiretrovirals was associated with lower costs per person with an undetectable viral load and lower hospital-related costs compared with placebo.²⁰

Applications of Pharmacoeconomics^{21, 22}

1. Clinical Decision Making: Making cost-effective choices when resources are limited for provider, third party payer, or patient.	2. Program Justification: To justify investment in a clinical service or program and reimbursement of a clinical service or program.
3. Formulary Management and inclusion or exclusion of new drugs.	4. Pharmacoeconomics in disease management.
5. Use of Pharmacoeconomics in drug reimbursement.	6. Drug Policy decisions, treatment guidelines.
7. Packaging negotiation.	8. Pricing in the Pharmaceutical Industry.
9. Clinical trials and economic modeling.	10. Computerized decision making from drug discovery to Pharmacoeconomics.

Limitations²³

- ♦ Many problems limit our use of health economics in practice. The whole process may be open to bias, in the choice of comparator drug, the assumptions made, or in the selective reporting of results. This suspicion arises because most studies are conducted or funded by pharmaceutical companies.
- ♦ Drugs are prescribed under promotional pressurizing activities of marketing executives of pharmaceutical firms. Incentives and gifts offered by these firms to doctors have a major impact on prescribing brands. For chronic diseases, bio-availability consideration can have an upper-hand over Pharmacoeconomics.
- ♦ Pharmacoeconomics, a branch of health care economics offers important guidance for the management of limited health care resources and medical practice.
- ♦ A limitation of decision tree models is that they are not well suited to represent recurrent events over time.
- ♦ Finally, health economics and Pharmacoeconomics is a young science and is slowly developing and testing its methodologies. We do not have space to address all of these concerns here but many of the details of the methods described above are academically and practically controversial.

Considerations for the Future and its Challenges²⁴

The main challenges for Pharmacoeconomics continue to be:

- ♦ Establishing guidelines or standards of practice.
- ♦ Creating a cadre of trained producers and consumers of pharmacoeconomic work.

- ♦ Continuing education on the relevant features of this discipline for practitioners, government officials, private sector executives.
- ♦ Stable funding to support applied Pharmacoeconomic research.
- ♦ Developments in economic modeling
- ♦ Systematic audit of Pharmacoeconomics processes and outcomes should be developed and implemented based on agreed standards ('Good Pharmacoeconomics Practice').

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