How Much Should We Spend on Health Services

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This paper considers five questions relating to the cost of health services. These are:

1. What is causing the growth of health care expenditures?
2. Why do we limit resource use in health care?
3. How much should we spend on health services?
4. What is the value of a human life?
5. What are the equity and ethical issues which must be resolved before a satisfactory answer to the fourth question can be given?

The paper concludes that there are no satisfactory answers to these questions and even the importance of the ethical questions is often not recognised.
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Introduction

Providers of health care generally dislike the idea of restrictions upon the services they offer their patients. Professional training encourages the collection of the maximum possible information before diagnosis and aggressive treatment, with the most recent and often the most expensive therapies. Concern for patient's well-being and personal and financial considerations usually reinforce the dislike of restrictions. Patients similarly expect unrestrained access to health services. For some time the prevailing attitude has been that health care is a right; that when sickness occurs there is a fairly well defined and appropriate therapy which should be universally available.

These attitudes have been challenged in the last decade. Many now accept, albeit reluctantly, that without fairly vigorous measures to control spending the health sector will face an even greater problems than at present. The common argument runs somewhat as follows:

Health care spending is rising too rapidly. Its growth is fuelled by an ageing population, by the existence of universal health insurance and by the introduction of new and expensive technologies. In the first three post war decades the rate of economic growth was sufficiently high to support this trend. But with the slowing of GDP growth in the 1980's and 1990's the economy cannot sustain the continued inflation of medical costs. In particular, the tax burden has become so great that the government cannot continue to underwrite the expansion of the health sector at its historical rate. The population cannot continue to receive unrestricted access to all possible medical care. It is therefore inevitable that explicit rationing will eventually be introduced and if this rationing is not sufficiently severe then governments will be forced to hand back responsibility for health spending to the private sector.

The theme of this paper is that there is some truth in the diagnosis but that the aetiology of the problem is far more complex than implied by the simple view above.

1 The author would like to thank Professor Dick Scotton, Leonie Segal and Richard Smith for comments on an earlier draft of this chapter.
It is certainly true that health services consume a very large share of the GDP and that they may continue to expand rapidly (Section 2). For this reason it is also likely that we will adopt some form of explicit rationing. Indeed, such rationing may be ethically desirable (Section 3). However it is argued that there is no inevitability about the level or source of health funding and that these decisions are matters of social choice; that they are not driven by some economic or technological imperative.

The chief difficulty in making a decision regarding the appropriate level of health spending arises from the imperfect information available and from the imperfect analytical tools for making the decision. In this respect economics makes a valuable contribution (Section 4) but it does not (and cannot alone) resolve a number of the ethical issues that underlie the decision. In particular there is no fully satisfactory method for placing a dollar value on a human life, although a judgement must inevitably be made if limitations are to be placed upon life extending services (Section 5). Similarly, judgements must be made about the appropriate distribution of health benefits (Section 6). Despite these difficulties there is a fairly clear agenda for reform. In the short run health service efficiency must be improved. This is a prerequisite to any sensible decision about how many resources we should finally spend on health services.

**Current and Future Spending**

While it is generally recognised that the health sector is large, very few people appreciate its true magnitude. This is shown in Figure 1 by comparison with Australian Gross Domestic Product (GDP) expenditures in other sectors. The figure reveals that the health sector is as large as agriculture and mining combined and over 50% the size of the entire manufacturing sector. By 1994/95 health consumed $38.5 billion\(^2\) (AIHW, 1996). At the underlying growth rate the burden on an average family of four in 2000 AD will be about $10,185\(^2\). While the distribution of the expenditure is highly skewed the figure indicates the average sacrifice that will be made to permit the use of medical services.

As two thirds of the spending is financed by the government, it is also true that the health sector imposes a heavy tax burden and that changes in the level of government support have a significant impact upon the budget. This is illustrated in the passage below.

“To give some perspective to the fiscal implications of changes in health policy, consider the following arithmetical figuring. Over the five years to June 1976 the ratio of health expenditure to GDP increased from 5.8 per cent to 7.8 per cent and the Commonwealth’s share of the bill rose from 28.5 per cent to 48.0 per cent. If the Commonwealth’s percentage share of total health expenditure had remained at the 1970 level, its ‘revenue savings’ from the reduced contribution to the total health expenditure of 1976 would have been almost sufficient to finance a doubling of the Commonwealth’s outlays on education or defence; alternatively, Commonwealth social security and welfare payments could have been increased by 30 per cent, or personal income taxation reduced by one-quarter.” (Richardson, J & Wallace, R 1983, p 125).

The period discussed in this quotation was atypical as it included the introduction of Medibank 1, Australia’s first compulsory health insurance scheme which extended health insurance to the 15% of the population previously uncovered. Nevertheless it

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\(^2\) In 1994 dollars.
indicates the magnitude of the budgetary savings that could be achieved by a full or partial reversal of the government share. It also indicates the problem facing a tax minimising government if health expenditures grow more rapidly than the GDP and general revenue.

Australia is not alone in spending so much on health care. The international comparisons shown in Table 1 indicate that the percentage of the GDP devoted to health care in Australia is fairly typical for an OECD nation. Indeed, if health expenditure is (statistically) “predicted” it is almost exactly what would be expected for a country with its GDP (Oxley & McFarlane 1994). When the data from Table 1 are plotted in Figure 2, two interesting facts are highlighted. First, and most obviously, expenditure in the USA significantly exceeds expenditure in any other country. In 1995 its per capita spending was 74.9% greater than in Canada which has the world’s second most expensive system. This supports the nearly universal belief that a more free market approach to health insurance and health care delivery is inflationary. The atypical US pattern became most evident in the 1980’s, the decade in which a concerted attempt was made to reduce spending through the use of market competition.

