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<td>Authors(s)</td>
<td>Durkan, Joe</td>
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<tr>
<td>Publication date</td>
<td>1994</td>
</tr>
<tr>
<td>Series</td>
<td>UCD Centre for Health Economics Working papers; No.1</td>
</tr>
<tr>
<td>Publisher</td>
<td>University College Dublin. Centre for Health Economics</td>
</tr>
<tr>
<td>Item record/more information</td>
<td><a href="http://hdl.handle.net/10197/1092">http://hdl.handle.net/10197/1092</a></td>
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Economic Appraisal in Health -
Some Conceptual and Methodological Issues

by

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Discussion Paper No. 1
INTRODUCTION

The objectives of this paper are:

i) to indicate the issues that are involved in the economic analysis of health care;

ii) to suggest appropriate methodologies for the evaluation of health care expenditure in the light of i).

The structure of the paper is as follows. In Section I the concept of the Demand for Health is introduced formally. This is then developed to derive the demand for health care within a framework of uncertainty, the existence of an agency relationship between suppliers of health care and consumers of health services and the emergence of the state as either the main agent or a very significant agent in the supply of health care. In Section II the choices confronting the State in the provision of health care are examined within the framework of cost-benefit, cost minimisation, cost effectiveness or cost utility analysis.

The paper draws heavily on existing published work as given in the references and is not meant to be original but highlights the issues involved in the economics of health.
SECTION I

The approach of the economist to health and health care is to consider demand, supply and price and the extent to which market imperfections exist. The demand for health, however, does not fall neatly into this framework because of the difficulty of defining both the demand for health and its supply.

The basic demand by the consumer is for health, both for its own sake and because it allows the consumer to participate in society. Health is a fundamental commodity/characteristic produced by consumers themselves as a result of their lifestyle, which reflects their consumption of market and non-market inputs, and their endowed characteristics. Health cannot be directly purchased, though for a given set of endowed characteristics, the consumer can purchase health inputs - information on lifestyle patterns of consumption and direct health care when health fails. The effective demand is thus for information on lifestyle, patterns of consumption consistent with this, and for health care. Much of health economics is concerned with the supply and demand of health care, but this represents only one element derived from the fundamental demand for health and strictly all must be taken together.

Grossman (1972) has provided us with a model for relating health to health inputs and other consumption, subject to income constraints. This model is very simple, but it does enable us to understand the nature of demand for health and health care, the forms societies have chosen to meet these demands, and the evaluative techniques that are necessary when the state is actively involved in health care.
The basic model is, as stated above, very simple: Health status is related to health inputs (lifestyle); the purchase of health inputs is at the expense of other consumption given that consumers have budget constraints, consumers have preferences for different combinations of health and consumption; and for a given set of endowed characteristics the consumer has a unique combination of health and patterns of other consumption that he can enjoy. Thus health status reflects a combination of choices, given the original set of endowed characteristics. If the model is briefly described below and while the basic model is not a reflection of reality, extensions, to make it more realistic, help us to understand the role of Government in the health care sector.

Health and Health Inputs.

The first element of the model is the relationship between health and health inputs. For a given set of endowed characteristics, health status is a function of the purchase of health inputs. The relationship that exists between health and health inputs is illustrated below.

Diagram I  Health & Health Inputs

[Diagram showing the relationship between Health and Health Inputs]
There is some maximum attainable level of health status for any individual given the set of endowed characteristics. The individual can never get beyond this irrespective of purchases of health inputs. The maximum attainable level of health is individualistic depending on age, and the ability to absorb health inputs. The relationship indicated above is a technical relationship.

Across the community this technical relationship would differ by individual because of differences in endowed characteristics and differences in age. Differences in endowed characteristics can influence not just current health status but also the ability to absorb information on the efficacy of health inputs. Health status also varies by age. The maximum attainable health status will tend to be lower for elderly than for young people. Thus we can think of the technical relationship between health status and health inputs as subject to change over time by individual, and differing across individuals.

This simple concept immediately raises issues of

i) the nature of health inputs and the extent to which they are known. To what extent do we know what constitutes a healthy lifestyle? For any individual the costs of acquiring information are large. Nor can the individual be certain that the information reflects anything other than current fashion.

ii) intertemporal health status - the relationship over time of health inputs to health status.

iii) equity, where endowed characteristics can result in poor health status.
Health Inputs and Consumption

The second element of the Grossman model is that consumers face a budget constraint. If consumers purchase health inputs, this reduces available income for other consumption. Consumers can allocate expenditure as indicated in Diagram II.

