# Progress in Clinical Pharmacy IV

Proceedings of the Tenth European Symposium on Clinical Pharmacy held in Stresa, Italy, 14-17 October, 1981.

*Editors*
G. Ostino
N. Martini
*and*
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# FOREWORD

The 10th European Symposium on Clinical Pharmacy, organized by the European Society of Clinical Pharmacy, was held in Stresa (Italy) from October 14-17, 1981. More than 250 people (pharmacists, physicians, pharmacologists, nurses and economists) from 15 countries (Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States) extensively discussed the cultural background, experiences and the perspectives of clinical pharmacy in Europe.

The ten-year march to date has documented the gradual spread of the philosophy and practice of clinical pharmacy, with some interesting differences from one country to another whose origin and characteristics can be traced back to the structural, social and political conditions where drugs are used and to the differences in university curricula and postgraduate educational programmes of

each country. It will be easy to recognize this situation in the proceedings of this 10th Symposium where, however, an attempt has been made to propose some unifying themes around two functions of the clinical pharmacist (drug evaluation and cost-benefit assessment), which are the frontiers of his ability to interact with partners and problems in the forefront not only of the drug scene, but of health care systems more generally.

The official, explicit opening of the pharmacy to the broader scene of health care may be seen as the specific feature of the Symposium. After ten years which have testified the achievements of pharmacists over the whole spectrum of drug-related technical activities (and a large sample of today's output is presented here), the accent should now be placed on how a drug project interacts with a health project. Ideas and perspectives may still appear embryonic, but the way is open, and will certanly be rich in new achievements.

The implications for the pharmacist's future basic training and continuing education are evident, and the present state of the art (a question addressed directly at the Symposium) offers a good basis for development. This should be viewed more and more on an intercountry basis, to assure not only compliance with national conditions and needs, but adherence to what appears as a general trend in medicine, namely to assess its own goals, performance and relevance in international projects.

In this context, though only brief and sketchy, the references to developing countries appear to be worth more direct, long-term consideration, if European clinical pharmacy is to keep up with a fast-expanding world and is to be active at the crossroads of a changing health culture.

As is the case for 5th, 10th ..... Symposia, it is tempting to try retrospective evaluations and to risk predictions. With the advantage of no ad hoc statements or declarations, Stresa could be considered one such occasion. Assessment of the fate of the above ideas, where the various suggestions from previous Symposia too have crystallized, will be among the main points of attention of research ahead.

The Editors

# CONTENTS

MODELS AND STRATEGIES FOR OPTIMIZING DRUG THERAPY

# BENEFIT/RISK AND COST/BENEFIT EVALUATION

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G. Ostino, N. Martini and E. van der Kleijn, editors.


# BENEFIT/RISK AND COST/BENEFIT EVALUATION

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A wise man once observed that a foolish man knew the price of everything and the value of nothing.

With the ever increasing cost of health care all over the world, and obviously resources for health care limited to what an individual or a state can afford, there is increasing interest in examining the relative benefit achieved by a treatment and the cost of that treatment. Since drugs and medicines account for a high proportion of treatments and in addition aids to treatment (eg anaesthetics) it is not surprising that the true cost and the true benefit of the use of medicines is presently under close scrutiny by almost all governments and by practitioners and economists in all parts of the world.

To be able to evaluate the cost and the benefit a working definition of these words must be arrived at and such a definition must prefix any evaluation.

Too often cost is defined purely as price and benefit as improvements in the condition of the patient.

In my view cost must include the price of the product, the price of distribution, the price of the labour involved in its use (eg does the treatment require the use of syringes and needles and a high level of pharmacist and nurse intensive involvement). An over simplified example would be that the cost of the use of a low priced medicine which required many pharmacist hours to prepare, requires expensive apparatus to administer and requires intensive nurse surveillance over a long period in hospital may be greater than the cost of a high priced medicine which can be used by the patient himself in his own home with minimal professional assistance. Consideration of costs is really the consideration of resource use.

The benefit should include not only a simple improvement but relative improvement compared to no treatment or another treatment.

In arriving at such definitions and in such evaluations use must be made of the economist's tools. In particular I refer to marginal costs (sometimes called costs at the margin) and opportunity costs.