The second interesting observation is that, with the exception of the USA, the growth in the relative share of the health sector was brought under control in the mid 1970’s with Australia being one of the first countries to achieve control. In most cases, including Australia, this was achieved by the imposition of (fairly indiscriminate) budget caps applied, in particular, to hospital spending. Budget caps were not generally employed in the USA. It is increasingly questioned whether this mechanism of cost control can continue. It is likely that the initial and relatively easy economies that could be achieved in the hospital sector have been exhausted and that further economies will be far more difficult to achieve.

An important question in the present context is whether health expenditures will continue to grow at their present or at a greater rate. The capacity to spend has already been illustrated. US per capita outlays are already 133% greater than in Australia and there is no technical reason why Australians could not spend this much, ie more than double their current outlays. There is also no reason to suppose that US expenditure has reached its limit. Various attempts have been made to predict future US health costs. One projection, made by the US Health Care Financing Agency is reproduced in Figure 3. Based upon the assumption that the current excess spending in the health sector continues at its historical rate it is estimated that by the year 2030 the US could be devoting 26.1% of its GDP to health care; that is, allowing for economic growth, more than double its current spending. By contrast, the National Commission of Audit (1996) has suggested that Australian health spending may reach 12.5% in the next 50 years. At least part of this difference could be attributed to the role of excess medical inflation in the USA; that is, the increase in the apparent unit price above the general inflation rate. Between 1975 and 1994 the excess in the USA and Australia were 46.6% and 5.7% respectively, suggesting, *prima facie*, a relative increase in the incomes of US health care providers (AIHW 1996).

The more important issue is whether such trends are really likely to emerge. Prediction is, of course, hazardous and especially when it is about the future! However a sensible judgement may be based upon an examination of the historical

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3 This calculation is problematical as it is difficult to define a homogeneous unit of health care and thereby separate pure inflationary effects from quality improvements.
reasons for the growth of the health sector and an assessment of whether or not these causal factors are likely to continue. The chief explanatory factors have been considered by a number of authors (for example Newhouse 1993, Weisbrod 1991, Fuchs, 1990 and Abel Smith, 1996) and the relative importance of different explanatory factors is fairly clear.

Surprisingly the chief economic variables do not play a very important role. Even in the USA where out of pocket costs faced by consumers have fallen fairly significantly with the extension of medical insurance, the authors of the definitive RAND experiment into the effects of medical co-payments calculated that only about 10% of the increase in US costs between 1950 and 1984 could be attributed to the extension of medical insurance (Manning et al 1989). In Australia Richardson (1991a) estimated that reduced co-payments could account for a maximum of 6% of the growth in medical costs. Similarly, rising expenditure cannot be attributed to the direct effect of income upon the demand for services as the direct effect of income upon expenditure is known to be small. This is particularly true when consumers face small co-payments as in the case for hospital and medical expenditure. In the absence of significant user charges there is no reason why personal income should affect a person's demand for services and none of the studies carried out to date have suggested that direct income effects are of particular importance. However, the close association observed between per capita GDP and national health expenditures suggests an important indirect income effect. It is clear that the pressure for increased expenditures generated elsewhere can be accommodated more easily as GDP rises, although the precise mechanism by which this occurs has never been clearly articulated.

Equally surprisingly, the effects of ageing per se do not appear to have been particularly important historically and projections suggest that they will remain of marginal significance. For example Abel Smith (1996) reports that over a 20 year period in the UK the changing demographic profile could only account for an 8% increase in service use. In France and the Netherlands ageing only led to a 0.3% per annum growth in service costs. Richardson (1991a) estimated that in the decade to 1986 the changing age/sex structure of the population explained between 3% and 6% of the actual change in Australian service use - very similar to the growth in France and the Netherlands. The future impact of demographic change per se is also likely to be underwhelming. By 2030 the percent of Australians over the age of 65 will be only slightly greater than the percentage in Germany, the UK, Austria and Sweden in 1980 and yet these countries absorbed the impact of ageing upon health expenditures without devoting an exceptional share of the GDP to health care. More generally, the impact of ageing has been exaggerated and the effects of future changes in the age structure in Western countries will be no greater than the impact already experienced and accommodated in the last 50 years (Johnson, 1996).

By elimination, the chief explanation for rising health costs appears to be associated with the supply and not the demand side of the health sector. (Newhouse 1992, Evans 1983, Ashby and Craig 1992, Abel Smith 1996). In particular, changes in medical technology are increasingly regarded as the main factor fuelling expenditure growth although this is accommodated by the increasing supply of medical practitioners, supplier induced demand and the permissive role played by rising GDP. While it is difficult to predict the impact of future technology the consensus appears to be that for the immediate future it is likely to be cost increasing and particularly when it is associated with more sophisticated and costly diagnostic procedures and with the introduction of therapies for previously untreatable conditions.
However it should not be assumed that technology is inevitably cost increasing. New procedures have dramatically reduced the average length of hospital stay (although it is not clear how much this is attributable to quicker, cheaper treatments and how much to quicker and more expensive interventions). As Fuchs (1990) notes, the most significant technological change in the late 1940’s and 1950’s was the introduction of antibiotic drugs which sharply reduced the length and cost of hospitalisation.

**Why Do We Limit Resources**

Observing the level and growth of medical expenditures does not explain why we should wish to limit what to many is a self evidently desirable use of our resources and, in the case of potentially life saving expenditures, a morally necessary activity. Adoption of this view would imply that future rationing of health services should be resisted. A possible rejoinder to this conclusion is that health services are already rationed both by their exclusion from the National Health Service or by their limited supply. The extreme variability in the rate at which services are provided to different populations implies that there is an enormous amount of care that could still be provided and that current service levels have more to do with a somewhat arbitrary set of historical decisions than with the maximum benefit that could be obtained with existing technology.