Diagram II - Health Inputs & Consumption Expenditure

For given prices of health inputs and other consumption goods, the consumer can purchase OA of health inputs or OB of other consumption goods, or some combination of health inputs and other consumption as for instance at point C.

For given prices, differences in incomes are reflected in a shift in the budget line. If the income of one person is lower than another, then potentially his command over health inputs is less. In practice his actual command depends on relative preferences for health and other consumption.

If the price of health inputs changes then the slope of the budget line changes. For instance if the price of health inputs increases then the consumer will be able to purchase
less than OA for a given income, say OA'.]

The budget constraint in turn raises issues of
i) equity, where differences in income are reflected in people's effective entitlement to health inputs;
ii) the relative cost of health inputs, and
iii) intertemporal transfers where consumers attempt to spread health inputs expenditure through their life by insurance, public funding through taxation, or by borrowing to meet sudden health needs.

Preferences for Health and Consumption.

The final element in the Grossman model is the subjective view of the consumer in respect of his preferences for health and other consumption. As a general rule, an individual will prefer to have more consumption and better health than currently experienced. However, there will be situations where an individual is indifferent between different combinations of health status and consumption, perhaps within very narrow confines. The combinations of health and consumption between which the individual is indifferent is illustrated below. (Diagram III)

Diagram III Consumer Preferences for Health & Consumption.
The curve AB (referred to as an Indifference Curve) reflects all those combinations of health and consumption between which the individual is indifferent. This implies that the individual is as content with the combinations of health and consumption at A (i.e. \(oa', \, oa''\)) as at B (i.e. \(ob', \, ob''\)). The curve is convex to the origin, indicating that as health status is reduced greater amounts of consumption are required to "compensate" the individual. Alternatively, as consumption is reduced, health status must improve by ever increasing amounts to "compensate" the individual.

The indifference curve represents just one level of general well being for the individual. For different levels of well being, there will be a different indifference curve. Thus, for any individual there exists an indifference mapping as illustrated in Diagram IV covering different states of well being. In this mapping the consumer prefers all combinations of health and consumption on IC2 to all points on IC1, but is indifferent between all points on IC2, and indifferent between all points on IC1.

Diagram IV Preference Mapping

\[\text{Health} \]

\[\text{Consumption}\]
This preference mapping raises issues in relation to

i) intertemporal behaviour - where individuals may in one period of their lives pursue a consumption pattern that reduces health status in the short run;

ii) sources and reliability of the information on the nature of the preferences.

The Complete Model

Grossman brings together these three elements - the technical relationship, the budget constraint and the preference of the individual - to indicate how the individual might behave. This is illustrated in Diagram V.

Diagram V consists of four quadrants. Quadrant I is the preference ordering. Quadrant II is the technical relationship between health inputs and health - where the health inputs axis is reversed but still considered positive, Quadrant III represents the budget line, where both axes are reversed but remain positive, and Quadrant IV plots consumption against itself and enables us to link all of these elements together to produce the Consumption Possibility Frontier (CPF) which shows the maximum combinations of consumption and health the individual can enjoy given the budget constraint and the relationship between health inputs and health status. The Consumption Possibility Frontier together with the indifference mapping determines the actual distribution between health status and consumption the individual will adopt.

The interpretation of the diagram is as follows:

Consider the Budget Constraint in Quadrant III. Suppose at one extreme the individual spends all his income on
Diagram V  The Complete Model

Diagram of the Health-Consumption model with different health states and consumption levels.
consumption and none on health inputs. The consumption level is given by OA with zero health inputs. Since the formulation assumes that zero health inputs produces zero health status then the actual position in the preference mapping that the consumer lies on is derived as follows: Consumption OA = AB = BC = OC and health inputs = 0 = health. The point C then represents the chosen position of the individual. At the other extreme suppose all expenditure is on health inputs. The individual then purchases OD units of health inputs and zero consumption. The associated level of health is then DE = OF. Thus points C and F represent extremes. In practice they are unrealisable. The more typical situation is where the individual chooses a point on the budget line between A and D. Suppose the point G is selected. Associated with this is a level of OH in health inputs and HJ = OK in health. Also associated with this is a level of GH = OL = OM of consumption. Thus, associated with a point G on the budget line is a point (OM, OF) = N in Quadrant I. For each point on the budget line, there is a similar point in Quadrant I. The locus of such points is given by the curve FNC which is concave to the origin, given the shape of the technical relationship between health inputs and health from Quadrant II. The curve FNC shows the consumption possibility frontier of the individual. The actual level of health and consumption will be determined by the highest indifference curve FNC meets i.e. the one to which it is a tangent. In the diagram the point P represents the optimum level, given the budget line, the relative price of health inputs and the technical relationship between health and health inputs.

