

Health Economics: the Cost of Illness and Economic Evaluation in Respiratory Diseases

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Introduction

Continuously rising health care costs have caused growing concern among governments since the 1970s. The reasons for this increase are the aging population, the care given to terminally ill patients, and an increase in chronic diseases and the continuous care they require. Pressure from demands for more services made by society and health care workers also plays a part, as does variability in clinical practice, which leads to inappropriate use of health resources.

A major part of health care costs is caused by the proliferation of new technologies, the use of which does not necessarily result in better health outcomes. Consequently, it is not enough for these technologies to be safe and highly specific. The main questions to be addressed are whether they result in better health outcomes and which patients they are useful for.

Implementation of new technologies is considered to be the main cause of the rising cost of health care.^{1,2} Clinical efficacy and cost-effectiveness must be the factors that determine their use, never routine.³

Respiratory illness is one of the major causes of morbidity in western countries and the source of a rise in socioeconomic costs which have major repercussions on individuals and health care systems.⁴⁻⁶ These costs must be calculated in order to appraise the problems of health care and to indicate how to distribute human, health, and material resources and thus reduce the undesirable effects these chronic diseases have on patients, health care systems, and society.

Health resource allocation, from the point of view of economics, is based on the principle of scarcity as sufficient resources do not exist, and never will, for all

worthy objectives. Therefore choices must be continuously made over where to increase spending. To this end, and to be able to judge what health benefits this additional spending provides, economic analysts use the concept of opportunity cost, which is the value of resources in terms of their most favorable alternative use. In the context of health technology, the opportunity cost would be applied by evaluating the benefits generated by financing one type of intervention instead of another intervention, and the repercussions this has in terms of health. Given the demands on health resources, the only principle to follow is to compare costs and choose what will provide the maximum benefit to the health of the population.

Methods of economic evaluation of health technology have been developed and improved over the last 10 years.^{7,8} While it is true that this evaluation is not perfectly adjusted to the needs required to make clinical or management decisions, it does provide valuable information towards deciding which technology should be financed or which one affords better patient care. Choosing involves confronting and comparing the alternatives and economic evaluation rationalizes this choice, making resource allocation more efficient.⁹

The health economy of respiratory diseases is examined from 2 different angles. The first is cost of illness, which does not examine results. The second is cost-effectiveness, which evaluates both the costs and results of the various technologies applied in respiratory diseases. In many cases the term pharmacoeconomics is used as a synonym when the economic evaluation of medication is involved.

Cost of Illness

Respiratory diseases have a series of effects on the well-being of the people who suffer them and on society, including effects on the use of health care and other resources, indirect effects on productivity through changes in health status, and, finally, effects on health

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such as reduction in quality of living (anxiety, incapacity, pain, etc) and also premature death (years of life lost).

Calculating the cost of illness, then, is essential for appraising the magnitude of a particular health problem as well as for allocating health care, human, and material resources directed at reducing the undesirable effects that chronic illnesses have on patients, the health care system, and the society that maintains it.¹⁰

Studies carried out to estimate the cost of illness are important because they help *a*) define the dimensions of the disease in monetary terms, *b*) justify and assess intervention programs, *c*) allocate research resources, *d*) provide a baseline for planning policy in relation to prevention and new initiatives, and *e*) provide an economic framework for evaluation programs. The cost of illness is the result of the addition of 3 factors: the direct costs that derive from the use of resources in the prevention, detection, and treatment of illnesses; the indirect costs related to the loss of productivity caused by disability (permanent or temporary) and premature mortality; and the effects on well-being (intangible, psychological costs) such as incapacity, anguish, and anxiety which are necessarily attributable to the quality of life produced by the illness.

In theory, direct and indirect factors in the cost of illness should be quantifiable. Direct costs can be calculated from the costs incurred, if the retrospective information is exact and precise, including data collected prospectively. Indirect costs are calculated as the equivalent of lost future earnings. Their calculation requires exact and precise information on incapacity (permanent and temporary) and rates of premature deaths. Effects on health status require a monetary evaluation in order to be included in costs of illness. Quality-of-life questionnaires, such as the EQ-5D, evaluate health status which can then be quantified economically, which is to say, given a monetary value.¹¹ In this way, estimates of the costs of an illness tend to be more reliable. Moreover, direct costs incurred by the patients and their families (caregivers) and which are not health related should be included; examples are extra costs and time involved in the care, for example, of child asthma patients.

It is true that resources should not be allocated according to the impact of a certain disease but rather where intervention produces greater health benefit. Cost-of-illness studies frequently allow the real dimension of a health problem to be seen, providing valuable information concerning it for society and society's policy makers.

Economic Evaluation

Economic evaluation aims at determining which technology is the most efficient, which is to say produces better health outcomes according to the

resources invested once the costs, risks, and benefits of the programs, services, or treatments have been identified, measured, and compared. According to this definition, and in contrast to what might be supposed, economic evaluation not only considers the cost of comparative technologies but tries to relate those costs to their effects (benefits); in other words their efficiency is compared. Thus, within an overall appraisal of technology, clinical evaluation based on efficacy/effectiveness and safety can be distinguished from economic evaluation based on efficiency in which the costs are calculated as well as the effectiveness.