This rejoinder would simply imply the desirability of an immediate increase in our present health budget as well as an acceptance of future growth: and there is no technological reason why this should not occur. In principle we could double our expenditure and double it again. The US HCFA projections cited earlier did not imply a declining standard of living as health expenditures rose to 26% of the GDP. Rather, almost all of the benefits of general productivity growth in the US economy were absorbed by the health sector. Even if health sector growth implied a lower material standard of living elsewhere this does not imply its impossibility or even its undesirability if the medical expenditures were providing benefits to people that exceed the benefits from spending on fast food, television, travel, etc. In short, there is no well defined technologic or economic limit to the share of the GDP that could be spent of health care. The final level is a matter of social choice.

Similarly it is entirely a matter of social choice whether health services are financed collectively through taxation or through some private mechanism. The claim that governments cannot or will soon be unable to afford the cost of a health service but that the private sector can, is simply untrue or, at best, a convenient myth to obscure some other objective (possibly the political objective of reducing taxation) which reflects (or promotes) an unwillingness by the healthy/wealthy to transfer resources to the unhealthy/poor). This is particularly true for countries such as Australia where the government share of the health budget is lower than in most comparable countries and where taxation as a percentage of the GDP is the fifth lowest in the OECD after Mexico, Turkey, the USA and Japan (OECD 1995). More generally there is no known relationship between the overall level of taxation and the performance or growth of the economy (Saunders, 1996). This implies that the decision concerning government or private financing in the foreseeable future is not subject to some economic imperative but should reflect social attitudes towards collective versus individual responsibility for the financing of health care.

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4 In 1994 the majority of governments in the OECD financed between 75% and 85% of health spending. The Australian figure of 68% was the fifth lowest in the OECD after the USA, Portugal, Turkey and Austria.
However social choice will inevitably result in a level of service delivery that is less than is necessary to maximise health and this implies some form of rationing. The reason for this, as emphasised by economists, is that an activity is only desirable when the benefits from the activity exceed the “cost”. Conceptually, “cost” does not refer here to dollar expenditures but to the “opportunity cost” which is the value of benefits or opportunities foregone by carrying out the activity. The economist’s dictum that benefits should exceed cost may therefore be translated as the rule that the desirability of benefits associated with an activity should exceed the benefits foregone.

Within this framework there are at least three reasons why health care expenditures should be limited. Each is based upon the theme that people will spend where they obtain the greatest benefits and this may not always be on health care services. First, people do not only want maximum possible health. They also want a good quality of life and this depends upon expenditures outside the health sector. The compromise between health and non health related expenditures implies less medical care than is technically possible. Secondly, to the extent to which people seek health improvement, this will not always be achieved by expenditure on formal health care. As emphasised by Evans and Stoddart (1994) health is now known to have far more to do with social position, the environment and nutrition than with health services and the best path to better health will often involve spending in these sectors. Thirdly, and related to this, there is considerable uncertainty about the benefits of many of the procedures that are currently delivered. The effectiveness of most procedures have not been demonstrated. In one survey of Dutch physicians the estimated number of proven procedures varied from 20% to 40% of those covered by the social health insurance scheme (Van der Ven 1996). One OECD study reported that 80% of medical procedures and two thirds of medical goods have never been evaluated (Oxley & McFarlane 1994). On numerous occasions the eventual evaluation of existing technologies has revealed an overall harmful impact (Abel Smith, 1996).

In addition, proven services may often be used inappropriately. Abel Smith reports estimates of 30-60% of services in some countries being unnecessary (although Abel Smith considers that the figure is probably exaggerated). Finally there is growing evidence of the iatrogenic effects of many interventions. For example, the recent ‘Quality of Australian Health Care Study’ reported the results of detailed analyses of the medical records of 14,179 patients admitted to 28 selected Australian hospitals (Wilson et al 1995). Extrapolation of the results implied that medical errors of omission or commission add about 420,000 additional admissions per annum to Australian hospitals and result in about 50,000 permanent disabilities and 18,000 deaths.

This uncertainty about the benefits of many services at the “micro” level is reflected in a corresponding uncertainty about the benefits at the “macro” or population level. The limited evidence available here suggests that these could easily be overstated. For example, Bunker et al (1994) examined the cumulative impact of all demonstrably effective clinical preventative and curative services and concluded that in the 20th century these have added roughly 5 years to life expectancy. McKinley et al (1989) present evidence that most of the increase in life expectancy that has occurred over several decades has been years of disability.

Finally and most provocatively, Cochrane et al (1978) found a systematic perverse and positive relationship between age specific mortality and the doctor supply
between developed countries after standardising for other relative variables. A similar result was found in Australia by Richardson and Richardson (1992) in an analysis which explicitly sought to disentangle the direction of causation in the association. A more recent cross national study of total mortality by Kim and Moody (1992) using a different statistical model did not replicate Cochrane’s results. However it did not find a statistically significant relationship between doctor supply and declining mortality.

In sum, while no one seriously doubts the beneficial effects of medical care overall there is a serious question about the benefits from further increasing expenditures except when this is on new and demonstrably effective care. Benefits are uncertain; costs - foregone benefits - are certain and significant. There is therefore a legitimate basis for restricting resources and for rationing when it appears that the overall benefits from expenditures are greater outside than inside the health sector.

