

THE MEDICAL-ECONOMICAL EVALUATION OF THE HEALTH PROGRAMS ACCESSIBILITY OR HOPE IN THE PERFORMANCE OF THE MANAGEMENT IN THE SANITARY INSTITUTIONS?

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Appreciated as a brave and complex practice, having as object the finding of the efficiency, through the prism of the report cost-performance marginally maximally acceptable, the evaluation medical-economical is regarded with quite reserve, even reticent by the sanitary environment, the elements which explain this concern being of ethical nature. In exchange, for an economist, taking into consideration the economical aspects represents an ethical necessity which leads to the permission to the maxim level of health with a given budget and distributed in a good manner, taking into consideration the existent compulsions. Questions like: “From what perspective are we treating the evaluation? What are its instruments? What is the typology of the costs and how do we quantify them? Are we taking into consideration the time and space effect? It constitutes problems specific to the analyzed models, opened to debates and controversies capable to combat the famous line “The cost is an illusion”.

Key-words: the lottery method, the time trade off method, quality adjusted life years, decisional shaft, willingness-to-pay, cost-utility, cost-efficiency, cost-utility.

1. Marriage – medical evaluation-economical evaluation- disputed necessity of the health programs

The appearance of the evaluation and of the medical-economical analysis as a new discipline, which adds to the medical criteria those economical ones, is regarded with quite reservation, even reticent we could say, by the people in health care. Thus, questions like: “*How can financial natured criteria be introduced in a domain as essential as that of health?*” “*Wouldn’t it be shocking that from economical considerations we refuse certain medical cares?*” “*Is the suzerainty of the doctor, which has the liberty of prescribing to take into consideration only the good of the patient, according to him the best treatment?*” determine that the medical institution should not take into consideration the economical consequences of the decisions.

In exchange, the economist in the health domain will complete this simple instrument which offers the necessary information in terms of expected effects and consumed resources for a program given with: *a theoretical efficiency evaluation of the health programs* which quantify the therapeutical benefits for a patient in a situation defined as being an ideal one; *a practical evaluation of the health programs* which has as main purpose the integration of the patients’ adhesion too the therapeutic benefit; *an evaluation of the health programs availability* which aims at the selection of the studied population. **General principles** generators of controversies have into consideration:

I. Where do we place and from what perspective are we regarding the evaluation? The evaluations can be realized from the point of view of several actors. This way, we can focus only *on the patient and its family* (example for the *cost of the dialysis we can analyze the expected repercussions on the patient's company*); further on we can extend the perspective on the *health institution* (example *what services in the ambulatory can be effectuated in order to improve the budget of some structures*) or on the *collectivity viewed as a whole – the state*. No matter in what hypothesis we recognize our situation, the adopted point of view must be specified, because on that depends the nature of the elements taken into consideration and the calculation of the costs:

The perspective	The cost of the health program
The system of social protection	It is equal with the sum of the reimbursement of expenses which it creates, being evaluated starting from the nomenclature of the papers published by the disease insurances.
Patient	Corresponds to the fees and eventual expenses on the disease and treatment not reimbursed by social insurances.
Hospital	It is evaluated from the prism of the financial results, materials and human necessary for starting of the program.
Employer	Corresponds to the production losses which include the stopping of the patients' work.
Society's global	Correspond to the value that society accepts to pay for health, to the prejudice of some other budgetary chapters, being evaluated by assuming the costs induced by the programs previously mentioned.

Table 1. The definition of the cost of some health program depending on the chosen perspective

II. The typology of costs. In general we distinguish the following types of costs:

(a) **The direct costs** – represent the ensemble value of the resources directly consumed for the treatment of some disease, being divided in: **Direct medical costs** – are those induced by the direct expenses on the patient – example, the cost of the intervention, tests, medicines, and the treatment of the side effects. ; **Direct non-medical costs** – transportation costs, domicile help. Another classification of the direct costs has in mind: **Variable costs** – which are in function of the activity level – example the number of the rectal cannula used during a surgical intervention and **Fix costs** – are independent of the number of effectuated actions – example the depreciation of the constructions.

(b) **Indirect costs** – reflect the value of the disease consequences which were not taken into consideration in the direct costs, in their turn, these ones are divided in two categories: **Tangible costs** – example the losses of production which concern the professional activity of the patient and which present, from the point of view of the society, in lost physical unities without value; and **Intangible costs** – refer to the loss of the quality of the patients' life (human cost) – example the psychological consequences appeared due to a handicap.

The table below regroupes the costs taken into consideration:

Study	Direct costs	Indirect costs
Cost-benefit	YES	YES
Cost-efficiency	YES	RARELY
Cost-utility	YES	NO

Table 2. The costs are taken into consideration depending on the nature of the medical-economical study, in the global perspective of the society.

