Economic evaluation in health: saving money or improving care?

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Summary

Economic evaluation, most commonly in the form of cost-effectiveness analysis, has now become an established tool of overall health financing policy. However, health policy makers choose to use or ignore the accumulated body of economic evidence for a variety of reasons. This policy review takes a step back and looks objectively at the appropriate role and use of cost-effectiveness analysis within the broader context of health system financing, and also discusses a series of technical limitations (and potential solutions) that impact on the generation of a genuinely comparable economic evidence base in health at the population level. While the explicit purpose of economic evaluation is to address the health financing objective of efficiency, the authors conclude that its application can be usefully extended to other health system goals, including financial protection (specification of core public healthcare packages for universal insurance) and equity in financing (assessment of intervention costs and effects by stakeholder or socioeconomic group). In order to contribute to these broader objectives, a sectoral or population-based approach to cost-effectiveness analysis is needed.

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Introduction

Economic considerations have assumed an increasingly prominent role in the planning, management and evaluation of health systems, ranging from the design of ways to pay providers or to improve access to care for households, to the definition of essential packages for insurance, to decisions about whether or not to include new medicines on hospital, state or national formularies. Increased attention to issues of cost and efficiency have been prompted by the pervasive scarcity of resources relative to health needs and demands, driven by factors such as the HIV pandemic, ageing populations, the development of innovative but often expensive technologies and also by the heightened knowledge and expectations of healthcare consumers. These classical forces of supply and demand on the market for healthcare have given rise to the need for sophisticated methods of quantitative analysis, including modelling of disease processes and outcomes, econometric modelling for population-based resource allocation exercises, macro-level modelling of the impact of (ill-)health on wealth (and vice versa), and multi-state decision analytic models that assess the technical efficiency of health interventions.

As part of this process, economic evaluation, often using cost-effectiveness analysis (here the term is used to include cost-utility analysis), has become a commonly used tool to inform health policy as well as to guide clinical decisions. It establishes the relative costs and impacts of health interventions, with the underlying objective of maximising population health for the available resources. There are now many thousands of completed evaluations that have identified how and where efficiency improvements could be made. Many are clinical and most focus on ways to address a particular disease or health problem, but a few have considered how the efficiency of the health sector as a whole could be improved.

In some countries, the use of cost-effectiveness analysis has been institutionalised for decision making, most commonly to address the question of public subsidies for the purchase of medicines. In other settings, the influence of this accumulated body of economic evidence on decision making and resource allocation is harder to detect. In part, this is due to the fact that it can be difficult to attribute changes in policy or resource allocation to the presence of an economic evidence base when economic evidence is but one of the factors that is typically considered when households, firms or governments make such decisions. However, it is also the case that decision makers find the evidence difficult to interpret and apply because of methodological heterogeneity and inconsistency, which limits the comparability and generalisability of different results.

This policy review takes a step back and looks objectively at the role and use of cost-effectiveness analysis at the population level within the broader context of health.
system financing, commenting in particular on the extent to which it can be used to address key financing challenges. A series of technical limitations are also discussed that reduce the value of the current information base to decision makers and suggest possible solutions. A discussion on the role of economic information in resource allocation decisions concludes the review.

**Health system financing: key challenges**

**The changing landscape of disease and injury**

Globally, great improvements in health have been observed over the last few decades, as evidenced by increased life expectancy and reduced child mortality in the vast majority of countries. Such improvements can be attributed partly to increased living standards, improvements in the availability of environmental conditions such as water and sanitation, and more recently, to advances in medical technologies and services²⁶,²⁷.