While accepting this conclusion it is still possible to maintain that there should be no limit on the amount spent when life itself can be saved. The basis of this argument is that “you can’t put a dollar value on life” or (as in the case of some religions) that life has “infinite” value. The implication of accepting this view would be far reaching. It would imply that any therapy or diagnostic test with even a finite probability of extending life should be carried out (and in preference to medical care which increased the quality of life). However small the probability, the repetition of such interventions with a sufficiently large number of patients will eventually result in the saving of lives. The case for unlimited expenditures would be re-established albeit for a different set of interventions.

This argument may be analysed as two separate questions: (1) as an empirical observation, does life per se always take precedence over the quality of life and, (2) as an ethical proposition, should this occur? The answer to the first question is unambiguously “No”. It is clear that neither individuals nor society treat life as having infinite value, ie always taking precedence over the quality of life. The evidence for this is obvious when a broad view is taken of the range of activities that can preserve and prolong life. Individuals do not minimise the personal risk of death. They voluntarily undertake a range of life threatening behaviours in full knowledge of the risk. The individual does not, of course, face the certainty of death. However when society permits its members to undertake these activities it is accepting the inevitability of increased mortality. The existence of cars, electricity, life threatening industries, dangerous sports, smoking, the consumption of fatty foods, etc, etc all ensure premature death.

We do not even minimise the risks associated with these activities. And the reason for this is also obvious. The benefits of each of these activities exceeds their costs. That is, the resulting improvement in the quality of life is valued more highly than the small number of deaths that occur. Life is, in effect, treated as having a finite value that is traded off against the quality of life.

It is, of course, still possible to argue that life should take precedence over the quality of life. However while the abstract principle may obtain some support it is likely that this would evaporate once the practical consequences were understood. A society incorporating the principle would be condemned to a relentless quest to reduce death. No effort would be too great. This would imply the crippling of industry as we now know it as much of this involves a finite - if negligible - risk of death to its work

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5 This study is currently being replicated.
force. The residual output from our emasculated economy would be largely devoted to risk reduction. All resources not needed for preserving life directly would be devoted to the achievement of a risk free environment. Freedom of choice would need to be significantly curtailed in case individuals recklessly chose risky activities. For all these reasons our quality of life would be dramatically reduced.

This scenario is, of course, ludicrous. It simply demonstrates by *reductio ad absurdum* that the absolute precedence of life over the quality of life is unsustainable as an ethical principle. The true question is how to determine the acceptable trade-off between life and quality of life and how to quantify this trade-off.

**How Should We Decide How Much to Spend**

By definition medical expenditure is equal to the price times the quantity of the services provided. Price is identically equal to the provider’s net income. The identity may therefore be restated as “expenditure is equal to the provider income per service times services received per patient”. This highlights two decisions which must be taken. First, what income should providers receive? And, secondly, how many services should patients receive? The decisions are not unrelated. As provider’s incomes rise the cost to the remainder of the population increases and the ideal level of health and health services will fall.

The issue of appropriate provider incomes is complex, unresolved and beyond the scope of this chapter. It is worth noting, however, that governments have been concerned with reducing unit medical prices and, by implication medical incomes. Governments, at least, have recognised the trade-off between real medical incomes and service availability.

In principle, the second decision concerning the number of services should be made by the application of the economic rule that all services should expand to the point where the additional (marginal) benefit is equal to the marginal cost. Application of this principle is, however, difficult and for this reason a variety of other approaches to prioritisation and resource allocation have been proposed such as “goals and targets”. To the extent that their methods deviate from the economic prescription it follows, as a matter of logic, that they will result in less health for any given cost. For example, suppose that the unit of benefit was the life year and that the application of the alternative methodology resulted in the adoption of two interventions where the marginal costs of obtaining a life year were $2,000 and $10,000 respectively. Scaling down the second intervention would lead to the loss of one life year; but the reallocation of the $10,000 to the first intervention would gain five life years. According to economic principles all else equal this reallocation should continue until it was no longer possible to obtain life years more cheaply from the first intervention. Alternative approaches to resource allocation typically do not employ this logic and often fail to consider costs and benefits at the margin or even fail to consider costs at all.

Economists have developed three basic techniques to assist with the implementation of the general rule. These techniques are described in most text books of health economics and are summarised in Table 2. The defining characteristic of the first, Cost Benefit Analysis (CBA), is that benefits must be measured in dollars. Because of the difficulty in converting the value of human life into dollars, economists have attempted to side step this issue through the use of Cost Effective Analysis (CEA).

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6 See, for example, Drummond et al, 1987
This allows the comparison of any interventions where there is a single and common unit of benefit. This, of course, is a serious disadvantage as it is often necessary to compare quite different outcomes and interventions which affect both the quantity and quality of life. Consequently, Cost Utility Analysis (CUA) was developed in which the unit of benefit, the quality adjusted life year (QALY), combines both of these dimensions of outcome. The techniques for doing this are still relatively new and controversial Richardson (1991b). However CUA represents an explicit recognition of the importance of the quality of life and the inevitability of judging its relative importance when health outcome is compared with cost.

A common characteristic of all of these techniques is that they are applicable at the “micro” level; that is, they are designed to determine whether particular small scale interventions are or are not desirable. To assist with the global allocation of resources the results of individual evaluations must be combined in some broad framework. The most direct approach is the one adopted in the famous (or infamous) Oregon experiment (Eddy 1991, Haddorn 1991). Simplifying somewhat, all of the possible services which could be offered to the Oregon Medicaid population were ranked according to their cost per QALY. Services with the lowest ratio were to be selected progressively until the Medicaid budget was exhausted. The underlying value judgement in Oregon was that as the budget contracted it was desirable to eliminate less cost effective services rather than to restrict population eligibility to participate in the scheme.

