

Contributions of economic evaluation to early phases of product development: A methodological and empirical review

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Background

Innovation is vibrant in health care development and has a major economic impact on the health care system. In the health related industry, innovations generate revenues that are part of the companies' profits and thus have a direct impact on further investments in research and development (R&D), giving way to new innovative products. The public health perspective rather focuses on the best use of scarce resources and the diffusion and availability of innovations.

Faced with increasing health care expenditures, numerous countries install fourth hurdle institutions that require new technologies to show evidence of cost-effectiveness before national health services or insurance systems provide coverage.

Applied timely in the product development process, economic evaluation provides the manufacturer as well as the health care system with useful information on the future economic viability of a new product.

Objectives and Methodology

Objectives

The first part of this review sets out to explore the potential uses of economic evaluation in early phases of product development. The perspectives of both the healthcare industry and the public health policy are adopted.

In a second step, the findings are confronted with an explorative review of economic evaluations carried out with early data or for emerging technologies.

Methodology

An exploratory literature research was conducted to search for the use of early (phase I/II) data in economic evaluations by key words and MeSH terms in a variety of databases. In addition, relevant journals were hand-searched, references of relevant publications were tracked, websites of institutions related to innovation and healthcare were investigated and an additional internet research was conducted via Google Scholar.

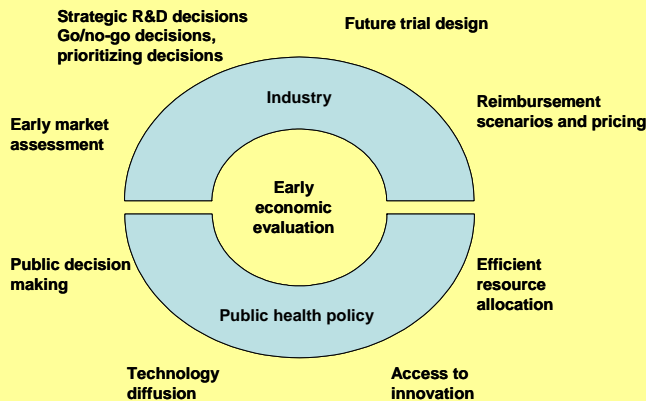
To account for technologies that might have escaped this search strategy, reports of international horizon scanning agencies were reviewed for emerging technologies which were then researched for economically relevant publications.

In total, more than 1000 titles and abstracts were reviewed. Publications in English, French, German and Spanish that covered an health care delivery context were included.

Over 70 methodological contributions on the potential uses of early economic evaluation were identified and entered the first part of our review.

For the empirical review, 109 potentially relevant papers were examined, 82 out of which fulfilled the inclusion criteria. Studies were classified as trial-based (44), model-based (28) or more comprehensive HTA reports (10).

Results



Economic evaluation conducted in early phases of product development offers valuable information both for manufacturers as for the public health care policy. For the company, early economic estimates support R&D resource allocation and prioritizing, thus improving productivity and return on investment. It also informs shareholders and analysts about the product pipeline potential. For health policy making, early economic evaluations can support maximisation of health benefits for a given budget as it provides early information on the economic impact of a new technology.

Characteristics of the included studies

Study characteristics		total	%
Study type	Trial-based	44	54
	Model-based	28	34
	HTA	10	12
Intervention	Medication	54	65,85
	Surgical procedure / combination	14	17,07
	Novel products or systems	6	7,32
	Others	8	9,76
Intention	Curative	76	93
	Diagnostic	6	7
Fields of indication	Cancer	47	57
	Diseases of the circulatory system	7	9
	Diseases of the digestive system	6	7
	Infectious diseases	5	6
	Diseases of the musculoskeletal system	5	6
	Others	12	15

Discussion

The results of our review show that the idea of starting economic evaluations early in the product life cycle has gained considerable momentum in the past few years. Beneficial uses of early economic analysis have been identified and discussed, together with numerous methodological contributions adapting existing analytical concepts to this particular use, e.g. clinical trial simulation or value of information analysis.

However, the economic evaluations found in practice can mostly be characterized as studying a new technology without disclosing a concrete decision context. Most studies are based on data from early phase clinical trials, supplemented by literature reviews. The majority of studies has been found in the field of cancer therapeutics. Due to the explorative nature of the research, our review cannot claim to be comprehensive and can only spotlight the current use of early economic evaluation.

Conclusion

Our review summarizes the uses and benefits of early economic evaluation. Confronted with the current use in practice, there still seems to be considerable potential that decision-makers are invited to exploit. The way is paved as today techniques are available to mostly overcome the inherent difficulties of conducting economic analyses with early data.

Selected literature

Miller, P. Role of Pharmacoeconomic Analysis in R&D Decision Making. *Pharmacoeconomics* 2005, 23(1):1-12
 Avorn, J. The Role of Pharmacoepidemiology and Pharmacoeconomics in Promoting Access and Stimulating Innovation. *Pharmacoeconomics* 2004, 22 (Suppl2):81-86
 Biondi G. Too early or too late: a never-ending dilemma with new technologies. *Scand J Infect Dis.* 2003, 35 (Suppl106):99-104
 Acknowledgement: This research is part of the Inno-HTA (HTA methodology for innovative healthcare technologies) project which is funded by the European Union within the 6th Framework Programme under contract no. SP5A-CT-2007-044390. Inno-HTA aims at helping close the gap between the development of new technologies and their application by developing a generic methodology for the evaluation of healthcare innovations. For further information on Inno-HTA see <http://www.inno-hta.eu>.