The recent growing interest in economic evaluation of health technology is reflected by its increasing appearance in medical journal articles. The increase in quantity, however, has not been accompanied by a corresponding increase in quality, and a lack of methodological rigor has been the norm. This is because it is a relatively new field which uses methods and concepts outside medical knowledge, leading to confusion in the use of terminology and in the objectives stated.

For these reasons, we must become familiar with the methodology, apply it appropriately, and use and interpret terminology correctly. Some authors have proposed guidelines for carrying out economic evaluation studies, insisting on the need for readers, researchers, and journal editors to systematically apply the principles.¹² There are several types of economic evaluation techniques^{7,8}:

1. Minimization of costs. This kind of analysis is used to compare interventions of identical clinical effectiveness. The cost alone of each option is compared and the cheapest one is chosen. Evidence of the equivalence in benefits of the options compared must be shown. This type of analysis is the simplest to apply but also the one with which the most precautions must be taken.

2. Cost-effectiveness analysis. In this analysis the benefits of the treatment options compared are measured in the same units. The results of these analyses are expressed in terms of costs, measured in certain units, and effects, measured in physical or natural units (for example, lives saved, life years gained, days of pain prevented, etc). This is undoubtedly the most common type of analysis in the current literature. The main drawback is that its use is limited to the comparison of similar interventions (or technologies), the benefits of which are measured in the same units. The analysis involves calculating the increases in costs and effectiveness and evaluating whether the extra benefit compensates the additional cost.

3. Cost-benefit analysis. In this kind of analysis, the costs of both the treatment options and the effects of those options are measured in monetary units. As with

costs, benefits are of 3 types: direct (resource saving), indirect (gains in productivity through early return to work), and intangible (how the patient values his health) depending on their relevance. Results are expressed as cost-benefit coefficients or the net difference between costs and benefits. This type of analysis is the most orthodox from an economic point of view. The main advantage is being able to compare several options, whose results in another type of analysis would be expressed in different terms. The main drawback, however, lies in the difficulty of measuring health in monetary terms and the ethical problems that arise.

4. *Cost-utility analysis.* This analysis is used to measure the effects of an intervention using units which combine quantity and quality of life by calculating the life years gained through an intervention and weighing up the quality of life achieved. The units obtained are quality-adjusted life years. This allows a much more advanced analysis of effects than the cost-effectiveness studies as indexes which take into account subjective aspects such as the quality of life of the patients studied are included.¹³ The main advantage is being able to compare different types of interventions or health care programs and to integrate the quantity and quality of life of the patients. The main drawback is the lack of well-defined methodology, which leads to results varying according to the method used.

Establishing Priorities

Cost-of-illness assessment can not be used to establish priorities, as these can only be set after a careful evaluation of the costs, benefits, and all the technological options to be compared. Given that the budget of the Spanish public health service is limited, not all technologies can be financed. Priority must thus be given to those which produce the greatest improvement in health per unit of cost incurred and in comparison to other options for care of respiratory illnesses and to other technologies in all health care fields. This exercise requires information on costs and effectiveness, not only costs. To establish priorities in this way, economic evaluation techniques such as cost-effectiveness, cost-benefit, and cost-utility are needed rather than cost of illness alone.

Economic analysis is most used in health service decision making. Politicians, managers, clinics, drug companies, nursing staff, and others are increasingly obliged to examine the evidence concerning the costs and effectiveness of technologies in order to decide which ones should be financed and to include this information in clinical practice guidelines and therapeutic protocols. With these possibilities in mind, rapid advances are needed in the validation of economic evaluation methods. Those who remain

aloof from the kind of economic analysis that has been developing over the last few years will find themselves at a considerable disadvantage in the near future.

Conclusions

The resources available to satisfy the demands of society are always limited, obliging us to decide the best way of allocating them. Although cost-of-illness studies have a more limited role in decision making than economic evaluation studies, they provide information for mathematical models on the relative consequences of different illnesses. This information can be very useful when managers have to make decisions and do not have information on the potential treatments and their cost.

Guidelines for economic evaluation are controversial and many such studies do not follow the rules that have been established to assure their quality. Nonetheless, the inflation generated by the introduction of new technologies and the substitution of new ones for old ones have made economic evaluation essential for making decisions when the most modern tools must be paid for. Moreover, the use of economic evaluation greatly increases the degree of transparency in the decision-making process.¹⁴

Economic evaluation of respiratory diseases is essential in order to provide a baseline that ensures that our patients are treated with efficiency and equity.

The greater presence of economic studies in health care should be aimed at encouraging the adoption of decisions and actions based on cost and effectiveness, thus reducing the arbitrary prioritization with which health care programs are now financed.

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