The chief difficulty with this approach is the magnitude of the evaluation task. The Oregon experiment was based upon research that was arguably inadequate. Costings were rough, quality of life values were doubtful and cost to QALY ratios were obtained for very broad intervention categories which did not distinguish marginal from intra-marginal services. Despite this, the Oregon experiment remains an impressive model for one approach to global prioritisation within the health sector. Despite measurement error, each of the steps required for correct decision making was subject to explicit investigation and the overall analytical framework had the potential to maximise health from a given budget.

An alternative framework has been suggested and trialed by Segal and Richardson (1994, 1997) in which more comprehensive evaluations are conducted within a disease category but, initially, only for those interventions where there is a serious possibility of expansion or contraction. Global efficiency is envisaged as being achieved iteratively by the progressive elimination of the least cost effective and the progressive expansion of the most cost effective services.

While these techniques may make an important contribution to achieving efficiency in the health sector - maximising health per unit of cost - they fall short of determining the appropriate level of overall expenditure in two important respects. First, the techniques purport to place a value or relative value on health benefits. They do not assist with the measurement of benefits in natural units; that is, they require information about the impact of health services upon the quantity and quality of life. This must be obtained from the medical literature and, as indicated above, the

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7 In Oregon the public was also involved in an exercise in which broad service categories were defined according to ethical principles and these categories ranked according to the value placed upon these principles. Strict CUA was only applied within each category.

8 The scheme was never implemented as it was deemed to violate US anti discrimination legislation. The logic of this strange decision is discussed by Kaplan (1994). An emasculated scheme was subsequently accepted which did not include costs or the quality of life in the prioritisation process.
majority of health services have not been clinically evaluated or evaluated in a way that is a suitable basis for economic evaluation.

Secondly, CEA and CUA and both of the broader frameworks discussed above only rank projects. They cannot unambiguously indicate whether or not a service should be provided. In the short run this is all that is required. There is overwhelming evidence of allocative inefficiency in the health sector and, as in the Segal-Richardson framework, the greatest health gains may be obtained initially by reallocating resources to where the greatest health benefits can be obtained. Eventually, however, a comparison must be made between benefits inside and outside the health sector. This implies a common unit of measurement with which to make the comparison and, as most benefits outside the health sector cannot sensibly be measured in QALY's this implies that the value of QALY's life years and lives must be measured in dollars. If this could be satisfactorily achieved then cost benefit analysis could be used for the economic evaluation of all health projects and, in principle the frameworks discussed above could determine, not simply the appropriate ranking of projects, but whether or not benefits exceeded costs. The iterative application of CBA could eventually determine the appropriate level of health expenditures; that is, the level where marginal expenditures were just producing the same value within the health sector as they could produce elsewhere.

The Value of Life

Various attempts have been made to measure the dollar value of life. These, of course, require a precise quantifiable criterion of value and two have been suggested. The first is the “human capital” criterion. In the “material welfare tradition” of Marshall and Pigou this treats the “value” of the human life as being external from the individual (Robinson 1986) and “value” is equated with the present value of future earnings (as with capital generally). The approach, pioneered by Mushkin (1962) and Rice (1966) has been widely used because of its simplicity. Calculating the value of human life only requires information on future earnings and these may be estimated from the age specific earnings of similar groups of individuals in the workforce.

Despite this, the approach is generally recognised as being theoretically unsound for at least two reasons. First, by equating “value” with earnings it discriminates against those with low earnings; women, various ethnic and low income groups and the unemployed. By this criterion the retired have no value and projects which only saved their lives would be worthless. Secondly, it is clear that individuals are valued for more than their output. There is an intrinsic value of a person’s life to their families, friends and to society which must be measured and quantified. At best the human capital approach measures the contribution of an individual to the (measured) GDP and this is a sub-set of the factors that determine the value of a human life.

9 Of course, even in the short run the application of CEA or CUA implies a dollar value of life. If, for example, we do not provide services when the cost per life year gained exceeds $50,000, then this is the implied value of a life year. The point here is that in the ‘short run’ when the health budget is relative fixed, significant health gains can be obtained without any explicit recognition or endorsement of this figure.

10 Some benefits are directly comparable. Road and public safety measures for example, save lives and improve the quality of life. Expenditures on sanitation and nutrition may even have a greater impact upon health than narrowly (?) defined health services. However the major benefits outside the health sector arise from the consumption of non health related activities that is, goods and services and it is these benefits that are hard to convert into QALYs.

11 Program evaluation is usually carried out on the assumption that the price of resources will not vary because of the projects. This assumption could be violated if a large scale reallocation of resources occurred as a result of CBA and explicit prioritisation. This is an additional reason for preferring an iterative approach to reform in which changing prices were employed in later analyses.
The second criterion is that “value” is what people are willing to pay (WTP). Influential economists such as Mishan (1971) have argued that despite its practical difficulties this is the theoretically correct approach as it is the criterion used more generally in the economy. The argument reveals a surprising but widespread misunderstanding of the role of social values amongst economists. While it is true that willingness to pay is the generally used and generally accepted criterion of value in much of the economy this does not imply that it is, or should be, universally accepted. It is, nevertheless, a serious contender as a criterion of value.

The chief practical difficulty with this approach is that there is no market for life per se in which we can observe the price of life. Some have suggested that the WTP can be inferred from court decisions involving compensation for the loss of life or from government (ie collective) decisions regarding projects involving the gain or loss of life. Such an approach is clearly circular. The more common solution is to observe the WTP, not for life, but for an increased probability of life or, conversely, to observe the compensation paid when there is an increased risk of death. If, for example, an individual is prepared to accept $200 for a 1 in 10,000 risk of death then it is inferred that the value of life is $200 x 10,000 or $2 million. Typically, the value of the compensation is “observed” statistically. Wage rates in a variety of high risk industries are observed, the relationship between increasing risk and compensation is estimated and from this the implicit value of life is calculated.