This model allows us to consider several issues.

i) Suppose income declines. This causes the budget line to shift towards the origin. The extreme points on Quadrant I are also brought closer to the origin and the new optimum for the individual will be at a lower
level of health and consumption.

ii) Suppose the price of health inputs increases. This will result in a change in the slope of the budget line. The extreme point D shifts towards the origin, and as a consequence the extreme point for health on the consumption possibility frontier shifts to the origin. The result will be lower consumption and poorer health.

iii) Suppose a person ages and for a given level of health input, health status is less favourable. The extreme point D remains unchanged, but the extreme point on the consumption possibility frontier is less than previously. As in the previous cases, this results in the consumption possibility frontier being a tangent to the indifference mapping at a lower level of both consumption and health.

Extensions of Model.

This model is very simple. It provides a convenient way to consider the relationship between income, the price of health inputs relative to the price of other goods, and the optimum pattern of expenditure. However, many of the assumptions of the model are unlikely to be satisfied.

First, it is assumed that the individual is able to make comparisons between various consumption and health levels in a consistent manner. To do this, the individual must have adequate information i.e. the information must exist and the individual must be able to acquire and absorb it. However, both of these sub-conditions may not be valid. In particular, the costs associated with the second may be prohibitive - giving rise to the role of the medical profession as a purveyor of information, and the State as
an interpreter of this information.

Second, it is assumed that health status is related to health inputs for a given set of endowed characteristics. However the dominant feature of health status is uncertainty. In practice there is not a smooth relationship between health inputs and health status. Health status is affected by episodic events which cause a reduction in health status, irrespective of normal health inputs and which require health care expenditure. The episodic nature of a breakdown/reduction in health status has resulted in the development of health insurance to finance health care and all costs associated with ill health. In some societies the State has absorbed the function of absorbing the episodic costs faced by individuals through the public provision of health care financed by taxation. Generally however, this has also been undertaken on equity grounds where it is believed that incomes are inadequate to provide health insurance, and where it is believed that even where incomes are adequate individuals will fail to make provision for health care due to ignorance, or due to a belief that others will provide services irrespective of payment.

Third, the model assumes no feedback from health to income. In this model, health status is a pure consumption good. People derive well-being from being healthy. In practice, however, good health is a capital good. Good health reduces time loss due to ill health and this influences the total time the individual can spend producing money income, and hence his command over other consumption goods. Thus the individual will push expenditure on health inputs to the point where the marginal cost of health inputs equals the pure consumption benefit from the restoration and maintenance of good health plus the consumption benefit from the additional command over other expenditure (the investment benefit). In societies where the employer/State
guarantees income during ill health there will be a weakening of health input expenditure by the individual, whilst at the same time if the employer/State provides health care there will be a bias towards the investment benefit from health care expenditure away from the consumption benefit. Much of economic evaluation in health economics is concerned with the appropriate mechanisms for handling these two issues.

Fourth, the concept of health inputs is not clearcut. A distinction must be made between expenditure necessary to maintain health status in the absence of ill health and health care expenditure undertaken to alleviate sickness. The latter occurs as a result of a breakdown in health status and constitutes the bulk of expenditure. In the model as outlined above, the former constitutes the bulk of health inputs and can be loosely thought of as lifestyle and behaviour. However the distinction between expenditure related to lifestyle and behaviour and other consumption expenditure is not obvious.

Consequences of the Model and its Extensions

The individual has difficulty in judging over a variety of areas: the benefits from health inputs; the technical relationship between health care and health; the difference between different forms of health care; the direct financial and other costs of health care; the risks associated with health care; and of course in some circumstances the nature of the decisions that are needed.

