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Pharmacoeconomics in Ireland - concepts and terminology.

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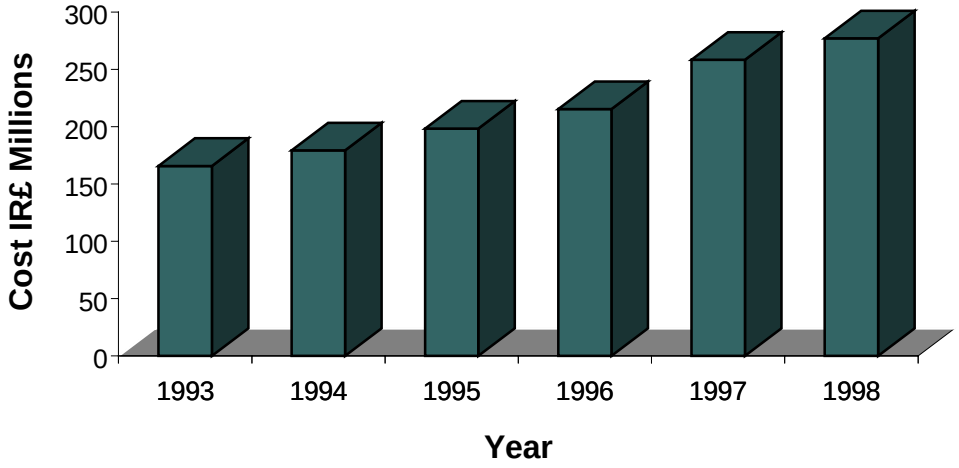
The primacy of drug therapy in medical practice and continuing development of new and novel therapy explains why expenditure in this field will continue to grow. The ingredient cost of medicines under the Community Drug Schemes (GMS, DCSS, LTI etc.) have increased from IR£166 million in 1993 to IR£276 million in 1998 (figure 1) [1].

Figure 1.

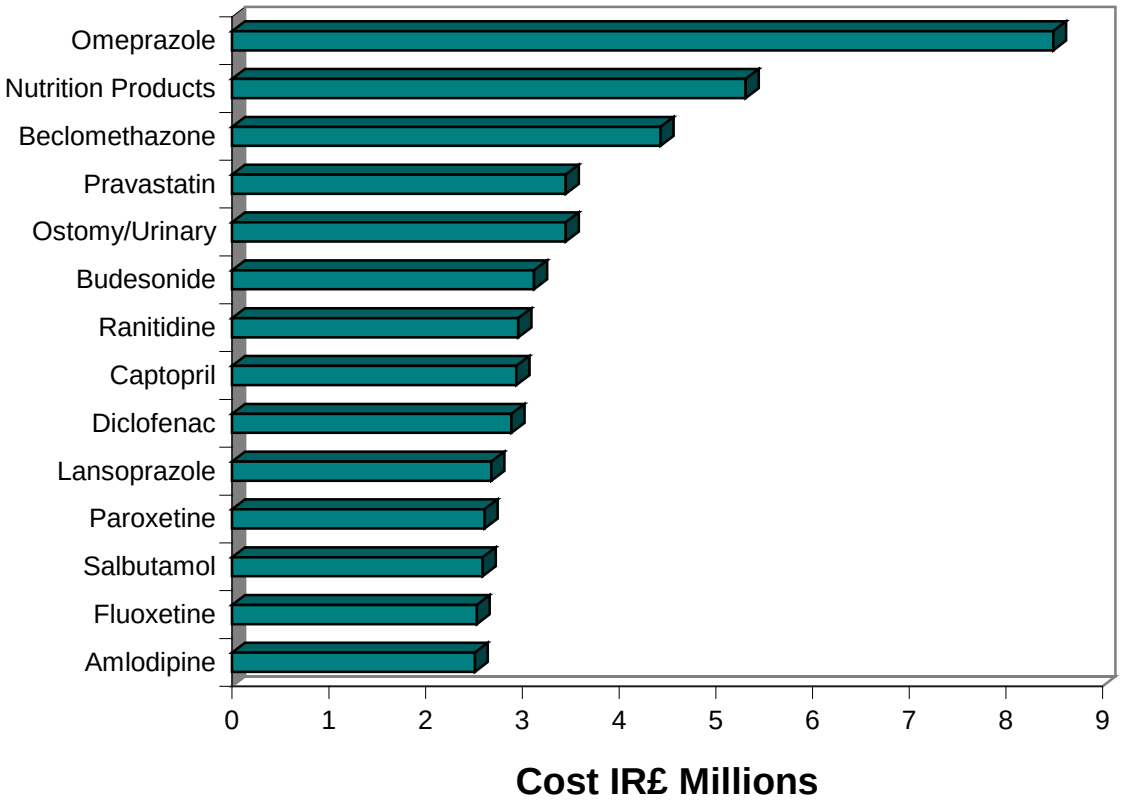
Figure 1: Expenditures on medicines in Ireland 1993-1998