This second approach has produced a wide variety of estimates. For example, in his review Viscusi (1993) found value for single life as low as $US 0.6 million and as high as $US 16.2 million (1990 dollars). A more serious difficulty is that the process of extrapolation from the risk of death to the value of life relies upon the famous axiom of von Newman and Morgernstern that choices under risk are not altered by “linear transformation” ie it is possible to carry out the type of multiplication described here. However there is evidence that this axiom is both theoretically and empirically invalid.

In principle, a third approach to the quantification of the value of life could be to ask people directly what they, or society generally would or should be prepared to pay in different circumstances. If it was clear that the answer to the question could affect the amount that would, potentially, be spent upon the individual then this modified willingness to pay alternative would also incorporate the principles of Rawlsian justice. In practice, such an approach would be enormously difficult and does not appear to have been attempted to date. The relationship between stated and true preferences is problematical and it is not clear whether, in the case of human life, people have preferences which could be easily converted into dollars. At best the approach would require that decision makers be fully informed of the context and consequences of the decision and possibly involved in discussion of the issues.

Despite these reservations stated preferences are increasingly used as the basis for decisions. In the environmental literature stated preference techniques (contingent valuation) have been used to assess the value of the compensation payable because of environmental damages. In the most famous case, the 1989 Alaskan oil spill from the US super tanker Exxon Valdez, the controversy resulted in court action. To help

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12 Such decisions cannot be used to infer a value of life that is then used to assist with such decisions. It is also common for court determinations to be based upon lost earnings (human capital) which is not equivalent to a willingness to pay.

13 For a review of the theoretical and empirical evidence see Richardson (1994) and Schoemaker (1982) respectively.
resolve the issue the US National Oceanic Atmospheric Administration (NOAA) commissioned a panel chaired by two Nobel laureates in economics, Kenneth Arrow and Robert Solow, to review the evidence and theory relating to the validity of contingent valuation methods. Their report concluded that, if conducted carefully and subject to the various methodological safeguards discussed in the report, the methods were capable of correctly measuring preferences and placing a valid dollar value upon intangible benefits (NOAA, 1993).

**Equity and Values**

Most of the methods discussed above have all assumed a simple form of consequentialist utilitarianism. First, benefits are determined by health outcomes, the quantity and quality of life; and, in the tradition of preference utilitarianism, the value of these outcomes is determined by the strength of people’s preferences. Second, there has been an implicit and simplifying assumption that there is a single value of each outcome (albeit an average of many individual’s values) which can and should be employed in economic evaluation. It is as if there were a single purchaser of health services who had placed the same value on health outcome no matter who received it. Neither of these assumptions is tenable.

There is compelling evidence that people have a very strong preference, not only for the maximisation of health outcomes but also for an equitable distribution of health benefits, that is, for a system or process benefit which arises from the distribution of benefits. For example, Table 3 summarises the results of an Australian study designed to test the commitment to maximising life years, QALY’s and health more generally when this implies less equity. From the last column it can be seen that the health maximising option is not usually selected. The last result is particularly striking. The 551 survey respondents rejected the principle that, all else equal, the least costly option should be adopted because this would permit more patients to be treated. Subsequent and more intensive questioning of a sub-set of the sample did not alter this opinion (Nord et al, 1995a). Other results from the same survey suggest that, all else equal, there is a preference for more equally shared benefits (Nord et al, 1996b), that is, a smaller number of health years may be preferred when they are shared amongst a larger number of recipients.

More generally, it is not known exactly what ethical principles people wish to incorporate in the overall health sector and what price they are prepared to pay for these principles. A small number of economists have commenced investigation of these issues (Nord et al, 1996, Williams 1996). But to date these explorations have not proceeded very far. They have been concerned with the appropriate importance weights that should be given to different benefits in a micro evaluation program. There has been no conceptual means suggested for determining how the value of equity should influence the decision regarding the overall level of health expenditure.

The second simplifying assumption is equally untenable. Various values exist depending upon who is asked and the perspective they are asked to adopt. Patient values are different from those of the general population and it is possible to argue that either group should be the appropriate judge of the value of public programs.

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14 It is possible to obtain a willingness to pay valuation or even a time trade off score for scenarios which include process as well as outcome. In practice this is seldom done.

15 The failure to take account of the distribution of benefits in economics is often justified by the argument that, in principle, benefits (money may be redistributed after the event to compensate those who lose from an activity). This is often not possible in health care as health benefits cannot be traded or, even in principle, redistributed to those who lose.
Values differ when individuals are asked to trade-off the quantity and quality of life for others and for themselves (Richardson and Nord 1997). Most obviously, if a willingness to pay criterion of a value is adopted, individuals will generally be willing to pay more for a health benefit that they receive personally than for a benefit received by an anonymous third party. The failure to distinguish these two sets of values is particularly obvious in the WTP literature where it is assumed that the WTP of an individual or the amount the individual is prepared to accept as compensation for personal risk is the appropriate basis for calculating the value of others ie the individual’s valuation of themselves is not distinguished from the amount they would or should pay to assist an anonymous beneficiary.

The latter point is particularly important and highlights a potential conflict with the strong preference for egalitarianism noted above. Health services in all western countries have had a very large collectivist element in their financing and organisation, with European governments generally undertaking 75-85% of total health expenditures. National schemes have also defined and limited the benefits available. Possibly because of the misperception that benefits are unlimited, populations have enthusiastically endorsed such schemes and, in particular, the egalitarian basis for the allocation of resources. If such collectivist values continue then there is a pressing need for the development of a method for evaluating the benefits of equity.