III. The evaluation instruments. The experts in the health domain are becoming more and more preoccupied by problems such as: Is it necessary to launch a program of detecting the breast cancer?; Does a laparoscopic surgical intervention need to be privileged when comparing with the classical one?; What certain type of antiasthmatic treatment needs to be foreseen and for what type of disease?; For what type of surgical intervention need we to foresee a smaller number of days of hospitalization?. The answer to all these questions can be given after the evaluation of the reports cost-results of the different health programs, which presupposes three types of interventions: the costs measurement, the costs measurement and the combination of the two elements. The economical evaluation presupposes the marriage cost-results viewed from an integrated perspective. The evaluation of the costs can be realized through the models **cost-efficiency, cost-utility, cost-benefit**. In all the cases we must estimate the long term consequences of the program, the instruments used being the **modeling** and the **sensibility analysis**.

The modeling represents a simplified representation of a real analyzed phenomenon, the most frequently used method being the decisional shaft. This one decomposes the health program tested in a succession of events whose modalities vary depending on the patient's answer. To each modality it correspond a probability. The cost, respectively the efficiency of the program will be the sum of the costs, respectively of the efficiency of all the well-balanced possibilities with their probability of realization. Another variant is constituted by the modeling of the disease history through its presentation as a succession of stages followed by the patient until death.

Example: each decisional shaft is built in the manner of dichotomy: any medical decision (exam or treatment) leads to two opposite eventualities: success-failure, survival-demise, and favorable evolution-complications, each of them having a probability of specific appearance notified by the domain experts or extracted from the specialty literature.

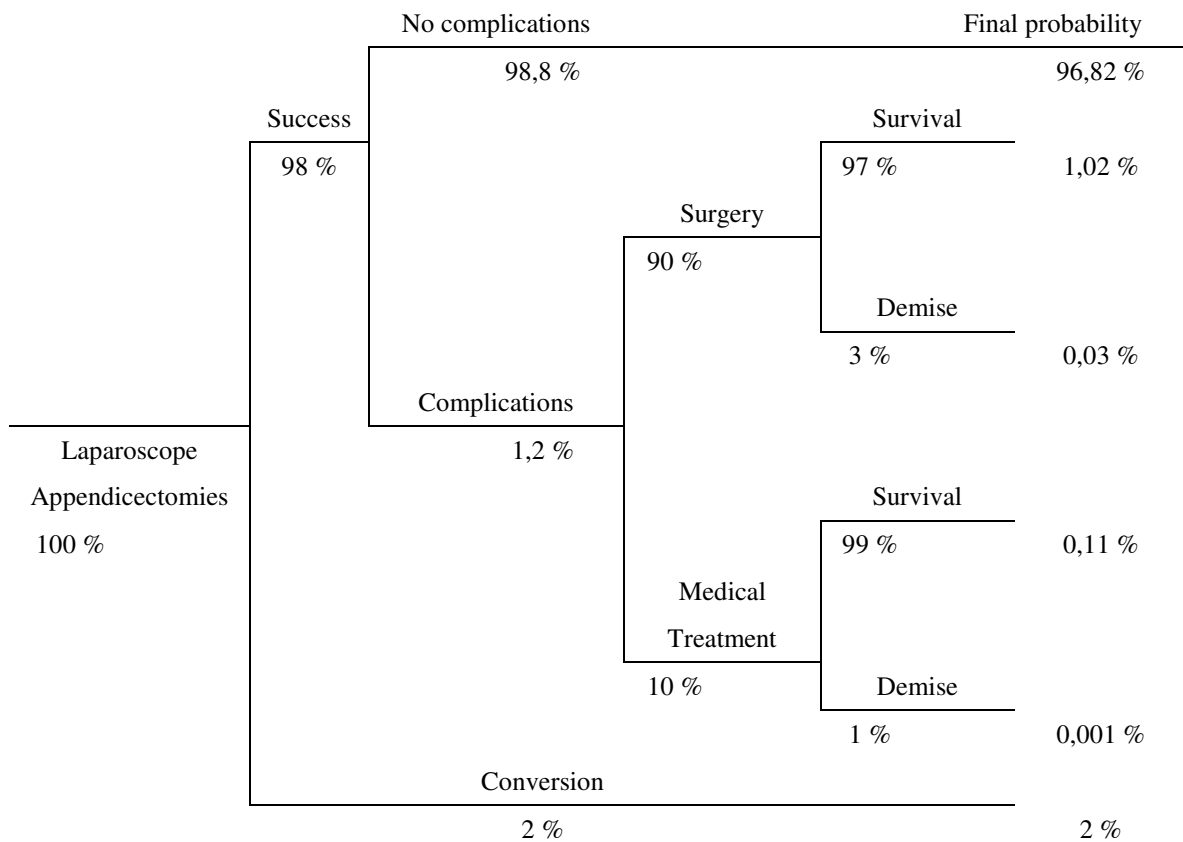


Table 3. Example regarding the decisional shaft

The sensibility analysis. In all the cases, the results of a medical-economical study need to be subdued to a sensibility analysis, whose objective is to analyze the variations of the study's conclusions depending on the hypothesis established for certain parameters. *For example, in the measure in which the cost of a*