There are many studies now available in the use of marginal costs to determine patterns of health care but very few in the use of medicines. I believe this to be a field wide open for clinical pharmacists. Marginal analyses uses one assumption that is resources are scarce. There is a finite limit to resources available to, and likely to be made available to, the

the health service. Within the health care service there is again a finite limit to resources available to and likely to be made available to any particular programme. This approach thus immediately moves away from the question of attempting to define total need and concentrates on the following questions in a model of patterns of care:

(1) Given the existing resources available for a particular programme or treatment, could some redeployment of these resources result in an increased total benefit from the programme or treatment?

(2) If additional resources were made available to the programme, how best could these be deployed to ensure the greatest possible increase in benefit from the programme?

(3) If resources for the programme were to be reduced, how best could cuts be made to ensure the minimum loss in benefit from the programme?

I will now show three slides to illustrate such an approach.

Neuhauser and Lewicki constructed the following table on the basis of a population of 10,000 of whom 72 have colonic cancer and each guaiac test detecting 91.67% of cases of cancer undetected by previous test. Thus the first test detects 91.67% of total cases, the second 91.67% of the 8.33% undetected by the first test, that is 7.64%; and so on. (Table I).

Table I

True positive rates and numbers of cases in population of 10 000 of whom 72 have colonic cancer with sequential guaiac tests.

| | True positive results | |
|---|---|---|
| Number of sets of tests | % | Number of cases |
| 1 | 91.6667 | 65.9469 |
| 2 | 99.3056 | 71.4424 |
| 3 | 99.9421 | 71.9003 |
| 4 | 99.9952 | 71.9385 |
| 5 | 99.9996 | 71.9417 |
| 6 | 99.9999 | 71.9420 |

The costs of screening were estimated against the cases detected. (Table II).

Table II

Numbers of cases detected and costs ($) of screening with sequential guaiac tests

| Number of sets of tests | Total cases detected | Total costs* $ | Average costs+ $ |
|---|---|---|---|
| 1 | 65.9469 | 77 511 | 1 175 |
| 2 | 71.4424 | 107 690 | 1 507 |
| 3 | 71.9003 | 130 199 | 1 811 |
| 4 | 71.9385 | 148 116 | 2 059 |
| 5 | 71.9417 | 163 141 | 2 268 |
| 6 | 71.9420 | 176 331 | 2 451 |

* Costs include the cost of guaiac stool tests on 10 000 population plus the cost of barium-enema examinations on all those found positive.
+ Total cost divided by number of true positive cases detected.

Note the average cost of the test rises marginally. If the data is revamped into a more appropriate form it can be seen quite clearly (Table III) that the marginal costs differ markedly except of course for the first test.

Table III

Incremental cases detected and incremental and marginal costs ($) of sequential guaiac tests

| Number of sets of tests | Incremental cases detected | Incremental costs $ | Marginal cost* $ |
|---|---|---|---|
| 1 | 65.9469 | 77 511 | 1 175 |
| 2 | 5.4956 | 30 179 | 5 492 |
| 3 | 0.4580 | 22 509 | 49 150 |
| 4 | 0.0382 | 17 917 | 469 534 |
| 5 | 0.0032 | 15 024 | 4 724 695 |
| 6 | 0.0003 | 13 190 | 47 107 214 |

* The marginal cost is the incremental cost divided by the incremental cases detected (that is, it is the additional cost of the *n*th test divided by the additional cases detected by the *n*th test).

The results rely heavily on the assumptions about prevalance and sensitivity (that is the percentage of positives detected - which is true). However it is a classical example of the importance of determining marginal costs. Thus these two statements are true drawn exactly from the same data.

(a) with six sequential tests the average cost per case detected is $2451.

(b) with six sequential tests the marginal cost per case detected is over $47M.

Given the first statement it is reasonable to go ahead with a screening programme of six sequential tests. The second more appropriate statement casts doubts, and the value of a five or even four test programme can be properly studied.

I will now mention that similar examples on opportunity costs are worthy of study by clinical pharmacist. Simply opportunity costs are the costs which would allow you to do something other than what you at present do and to assess whether this alternative was more beneficial.