To overcome these problems the individual may initiate an agency relationship with the medical profession, using the technical experts' specialist knowledge of the relationship between health care and health status, to purchase information. The agency relationship in health care is different to that in other areas of activity.
In health care the information agent is generally also the supplier of the service. In some cases, the agent is the effective decision maker, either because the individual is in no position to make a decision or does not want to. Furthermore, even after the consumption of health care, the individual in many cases cannot verify if the outcome was as a result of the health care or would have occurred anyway or whether the health care worsened or improved the outcome.

The healthcare agency also differs to the extent that for an individual search costs are very high, particularly if the individual is already ill. As a consequence, individuals rarely shift from medical practitioners. The consumer relies on the supplier who is then in a position to determine consumption - the problem of supplier induced demand i.e. where supplier suggests a level of treatment that is different from what the individual would choose with full information. The provision of health care facilities by the State with salaried health care providers, reduces the cost of supplier induced demand for the individual though there could be other problems for the State. Where health facilities are primarily private sector, the general belief is that ethical considerations limit the extent of supplier induced demand, though the possibility of litigation must also exert some effect.

It is no accident that the State is heavily involved in health care. The State is in a position to acquire information on behalf of its citizens in regard to many issues in health care defined above. The State has equity considerations in relation to citizens' entitlements to some basic health related characteristics which would not be satisfied by market forces, and health status may have merit and public good characteristics. The provision of health care by the State financed by taxation can substitute for private health insurance as well as meeting
equity considerations. The State may also, on equity grounds, carry costs that few private insurers would (e.g. long-term illness). As a consequence of these factors, the State has tended to become the largest single agent in the provision of health care, either directly through the provision of services or indirectly through the financing of services.

The emergence of the State as the principal provider/financier of health care services and the principal agent setting the conditions under which these services are provided in turn creates a set of problems. The individual with full information would push health input (including health care) expenditure up to the point where the marginal cost of health inputs equals the private consumption benefit plus the private investment benefit from good health. In principle, the State, in the provision of health inputs, should be undertaking a similar exercise, taking account of externalities the private individual would ignore (e.g. public health issues). In practice the State is almost exclusively involved in health care to deal with health failure, rather than the provision of other health inputs (though it does provide information on lifestyle etc.). Indirectly of course, the education system is intended to provide people with the tools for evaluating and adapting lifestyle). The State rarely sees the benefit from health care expenditure. It incurs the costs, but the benefits are generally private. This creates a narrow focus for public decision making. The purpose of Section II is to look beyond the immediate costs undertaken by the State in the evaluation of health care expenditure.
SECTION II

ECONOMIC EVALUATION IN HEALTH INPUTS & HEALTH CARE

Economic evaluation consists of the analysis of the costs and benefits of a course of action which can then be compared with alternative courses of action. An economic evaluation in health allows us to analyse a treatment in terms of costs and benefits, and even where benefits exceed costs, measured consistently, to compare this treatment with alternatives. Economic evaluation is thus a tool in the decision making process and if properly used will provide decision makers with techniques to enhance the health of the community.

In the health area, the broadest form of economic evaluation is that of cost benefit analysis. However, in different cases, cost minimisation, cost effectiveness, and cost utility exercises are used and may be the appropriate tool.

Cost Benefit Analysis.

Cost benefit analysis involves the quantification in money terms of all relevant costs and benefits associated with an activity. Where benefits exceed costs, the activity should proceed. The particular problem posed in the health area relates to the extent of relevant costs and benefits.

Much of what has been done in the past has considered only direct health authorities costs and the impact on national output as the relevant costs and benefits. However, the concept of cost (and of benefit) is much wider than this. On the cost side there will also be direct costs to the individual in addition to those undertaken by the health authorities and other public authorities. On the benefits
side the concentration on the return to production ignores the pure consumption element of improved health via life extension or an improved quality of life. One weakness among others of the narrow focus on costs and benefits is that its application would deny health care resources to retired persons, though clearly there are benefits to them from health care during illness. Furthermore, since the State provision of health care is just one form society chooses to deal with intertemporal health needs, a situation in which retired persons could not have access to health services would undermine the tax base. It is not obvious that people would be willing to forego current income if future health care is not provided.