treatment is approximately 500 u.m. but varies at other patients between 200 u.m. and 700 u.m. the analysis will be effectuated taking into consideration the two extremes.

IV. Particularities –Taking into consideration the time – the actualization. The medical-economical studies analyze in general health programs whose costs or consequences extend in years. The time intervenes both at the level of *realizations* (for example long term treatments which need devices with a long period of availability) but also at the level of *consequences* (the avoidance of a long term disease). Due to this fact if we desire to compare different periods of time it is important to account them with the same unit of measure, technique called *actualization*, which takes into consideration the population's preference and which benefits of health programs in the present time but which will be paid in time in the future. Health regarded as a non-transferable good in time and which does not belong to the market, raises in the domain of actualization the following problems: *what rate of actualization must we use? Are we actualizing only the costs or the results too? In the case of an affirmative response, is the actualization rate the same?* By convention, the used actualization rate is of 5%, although some authors recommend a rate of 3%, rate which results from the *option of fictive price of the capital*, in which the costs are transformed in consume losses, and the advantages in consume earnings.

An example regarding the actualization: we consider two health programs: A which saves a life only if it is applied continuously for 6 years and whose actual cost is of 100 m.u. and B which saves the life in the present moment with an actual cost of 500 m.u. the question is what program will be preferred?

In the case of program A, it is necessary only the actualization of the effects, the costs being propagated right from the first year.

Using a rate of actualization of 5%, the value actualized of a saved life:= $1 / (1 + 5 \%)^6 = 0,74$, value translated like this: a life saved in 6 years means in equivalence 0,74 saved lives actualized at the present time. The cost per saved life for program A= $100 \text{ m.u.} / 0,74 = 135 \text{ m.u.}$, while program B has a cost of 500 m.u. the choice being in A's favor.

2. The medical-economical studies: objectives, methodology and limits

I. The studies cost-efficiency are searching the health programs with the maximal efficiency for a given cost or with a minimal cost for a given efficiency. In this type of evaluation it is compared and analyzed: for many strategies, the obtained costs and results, the latter ones being measured with physical units (for example the diminution of the sanguine pressure expressed in mm/Hg); different types of strategies on domains (example the interest of a campaign of tracing out the colon cancer; the treatment of the corneal renal insufficiencies by dialysis or grafting; the treatment of the myocardium infarcts through three different medicinal strategies); the financial sum necessary for the gaining of a year of life in the case of serious diseases. **The analysis cost-efficiency** utilizes more measurable criteria in monetary units and one criterion of medical efficiency. The comparison of the possible options is done upon some cost-efficiency indicators in the case in which the cost varies linearly with its efficiency or, contrarily, upon some marginal cost-efficiency indicators. These analyses reflect the realizations in the state of the patients' health, in the reduction of the disease impact, obtained through a specific intervention in report with the cost of this intervention. At the same time, this kind of analysis leads to the comparison of the cost and of the alternative methods efficiency having as purpose the optimal selection. On this occasion it is established the most efficient method which allows the reach of the objective by using a minimum of resources.

II. The studies cost-utility. Constitute in fact a development of the studies cost-efficiency, in the way that, within these ones, the efficiency is pondered by the quality of life before evaluating the utility of the measured action. In these methods the cost of the strategy is faced with the result of an action appreciated in the future, starting with a smaller measure which at the same time incorporates the quantity and the quality of the gained life. Methods of measuring the utility:

(a)The lottery method consists in the search of an indifference grade of a patient (marked with g), grade situated between two options: the first one is uncertain and aims at applying the health program, and the second one is certain – “nothing to do”. If the patient chooses not to do a thing, he is assured that he will live a certain number of years in a state of health equivalent with a handicap. If the decision of the patient is to intervene, he will have to establish a demise risk which he will have to take as a consequence of the surgical intervention in order to survive the same number of years, but recovering from the handicap (risk

of demise with a probability of g%). The value of the utility for an individual is determined as the difference 1-g.

(b)The time trade off method – consists in the variation of the number of years marked with “n”, this being the starting point in which the patient is indifferent to survival in a certain state of handicap for a period of “t” years until his death time or to live in a healthy state until demise time for “n” years. The utility for the patient, associated with this health estate, is obtained calculating the report $1/n$.