The products of highest ingredient cost under the GMS scheme(1998) are shown in Figure 2.

Figure 2.

Figure 2: Products of Highest Cost in order of their Total Ingredient Cost: GMS Scheme 1998



The main reasons driving such growth include those of "product mix", the prescribing of newer more expensive medications in addition to the "volume effect" comprising growth in the number of prescription items. This is highlighted in the General medical Services Payments Board report for 1998 where in excess of 25 million prescription items were paid for by the Board, and increase of over 1.5 million items on 1997. Against this background it is appreciated that one of the main objectives of the Department of Health outlined in the 1997 Statement of Strategy includes the encouragement of "quality and value for money in the health delivery system" [2]. Spending on drugs is a major target for savings in part because it is easily identifiable. However it must be appreciated that constraints in drug expenditure could lead to increased costs elsewhere e.g. increased hospitalisation. Therefore the focus of concern for decision makers, health care professionals and the public should be the value derived from drug therapy rather than the actual drugs bill. Consequently economic evaluations of medical treatments are becoming commonplace reflecting a recognition that health care decision makers are placing increased emphasis on value

for money from healthcare interventions. Pharmacoeconomics is that branch of health economics that focuses on the costs and benefits of drug therapy and some of the concepts of this relatively new discipline are discussed.

Methods of economic evaluation:

A number of methodologies are available for pharmacoeconomic evaluations which include the common feature of determining inputs (costs) and comparing these with the outcomes (benefits) resulting from drug intervention [3]. The cost arising from drug therapy relates not only to the price paid for the drug but includes "direct costs" paid by the health service including staff and capital costs. Indirect costs may be experienced by the patient, family or society and might include loss of earnings, loss of productivity and cost of travel to hospital. Many of these costs are difficult to measure as are "intangible" costs for pain or other distress a patient might suffer. As the "costs" are expressed in monetary terms the difference between economic evaluations resides in the measurement of benefits. Such benefits may be measured in "natural units" e.g. the years of life saved following lipid lowering or antiretroviral therapy. The benefits may be measured in terms of "utility units" where changes are frequently based on some measurement of "quality of life" which combines assessment of physical (e.g. degree of mobility) and psychosocial outcomes such as anxiety and ability to cope [4]. The Quality Adjusted Life Year (QALY) is a measure of the value of health outcomes which includes quality and quantity of life. Benefits can also be assessed in financial terms which would also facilitate comparisons to be made across disciplines. Such economic benefits would include the benefit to society of a patient being able to return to work.

The four pharmacoeconomic evaluations frequently used include the following:

- **Cost minimisation analysis(CMA).**

This method of analysis can be used when the alternative treatments being evaluated have identical health outcomes. The comparison is therefore limited to analysing only the costs. This analysis has been applied to certain surgical interventions which have traditionally been performed on an inpatient basis but transferred to the outpatient setting. It has also been used to compare different intravenous antibiotic regimens where previous studies had confirmed similar clinical efficacy. Although the method of evaluation is easily understood it cannot be used to assess drug therapies with differing outcomes.