Cost benefit analysis consists of several stages;

i) listing of realistic alternatives;

ii) enumeration of all costs and benefits for each alternative;

iii) measurement and valuation of these costs and benefits;

iv) the consistent valuation of costs and benefits taking account explicitly of the differing time dimension of benefits and costs, and taking account explicitly of uncertainty with regard to costs and benefits;

v) the adoption of a decision rule to choose between alternatives.

The particular problems in health care evaluation relate to the measurement and valuation of costs and benefits in so far as they reflect intangibles. Typically these refer to the value attached to life years saved and the quality of these life years; the value attached to reassurance that a complaint is not life threatening; the valuation of time
saved. The methods of valuation tend to be crude - relying on a mixture of market prices where available, willingness to pay to avoid a condition, policy makers evaluations, professional opinion - expert witness evaluations.

A further problem relates to discounting benefits and costs. Typically benefits and costs do not take place at the same time. Costs tend to be up-front while benefits are spread often over the expected life time of the individual. Discounting is necessary to determine whether the present value of benefits (i.e. the sum of discounted benefits) is greater than the present value of costs (i.e. the sum of discounted costs). Where alternative treatments are considered both the benefits and costs are likely to differ between alternatives. The virtue of the cost-benefit approach is that it allows us to identify if benefits exceed costs and to choose between alternatives. Thus cost-benefit analysis is an input into the decision making process.

The following charts set out a schema for carrying out a cost-benefit study.

**Cost Minimisation Analysis**

Cost Minimisation analysis is much narrower than cost benefit analysis. Cost Minimisation analysis is undertaken in those cases where different techniques are used to produce a known result. It concerns itself solely with the cost side and makes no attempt to identify benefits, or to answer the question - do benefits exceed costs. As with cost-benefit analysis, cost minimisation may require discounting of costs and an allowance for uncertainty in treatments. In principle, cost minimisation should take account of all costs incurred - both by the health authority and by the individual - but cost minimisation studies rarely do so.
Health treatment or programme

Consumes resources

Costs
What is forgone?

Gives improvements in health

Benefits
What is obtained?

Costs and benefits in money terms

The cost-benefit approach.

Cost-effectiveness analysis

Benefits not in money terms

Costs and benefits in non-money terms

Treatment objective can be questioned

Enumerate:
Changes in resource use
Changes in productive output
Changes in health state per se

Can be measured?

No

Measurement:
Key issues are
(1) Reliance on the underlying technical appraisal
(2) Joint use of resources

Will explicit valuation be attempted?

No

Explicit valuation:
Key issue is source of values
(i) Market values
(ii) Clients' values
(iii) Policy-makers' views
(iv) Practitioners' views

Yes

Combining costs and benefits in the appraisal
(1) Weighing of the valued against the un-valued
(2) Re-appraisal of the scope of the study

Allowance for differential timing

Estimates of costs and benefits

Allowance for risk and uncertainty

Sources
Remedies
Pitfalls

Why is this necessary?

What discount rate?

Does discounting make any difference to the result?
Cost Effectiveness Analysis

Cost effectiveness analysis differs from cost minimisation in that the outcomes of different treatments are different. If there is a single common effect, for instance prolongation of life, then it is possible to estimate the cost per unit of effect and to choose between techniques. Cost effectiveness also allows a comparison between different programmes where the effects are similar. Thus it is possible to identify the cost per year of life across a range of programmes (e.g. heart operation, kidney transplants). The outcomes in cost effectiveness analysis are not measured in money terms but in some physical units.

Cost Utility Analysis

An extension of cost-benefit analysis and indeed one that ideally should be incorporated in it is cost utility analysis. Cost utility analysis concerns itself with the quality of health status. Cost utility analysis seeks to estimate the value/worth of health status, will adjust length of life by quality of life, and will estimate the cost of treatment per quality adjusted life year, for instance. The estimation of quality of life is the subject of much theoretical and empirical debate, partly because of the subjective nature of quality of life descriptions. However some guidance is available from survey work into society's own assessment of what constitutes a healthy person in some countries. Quality of life measures where developed should ideally be used in evaluating health status, per se in cost benefit analysis.
CONCLUSION

In Section II some evaluative techniques have been briefly described. The purpose of these techniques is to assist in choice in health care. The principles involved are straightforward. The difficulties arise with respect to the values placed on intangibles, the assessment of quality of life and the ethical issues involved in choice. These techniques allow decision makers to face choice in a structured and consistent manner. It is now necessary to go beyond description and undertake a detailed cost-benefit analysis which will illustrate the principles and the practical problems involved in such work.
REFERENCES

BOOKS


ARTICLES


Cross-Country Comparisons of Health Expenditure

Introduction
The purpose of this paper is to examine shares in GNP of Health Expenditure, over time and across countries. The paper then offers explanations for differences between countries.