However two factors place the collectivist approach to health under considerable pressure. First, rising health costs imply greater per capita transfers from the healthy wealthy to the unhealthy poor. At present few (outside government itself) appear to question the cross subsidy. As its magnitude grows, social generosity will be increasingly strained. Secondly, and as judged by the (modest) decline in the size of the government sector in most OECD countries, there has been a slow but steady decline in social generosity. This is particularly evident in Australia where (despite mythology to the contrary) the redistributive role of government is small by western standards and where there has been constant pressure to scale back the government sector and the redistribution of income.

This discussion implies that at least two criteria are needed to determine the value of health interventions and the overall level of health expenditures. First, and to the extent to which decisions are still made collectively, it must be decided how individuals evaluate benefits to others (subject to the important caveat that the individual knows that he or she is a potential recipient of benefits). If a major part of the benefit arises from the satisfaction of having a collectivist approach and an equitable health system then this calculation may not be reducible to the evaluation of individual health outcomes. It is for these benefits that economists have not developed a satisfactory evaluation methodology. Yet, paradoxically, it is precisely this situation which is usually used to justify the use of CBA; viz, where social values are not simply the summation of the value of individual benefits (or where for technical reasons individual benefits cannot be expressed). This does not imply that

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16 As noted earlier tax as a percent of the GDP in Australia is the fifth lowest in the OECD (OECD 1995). Survey data from the Luxembourg study (Fritzell 1991, cited in Saunders 1994) found that fewer Australians had their relative income changed more then one decile as a result of taxation and cash benefits than in any of the nine countries studied. (The range was from 8.3% of Australians to 47% of Swedes and Dutch for the general population and 2.3% of Australians to 25% of Swedes for the economically active, (cited from Saunders 1996). Reinforcing this impression that Australians are rather less concerned with redistributing income than many, Saunders (1994) reports that in 1990 the bottom quintile in Australia received a smaller share of gross family income than in any of the eight countries studied (including the USA): a similar result is reported in the World Development Report for 1996 with respect to the distribution of GDP (World Bank 1996). In Saunders’s study the Australian gini index (of overall inequality) at 0.4 was higher than any other country except the USA (0.41).
CBA is of no potential use. Social values will heavily reflect individual benefits. The twofold shortcoming of simple CBA as it is usually employed is that it does not include the benefits of collectivisation per se and that it employs a purely personal notion of value (i.e., what the individual would pay for their own benefits) to measure the value of benefits received by anonymous recipients.

Secondly, and to the extent to which decisions are made individually and for the primary benefit of the individual, market principles should govern the evaluation of benefits and the level of expenditures. This does not imply that there should be a simple deregulated market (as the evidence suggests that such markets are very inefficient). It does imply that the value of health services and health outcomes will vary with individual's incomes and their demand for health. The optimal level of health expenditure in a country will therefore depend on the extent to which it is decided to collectivise the health service, the extent to which there is a (large or small) “window” for purely individual decision making and the extent to which health outcome is valued differently under these two systems. Finally, if private markets remain technically inefficient then the optimal level of expenditure will also reflect the amount that people are prepared to pay to achieve the personal benefits of a free market component in the system; viz, the reduced subsidy to the poor and unhealthy and the greater flexibility in the purchase of health services.

The Way Forward

At present we cannot determine the ideal level of health service expenditure or even if this is above or below the present level. In part this is a result of the methodological problems discussed above and, in part, because of the poor information that is a prerequisite to sensible decision making. Data concerning direct health care costs are now relatively satisfactory. The issue of indirect costs remains problematical. However, as noted earlier the chief problems arise in the measurement of benefits: both tangible systemic benefits but, far more urgently, the benefits of direct interventions measured in medical terms (life years gained, pain alleviation, etc). It is difficult for a health service to determine optimal expenditure when the benefits of many expenditures are not even approximately known and best practice guidelines based upon current knowledge have not been developed or are not used. It is somewhat anomalous that there is such a large budget for medical research and yet so little known about the most appropriate use of the research findings. This may reflect the common prejudice that evaluative research, and especially the evaluation of service delivery is, in some sense a “softer” - less rigorous - and less worthy activity than research into the “harder” sciences.

Information is a prerequisite to the determination of appropriate spending, but equally it is necessary to have incentives to generate and employ the information. This obvious fact suggests that the highest priority in the short run should be health system reform. There is ample evidence of both technical and allocative inefficiency in most health systems and it is a futile exercise to conduct even sophisticated CBA on services which are unnecessarily costly or which would not be provided in an allocatively efficient system. That is, the final decision concerning the inevitable trade-off between the value of life and the value of other benefits can be postponed while health benefits can be obtained at no cost by improved system efficiency.

The difficulty in assessing the various options in the health sector is so great that systemic reform cannot be based upon a model in which individual consumer/patient is required to judge the options even when he or she is supported by the judgement of a self interested and narrowly focused provider. To date this approach has failed
to achieve maximum health benefits from the resources made available. This implies an increased reliance upon some form of agency arrangement in which agents are required to inform, advise and/or negotiate and purchase on behalf of patients. The power in balance between providers and even moderately large agents further suggests that reform will not rely on relatively deregulated and simple markets.