- **Cost effectiveness analysis (CEA).**

If two or more drug therapies have the same treatment objective e.g. healing of peptic ulcers but differing degrees of efficacy then cost effectiveness analysis may be performed. The health benefit is measured in natural units (years of life saved, ulcers healed) and the costs are measured in monetary terms. If there are two therapies A and B the important question for resource allocation is how much additional benefit is achieved with one of the medicines for the additional cost incurred. It is therefore

essential to calculate the "incremental cost effectiveness" of one therapy over the other. This is expressed as Cost (A) - Cost (B) / Effect (A) - Effect (B). Cost effectiveness analysis does not allow comparisons between different areas of medicine with different outcomes.

- **Cost utility analysis (CUA).**

This form of analysis enables the effects of treatment on patient quality of life and survival to be considered together, by converting both into a common unit of measure. The quality adjustments are based on a series of preference weights reflecting the relative values that individuals place on different states of health. The outcome measure most commonly used is the QALY. The use of a standard outcome measure facilitates, in theory, the comparison of health interventions over different therapeutic areas e.g. antihypertensive therapy to prevent stroke (cost per QALY = £490 in UK, 1990) and haemodialysis (cost per QALY = £21,970 in UK, 1990). However measurements of quality of life may use differing methodologies, input costs can be based on different concepts and QALYs may reflect differing priorities in diseases states and so we must be cautious in attempts to produce league tables of QALYs to enable value for money comparisons between therapies.

- **Cost benefit analysis (CBA).**

In this approach both the costs and benefits of the drug therapy are measured in monetary terms. The analysis may ignore intangible benefits e.g. relief of discomfort or pain however the benefit of a therapeutic intervention from the societal perspective may be assessed as both costs and benefits are expressed in the same unit of measurement. In addition, cost benefit analysis enables comparison of expenditure not only within the health sector but also a comparison of the net benefits of investments in non health care sectors, such as education, with those in health care. In comparison to other methods of evaluation, fewer cost benefit studies have been published as there may be ethical objections to placing a monetary value on health, particularly with respect to valuing a human life. There are however numerous examples where health is valued in monetary terms, including compensation for injury or death

Analysis and reporting of pharmacoeconomic evaluations:

- **Perspective**

An important aspect to consider when reporting pharmacoeconomic evaluations is to consider the viewpoint of the relevant decision makers. It may well be that the same evaluation needs to be communicated in different ways in order to meet the needs of governmental decision makers and individual prescribers. As the aim of economic analysis is to make the best use of all society's resources, the societal perspective is considered most appropriate. However a health care manager with a fixed budget may

consider added drug costs a greater priority. An assessment of lipid lowering drugs (statins) from a societal perspective may be cost effective in reducing the risk of coronary heart disease but the significant drug acquisition costs (currently IR£8,368,498 under the community drug schemes in 1998) may be less attractive from the health service viewpoint.

- **Incremental analysis**

The relevant information for decision makers following economic evaluation relates to the incremental analysis of one therapy over another i.e. what extra benefit is being gained for the additional cost? Incremental analysis will of course be influenced by the choice of baseline comparator. Therefore when a medication is deemed cost-effective questions such as " cost effective with what?" and "under what circumstances?" arise.

- **Discounting**

In many cases the investment of health care resources occurs over a different time scale to that of the benefits obtained. It is convention in economic analysis to discount costs and consequences occurring in the future to present values (by an annual rate of approximately 5%). A difficulty arises in respect of discounting benefits which are typically not expressed in money terms. As this is an area of controversy presenting health benefits in the discounted and undiscounted form has not been suggested [5].

- **Sensitivity analysis**

The choice of discount rate is just one of the uncertainties in economic evaluation. Others arise from a lack of precision in the estimates of costs and benefits. Sensitivity analysis, the approach used to deal with these uncertainties, involves alteration in key parameters or assumptions in an attempt to determine their impact on the economic evaluation. If the cost-effectiveness of lipid lowering therapy is based on a 25% reduction in coronary event rates over a given time period would cost-effectiveness be maintained if the reduction in event rate was 15%? Therefore a sensitivity analysis is essential to demonstrate the impact of critical assumptions in any economic evaluation.

Conclusion

All the available evidence suggests that expenditure on medicines will continue to grow and take an increasing share of the total health care budget. The concepts and terminology discussed here will be increasingly utilised as decision makers place an increasing emphasis on cost-effectiveness of medicines in an attempt to maximise the impact of the drugs budget.

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