Cross-Country Shares
Table 1 shows the trend in the GNP share of health expenditure in a range of countries

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Source: OECD

During the 1960's and 1970's, health expenditure as a % of GNP increased in the developed economies. Since 1980, with some exceptions, the share has increased, but at a slower rate. Health expenditure now accounts for a significant proportion of GNP in most developed economies.
If one looks at crude shares of GNP, Irish expenditure in relation to health appears to be very similar to that of other developed economies. However, expenditure on health across countries has been shown to be related to income per head and when allowance is made for much lower income per head in Ireland, Irish expenditure on health as a share of GNP is very much higher than in other developed economies. This is an important point.

Given that income levels matter, we are saying that expenditure on health in Ireland is relatively high and it is this phenomenon that needs to be explained. People tend to rely on international comparisons of expenditure or levels of treatment in looking at health care services while strictly these do not provide a basis for decision making because we should be comparing the benefits with the costs. In the case of Ireland, the National Health Service in the UK was seen for a long time as providing an ideal form of health cover and people sought to make the Irish health services comparable even though incomes per head were very much lower in Ireland than in Britain. This demonstration effect is clearly important in the development of the health service in the 1960’s and 1970’s. Anecdotal evidence suggests that delivery in the Irish health care system is now better than in the NHS. This latter point suggests that other factors are important in determining health shares.

- In fact it not just income per head that is important, but the reaction of the system to technological change where a system that is responsive to technological change can experience ever-increasing expenditures as new technologies become available. It is often remarked that the fragmentation in the Health Board system and the co-existence of private hospitals results in multiple provision of new technologies even though none are fully utilised.

- Arrangements for finance, where the bulk of finance comes via State funds or health insurance. Thus the individual
does not face a budget constraint when it comes to health services and this creates an upward bias in health expenditure.

- Lack of information on behalf of the consumer and an incentive on behalf of the supplier to sell more services to maximise his income. This arises more in private healthcare systems than in public healthcare systems since State agencies can acquire information which it can use to contain costs.

None of these factors - income per head, demonstration effects, technological change, financing arrangements and information and incentive structures - on its own can plausibly be assigned the responsibility for the growth in health spending. Taken together, however, particularly in the context of what economists call Baumol's disease (which I discuss later), and especially when interaction effects between them are taken into account, they offer a credible explanation of the trend in health spending in the OECD as a whole, and can by extension be used as a model for the growth of Irish health spending. It would be easy to explain the high proportion relative to GNP given the levels of income per head in terms of these factors.
Given that the share is a function of GNP per head it is no surprise to find that the US share is consistently the largest, with one exception. In 1980 the Irish share, at 9.2%, equalled that of the US. 1980 was the year of fastest growth in health expenditure in Ireland, coming at the end of a three year period of extraordinary growth in the economy. The Irish share in 1990 had fallen back, but still remained higher than the UK.

The 1990 share fell so much primarily because GNP rose very rapidly between 1985 and 1990. GNP actually increased by 30 per cent over that period, with most of the increase occurring between 1987 and 1990 while health expenditure rose by 6 per cent in real terms. In essence, health expenditure was lagging behind the growth in income. In recent years as we noted earlier, there has been a very large increase in real expenditure on health, so that the share of health expenditure in total expenditure increased to 7.3 per cent in 1992.

What Table 1 does not show is the increase in the level of resources devoted to health expenditure. Over the period from 1960 to 1990, GNP in the developed world trebled, so that these increasing shares indicate a much more rapid increase in the resources devoted to health expenditure. Of course, it should be remembered that percentage shares of GNP do not constitute a decision-making procedure. It still remains the case that expenditure on health should be related to the expected benefits. The critical decision remains as to who makes the judgements with regard to expected benefits and actual and implicit costs. Before we can look at these issues, it is worthwhile to examine the extent to which expenditure is now financed by the State.
Public Expenditure on Health.