Benefit/risk studies for medicines are also a very important role of the clinical pharmacist since obviously all treatments using medicines have a risk. The benefit has to be accurately assessed if society has to pay for the use of medicines.

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# COST/BENEFIT EVALUATION: THE POINT OF VIEW OF AN ECONOMIST WORKING IN DRUG COMMISSIONS

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## BACKGROUND

Attempts at reform in the public health field often come to nought because there is insufficient information available for rationally allocating the available resources, or even when there is enough information, there is a shortage of means for analyzing and evaluating it. There is no magic wand to wave to achieve effective and efficient allocation of the resources, and therefore we find ourselves today confronted with a progressive breakdown in services, as a result of overcrowding and bureaucratization, with uncontrolled expansion of the services of less essential function, that is to say, less responsive to the real public health needs of the population; with eruptive increases in the production costs and expenses of the facilities and their services, and with their increasing rigidity, all of this with continuing increase in shortage of funds for the public health sector as compared with the rest of the economic system (1).

Attempts to do something in this sector are usually complicated by the fact that those who decide on the amounts and types of expense are not those who need to find the money. When, as in our country, even with a context largely consisting of "private" relationships, the largest part of the cost is borne by a "third payer", the situation is no longer of interest to the individual, but to society as a whole, and there is collective interest in seeing that society gets from the public health services no less than it pays for.

It is only relatively recently that there has been a search for means to improve the effectiveness of allocations and to

improve the choice of public health services to be supported. One of the most important of the many procedures proposed (2) for creating more satisfactory conditions for social effectiveness is the application of the methods used in economic field, especially cost-benefit and cost-effectiveness analysis, to the problem.

In its application to the public health sector, cost-benefit analysis consists essentially of comparing the current value of the expenditure flow needed to finance a new public health initiative with the current value of the flow of benefits, in terms of the improvement in health obtainable by that expenditure.

However, there are quite a few problems in using this method. First of all, the idea that some public health activity that leads to increased quantity and improved quality of the available work force, constituting an investment in man, increases the amount of "human capital", is to some extent unrealistic. If this hypothesis is carried to its extreme, public health activities should all be aimed at improving the potential of the work force for the economic system supporting it. Not only would there be no justification for helping the unproductive segment of the population (for example, the aged), but during periods of less than total employment, it would not be economically justifiable to provide services for all the people of working age. In reality, public health service does not exist only for potentiating the work force, in large part it also consumes means with the aim of reducing suffering, and in wider terms, of improving the conditions of life. This makes it necessary to evaluate all the benefits deriving from a public health activity, even when they can not be evaluated in terms of money. In addition, if analysis is to be applied to the entire population, a given benefit might be evaluated differently for different social groups or geographic locations, or for political reasons rather than for technical ones.

There is also difficulty in identifying unequivocally which

benefits to attribute to a given program. Improvement in the health of a population, or even of a single group, probably is the result of more than one activity and it is not always easy to detect which part should be attributed to the particular activity being evaluated. As a result, the greater the field of application, the more rapidly the practical usefulness of this approach decreases.

An additional problem is to determine the discount rate to use in comparing costs and benefits. This factor can not be based on monetary criteria, but must reflect an opinion derived from the overall data as to what the costs are and what the benefits enjoyed are. Arriving at this factor involves highly political connotations, and it can radically modify the results of the analysis.

These and other problems connected with evaluation of benefits are usually overcome by using hypotheses that are both interpretive and reductive of reality. The indwelling danger of this type of exercise is attribution of an objective value to the results obtained while forgetting the underlying hypotheses. Its usefulness consists of requiring the policy maker to analyze each project and its possible implications in depth and to make clear his value judgements. The final responsibility for making the choice cannot be delegated to such a complex and sophisticated instrument as cost-benefit analysis unless the benefits of a given operation are so clearly obvious that it is superfluous to carry out any study of societal advantage.

Cost-effectiveness analysis is much simpler to apply. This is also based on confronting the costs of a particular health service and its benefits, but in this case the benefits are expressed in numerical terms (lives saved, days of hospitalization avoided, etc.). In this way, one avoids giving a monetary value to the benefits, but the terms of comparison remain heterogeneous. This type of analysis can be used to compare different types of