(c)The evaluation the quality adjusted life years (QALY). The utility which were associated with each health estate allow the calculation for each program of its equivalent in terms of QALY.

Example. Be it a treatment A which: If it is efficient (demonstrated 7 of 10 cases) allows the survival for 6 years in a perfect health estate – utility associated 1; if it is inefficient (demonstrated 3 of 10 cases) allows the survival for 6 years but in a health estate associated with a handicap whose utility is of 0,4% and which, at 3 cases of 10 causes the demise of the patient – utility associated 0.

The QALY calculation for this treatment: $(0,7\% \times 6 \text{ years} \times 1 \text{ utility}) + (0,3\% \times 6 \text{ years} \times 0,4 \text{ survival utility}) + (0,3\% \times 0 \text{ utility for the demise}) = 4,92 \text{ QALY}$. If we have in view the actualization with a rate of 5%, the calculation QALY becomes: $(0,7\% \times 6 \text{ years} \times 1 \text{ utility}) / (1 + 5\%)^{6 \text{ years}} + (0,3\% \times 6 \text{ years} \times 0,4 \text{ survival utility}) / (1 + 5\%)^{6 \text{ years}} + (0,3\% \times 0 \text{ utility for the demise}) / (1 + 5\%)^{6 \text{ years}} = 4,66 \text{ QALY}$.

Example regarding the studies cost-utility. We consider 4 health programs P1, P2, P3, and P4 whose utilities were evaluated through the method time trade off, the study being realized from the society perspective. The cost of the effects was actualized using a rate of actualization of 3 %. The costs in millions m.u., the utility in thousands QALY, as well as the calculation of the rate cost-utility incremental and the comparison of the health programs are presented in the table below:

Program	Total cost(A)	Total Utility (B)	RATE (A/B)	Incremental cost of $C=A_{1+1}-A_1$	Incremental utility $D=B_{1+1}-B_1$	Incremental rate (C/D)
P1	7.010.200.000	1.610.700	4352,2691	-	-	-
P2	7.020.200.000	1.610.704	4358,4668	10000	4,0	2500
P3	7.070.200.000	1.610.705	4389,5064	50000	1,0	50000
P4	7.080.200.000	1.610.706	4395,7121	10000	1,0	10000

Table 4. The calculation of the rate cost-utility incremental and the comparison of the health programs

Interpretation: the incremental cost of the program P2 versus the program P1 is 10.000 m.u. and the earning in QALY is 4. So, we deduct a rate of 2.500 m.u. on QALY for the program 2 comparing with program 1. The interpretation of this rate is: a quality adjusted life year gained within the program P2 (more expensive) comparing to the one obtained with program 1 is associated to an over cost of 2500m.u.

III. The studies cost-benefit. The studies cost-benefit and cost-utility are in particular interesting within the decisions due to a small number of strategies. Although, they have two types of limits: on one hand, they do not take into consideration the non-tangible consequences of the health actions, and on the other hand although the costs of the strategies can be compared between them, the results will never be the same (how do we compare for example a diminution o the crisis number of an asthmatic patient with the increase of the perimeter of movement for an arthritis patient?). The studies cost-benefit remedy these inconveniences by evaluating the costs and the benefits of the health programs in currency terms, the comparison being possible because they are expressed with the same unit. For the appreciation of the results in currency units there are used two methods. The first one, already obsolete, presupposes the measurement of the human life price starting from the human capital theory. It consists in the evaluation of the lifetime days or health days lost because of a disease as a sum of the productive value of the patient. The second method, *willingness-to-pay*, also named by *the contingent evaluation*, measures the sum which the patient accept to pay for the improvement of their health.

Example of the willing-to-pay method application: we consider a program of prevention whose unitary value is of 20 m.u. per case. The total cost of the program for 100 patients will be of 20 m.u. .x 100 patients=2000 m.u. For the calculation of the benefits brought by the willingness-to-pay method it will be realized a test among those 100 patients, the demanded question being: “How much are you willing to pay in the benefit of the program?” The results are presented in the table below:

Number of cases	Willing to pay	Total
3 cases	30 m.u.	3 x30=90 m.u.
12 cases	25 m.u..	12 x25=300 m.u.
55 cases	20 m.u.	55 x20=1.100 m.u.
10 cases	15 m.u.	10 x15=150 m.u.
16 cases	5 m.u.	16 x5=80 m.u.
4 cases	0 m.u.	0
Total 100	The cost of the programs' benefit	1.720 m.u.
The difference cost benefit		2000 m.u. -1.720 m.u. = 280 m.u.

Table 5. The application of the method willing-to-pay

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