For most developed economies, the health sector is primarily financed by Government via general taxation receipts or mandatory health contributions. (Table 2)

### TABLE 2. THE PUBLIC SHARE OF TOTAL EXPENDITURE ON HEALTH

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>61.6</td>
<td>87.0</td>
<td>83.4</td>
<td>81.8</td>
<td>88.9</td>
</tr>
<tr>
<td>Canada</td>
<td>42.7</td>
<td>70.2</td>
<td>74.7</td>
<td>74.7</td>
<td>72.2</td>
</tr>
<tr>
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<td>86.3</td>
<td>85.2</td>
<td>84.4</td>
<td>82.8</td>
</tr>
<tr>
<td>France</td>
<td>57.8</td>
<td>74.7</td>
<td>78.8</td>
<td>76.9</td>
<td>74.4</td>
</tr>
<tr>
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<td>69.6</td>
<td>75.0</td>
<td>73.6</td>
<td>71.6</td>
</tr>
<tr>
<td>Greece</td>
<td>64.2</td>
<td>53.4</td>
<td>82.2</td>
<td>81.0</td>
<td>77.0</td>
</tr>
<tr>
<td>Ireland</td>
<td>76.0</td>
<td>81.7</td>
<td>82.2</td>
<td>77.4</td>
<td>74.8</td>
</tr>
<tr>
<td>Italy</td>
<td>83.1</td>
<td>86.4</td>
<td>81.1</td>
<td>77.1</td>
<td>77.6</td>
</tr>
<tr>
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<td>n/a</td>
<td>92.8</td>
<td>89.2</td>
<td>91.4</td>
</tr>
<tr>
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<td>74.7</td>
<td>75.3</td>
<td>71.3</td>
</tr>
<tr>
<td>Portugal</td>
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<td>59.0</td>
<td>72.4</td>
<td>56.3</td>
<td>61.7</td>
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<td>Spain</td>
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<td>65.4</td>
<td>79.9</td>
<td>80.9</td>
<td>80.5</td>
</tr>
<tr>
<td>UK</td>
<td>85.2</td>
<td>87.0</td>
<td>89.6</td>
<td>86.3</td>
<td>83.5</td>
</tr>
<tr>
<td>USA</td>
<td>24.5</td>
<td>37.2</td>
<td>42.0</td>
<td>41.4</td>
<td>42.2</td>
</tr>
</tbody>
</table>

Source: OECD

There are several noteworthy characteristics in Table 2:

- The current shares of public expenditure on health are very high in all countries with the exception of the US. For most countries, the share is in excess of 70%.

- There were very large increases in this share between 1960 and 1970 in most countries.

- These levels were consolidated over the period from 1970 to 1985.

- Since 1985 there have been reductions in these shares in many countries.
Health expenditure is also a very important element in total public expenditure. (Table 3)

### TABLE 3. HEALTH EXPENDITURE AS A % OF TOTAL PUBLIC EXPENDITURE

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>6.9</td>
<td>9.6</td>
<td>9.4</td>
<td>9.7</td>
<td>12.2</td>
</tr>
<tr>
<td>Canada</td>
<td>8.2</td>
<td>14.3</td>
<td>13.6</td>
<td>13.5</td>
<td>14.7</td>
</tr>
<tr>
<td>Denmark</td>
<td>13.1</td>
<td>13.2</td>
<td>10.3</td>
<td>8.9</td>
<td>9.1</td>
</tr>
<tr>
<td>France</td>
<td>7.2</td>
<td>11.3</td>
<td>12.9</td>
<td>12.5</td>
<td>13.2</td>
</tr>
<tr>
<td>Germany</td>
<td>9.6</td>
<td>10.5</td>
<td>12.9</td>
<td>13.3</td>
<td>13.1</td>
</tr>
<tr>
<td>Greece</td>
<td>10.6</td>
<td>9.6</td>
<td>11.8</td>
<td>11.5</td>
<td>12.7</td>
</tr>
<tr>
<td>Ireland</td>
<td>10.6</td>
<td>11.4</td>
<td>17.5</td>
<td>13.3</td>
<td>12.0</td>
</tr>
<tr>
<td>Italy</td>
<td>10.6</td>
<td>14.0</td>
<td>16.7</td>
<td>14.0</td>
<td>14.1</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>n/a</td>
<td>n/a</td>
<td>10.6</td>
<td>9.9</td>
<td>n/a</td>
</tr>
<tr>
<td>Netherlands</td>
<td>4.1</td>
<td>11.5</td>
<td>10.4</td>
<td>10.1</td>
<td>10.4</td>
</tr>
<tr>
<td>Portugal</td>
<td>5.4</td>
<td>8.6</td>
<td>12.0</td>
<td>10.1</td>
<td>9.8</td>
</tr>
<tr>
<td>Spain</td>
<td>n/a</td>
<td>11.1</td>
<td>14.3</td>
<td>12.2</td>
<td>11.8</td>
</tr>
<tr>
<td>UK</td>
<td>10.3</td>
<td>9.9</td>
<td>12.2</td>
<td>11.7</td>
<td>12.0</td>
</tr>
<tr>
<td>USA</td>
<td>4.8</td>
<td>8.7</td>
<td>12.0</td>
<td>13.4</td>
<td>14.8</td>
</tr>
</tbody>
</table>