In broad terms there appear to be two chief options for reform. First, it is possible for a government service to attempt to introduce decentralised managed care through the introduction of a purchaser provider separation; ie by the creation of an internal market within the government service in which there is a heavy reliance upon contracts to achieve desired objectives (Jonsson, 1996). Secondly, and the more radical option, it is possible to introduce competition between purchasing agents in a heavily regulated market; that is Managed Competition. Efficiency is envisaged as being achieved by competition; equity through regulation and the provision of a risk related subsidy for individual members of competing schemes (Scotton 1995). With the second option, managed care would again be likely to emerge as the most effective means of achieving allocative efficiency. With either option the era of professional dominance and passive government/private insurance would come to an end.

Conclusions

It is undoubtedly true that health expenditures should not expand until all possible benefits are exhausted. This conclusion must follow from the fact that our resources are scarce and that health expenditures have an opportunity cost. Greater health outlays imply less benefits somewhere else. The most fundamental principle of economics is that these competing benefits should be compared before committing resources to any task.

Beyond this self evident statement there is comparatively little we can say with any confidence about the optimal level of spending. It is not true that ageing or even the introduction of new and expensive technologies will inevitably precipitate a crisis. The impact of ageing will be comparatively modest and has already been accommodated in many developed countries. The overall level of health spending is very largely a matter of social choice. If it is believed that greater benefits are obtained through increased health and specifically for the elderly than are obtained from alternative uses of our resources and if these benefits are obtained more efficiently inside than outside the health sector then there is no reason why the health sector should not expand significantly. Similarly it is untrue that governments cannot afford to finance these services through taxation. This is, once again, a matter of social and political choice. The reluctance to devote ever increasing sums of money to the health sector is at least in part a result of the limited evidence that substantial benefits will be obtained by further indiscriminate spending.

In principle, the optimal size of the health sector could be determined by the economic evaluation of the cost and benefits of each of the services provided. In practise, this exercise has encountered not only formidable practical problems but serious conceptual difficulties in the measurement of benefits. The size of the optimal health sector depends largely upon the value placed upon these benefits and the relationship between health expenditure and benefits is very poorly understood. In CUA the quality and quantity of life are combined into a single unit, the QALY or, more descriptively, the healthy year equivalent. The techniques for doing this are still evolving and CUA has, to date, had little impact upon the allocation of resources.
More intractable problems arise when an attempt is made to convert the value of QALY’s into an equivalent number of dollars as is necessary if cost and benefits are to be compared. Current techniques are flawed. Underlying ethical issues are unresolved. Whose values should be used to make this decision? Which values or what mix of values are relevant? How should issues of equity and the distribution of health services affect total expenditures? Satisfactory answers to these questions have not been suggested; indeed, the importance of these issues is often not even recognised.

Fortuitously there is no urgency in producing answers to these questions. It is not necessary to decide the final marginal trade-off between health and non health expenditures while the health sector is as inefficient as suggested by the evidence. System reform has the potential for increasing both the quality and quantity of life without additional cost - without the loss of benefits elsewhere. However as health system efficiency is improved it will become increasingly difficult to postpone the question of the dollar value of life and, following from, this the optimal level of health expenditure. In the meantime it is appropriate the greatest attention be devoted to the achievement of efficiency and the improvement of health at given cost.

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Saunders, P See fax


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Source: OECD data file.
### Table 2
Three Types of Economic Evaluation

<table>
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<th>Type of Analysis</th>
<th>Benefits(outcomes) Included</th>
<th>Defining Characteristics</th>
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<tbody>
<tr>
<td>1 Cost benefit analysis</td>
<td>Only outcomes which can be valued in $ are included</td>
<td>Benefits measured in dollars.</td>
</tr>
<tr>
<td></td>
<td>Often excludes ‘intangibles’.</td>
<td>Only one project needs to be considered.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selection Criteria: Benefits &gt; costs (no budget constraint).</td>
</tr>
<tr>
<td>2 Cost effectiveness analysis</td>
<td>Only one ‘dimension’ of outcome is relevant, eg lives, life years; cases detected.</td>
<td>More than one project must be considered: projects are ranked.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Different ‘levels’ of the outcome are obtained in different projects.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selection Criteria: Minimise cost/unit output.</td>
</tr>
<tr>
<td>2(a) Cost minimisation</td>
<td>Relevant outcomes identical</td>
<td>More than one project must be considered: projects are ranked.</td>
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<td></td>
<td></td>
<td>No assessment of the ‘value’ of outcome.</td>
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<td>Selection Criteria: Minimise cost.</td>
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<tr>
<td>3 Cost utility analysis</td>
<td>Outcome is multi-dimensional. ‘Intangibles’ - quality of life is quantitatively important.</td>
<td>Quality of life is combined with life years.</td>
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<td></td>
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<td>Life years are weighted to obtain ‘quality adjusted life years’ (QALYs).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Projects are ‘ranked’.</td>
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<td>Selection Criteria: Minimum cost/QALY.</td>
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Table 3
Equity vs Maximum Health: Summary Results

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<th>Issue</th>
<th>Option*</th>
<th>% Choosing Each Option</th>
<th>Maximisation option</th>
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<td>Age/life gain</td>
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<tr>
<td></td>
<td>Against very old</td>
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<td></td>
<td>Equal priority</td>
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<td></td>
<td>Equal priority</td>
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<td>Equal priority</td>
<td>40.5</td>
<td></td>
</tr>
<tr>
<td>Cost/number treated</td>
<td>Favour least costly</td>
<td>18.6</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>Equal priority</td>
<td>81.4</td>
<td></td>
</tr>
</tbody>
</table>

* Summary of fuller statement of option.

Figure 1
The Relative Size of the Health and Other Sectors: 1974-1995

Source: AIHW: Australian Health p 123.
Figure 3
US Health Expenditure as a Percent of GDP 1965-2030

SOURCE: Health Care Financing Administration, Office of the Actuary. Data from the Office of National Health Statistics.