Source: OECD

Between 1960 and 1970, health expenditure increased as a percentage of total expenditure of Government in most developed countries, mirroring the increase in the public share in total expenditure on health shown in Table 2. For most countries, the relative share of health in total expenditure has increased gradually since 1970, and now accounts for about one eighth of total public expenditure. Even in the USA, where the share of public expenditure in total expenditure on health is relatively low, at 42%, the relative share of health in total public expenditure is high at about 15%, in 1989 being the highest of all countries listed. (It is no surprise therefore that the Clinton administration has introduced a major reform in health expenditure, particularly given the fact that in spite of the
level of expenditure, both public and private, there remain serious inequalities in the delivery of health care to the population.

What the international comparison shows is:

- The share of total health expenditure in GNP has been rising over the past 30 years and now accounts for between 6 and 12% in developed countries.

- Irish expenditure lies at the lower end of this range, but when allowance is made for income per head, the relative share in Ireland is very high.

- Income per head is just one factor influencing shares in GNP of health expenditure. Technological development and demonstration effects across countries also matter.

- The increase in shares has been associated with an increase in the proportion of expenditure funded by Governments. For most developed economies, Government finances about three quarters of total health expenditure.

Baumol’s Disease

The above analysis represents the conventional wisdom with regard to health expenditure across countries. However it is possible to add to this by considering the cost of health services relative to the cost of other goods and services. Productivity in services tends to be very much less than in industry and agriculture. Thus as incomes in an economy increases the differential productivity growth produces different price effects across sectors. Those with low productivity experience more rapid growth in the relative cost of providing goods and services. This is known as Baumol’s disease, and results in
services absorbing an increasing share of output in the economy as real incomes increase. The situation is self-correcting if relative prices differ between sectors to a significant degree, where there are pure market systems, as shifts in relative prices cause shifts in patterns of demand. However, as we have seen, the bulk of medical services are not market driven on the demand side, and thus the adjustment of expenditure to reflect differences in relative prices cannot take place directly. This of course applies to all non-market services, and not just health services. There are some price indices covering all health services, and all output, but there are some problems with the data. The relative price of health services is given in Table 4.

Table 4. Relative Price of Health Services 1960=100

<table>
<thead>
<tr>
<th>Country</th>
<th>Relative Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>125</td>
</tr>
<tr>
<td>Ireland</td>
<td>106</td>
</tr>
<tr>
<td>Germany</td>
<td>123</td>
</tr>
<tr>
<td>Canada</td>
<td>137</td>
</tr>
<tr>
<td>Italy</td>
<td>113</td>
</tr>
<tr>
<td>US</td>
<td>140</td>
</tr>
<tr>
<td>Denmark</td>
<td>101</td>
</tr>
<tr>
<td>Spain</td>
<td>111</td>
</tr>
<tr>
<td>UK</td>
<td>98</td>
</tr>
</tbody>
</table>

It is clear from the Table that there are significant differences between countries in the extent to which they have prevented the relative price of health services from increasing. These data must be embedded in a more general model of cross-country health expenditure, but they are instructive, particularly with regard to the UK and the US. Where a country is successful in controlling the relative price of health, then it is in a position to provide a wider range of services, or to maintain the current level.

Further Research
It is self evident that shares of GNP/GDP are not policy variables. It is interesting and worthwhile to explain differences between countries, rather than to seek uniformity in shares, when income levels and relative prices are so different. However to explain differences in shares we require a much more detailed analysis, which takes account of demographic structure, health education, and so on.