But of late there have also been some notable and significant reverses. For example, average life expectancy in a worrying number of countries in Sub-Saharan Africa has actually declined since 1990 while adult male mortality rates have increased in parts of the former Soviet Union including Russia²⁶–²⁹. These developments have different causes; economic decline and increases in HIV in Africa²⁸,³⁰, alcohol abuse and associated chronic disease in Russia²⁷,²⁹. However, in all regions of the world, non-communicable diseases are becoming increasingly important, leaving poor countries with the double burden of financing high burdens of infectious diseases while at the same time tackling the escalating toll of cancer, cardiovascular disease, diabetes and road traffic injuries³¹. Now that treatment is substantially prolonging life, the ‘lifestyle’-related non-communicable diseases, plus HIV, require relatively expensive, long-term care, increasing the need to find more resources for health. This is exacerbated by the need to develop effective early warning systems to detect the emergence of new infectious diseases such as SARS and avian influenza.

**Health spending: inefficient or insufficient?**

From an economic perspective, it is always tempting to point out that if resources were more carefully targeted towards the priority health needs of the population, more benefit could be obtained from existing levels of expenditure. While the search for such improvements is certainly needed, it is important to distinguish between the relative efficiency with which resources are allocated versus the absolute quantity of resources available in the first place. Of the 192 countries that are members of the World Health Organization (WHO), and for which data are available, 39 spent <US$25 per capita on health in 2004, and 60 spent <US$50³². This includes
funding from all sources; external and national donors, governments, firms and household out-of-pocket contributions. This level of funding is not sufficient to ensure universal access to even a minimum level of basic health services, estimated to cost somewhere between US$35 and $50 depending on the country.\textsuperscript{33,34}

In most countries, health expenditures have been rising more rapidly than national income, to the extent that the world’s richest countries are finding that in spite of cost containment measures, some are now devoting well in excess of 10% of their entire production to pay for health-related services and goods.\textsuperscript{32} Tax- or social health insurance-funded systems have been unable to find the funds required to ensure universal access to all the interventions that have the possibility to improve health or extend life, resulting in apparent resource scarcity even in rich countries. The first key issue of health financing policy, therefore, is to raise sufficient funds for health, an issue that is important in all countries but critical in the poorest parts of the world.

**Composition of health spending**

Raising funds is important, but not sufficient. The two other questions relate to how the funds are raised and how they are used. In terms of the former, out-of-pocket payments made by households directly to providers are a regressive form of health financing; they penalise those least able to afford care and ensure that some people who need services do not seek them. Moreover, they lead in many cases to health spending levels that have been labelled ‘catastrophic’ because they cause households to reallocate their budgets away from other essential needs such as education, food and housing. In some cases the simple act of seeking care can even push households under the poverty line because of the need to pay for services. Every year an estimated 44 million households worldwide face catastrophic health expenditures; defined as spending more than 40% of their non-subsistence income on healthcare payments, and about 25 million are pushed into poverty.\textsuperscript{35,36} Catastrophic health expenditures are not only a threat to household economic security in low- and middle-income countries, they also effect households in virtually all high-income countries. For example, in the US out-of-pocket health payments are reported to be a leading cause of household indebtedness.\textsuperscript{37}

To protect people against the financial risks involved in falling ill and seeking care, there is now solid agreement that it is important to increase the extent to which most low- and middle-income countries rely on pre-payment mechanisms to finance health, via insurance, taxation or a mix, rather than relying on user charges. Pooled funds can then be used to allow people to access services when they need them, spreading the financial risks of ill health across the population. How this is achieved when many people work in the informal sector (which makes it hard to collect both taxes or health insurance premia) is a major issue capturing the attention of both the countries and the international community.\textsuperscript{38,39}
Health system financing and the role of economic evaluation

Two fundamental questions for health financing, therefore, are how to raise sufficient funding for health and how to generate resources in an equitable manner that protects households from financial catastrophe and impoverishment. How can this be done?

Health financing functions and objectives

All health financing systems, however organised, share three key functions: revenue collection (i.e. how financial contributions are collected from different sources, and via what mechanism (tax, insurance etc)); pooling (i.e. how financial contributions are pooled together so that the risk of having to pay for healthcare is not borne by each contributor individually); and purchasing/provision (i.e. how contributions are used to purchase or provide health services).

There are many different ways of undertaking these functions. Revenues might be collected by using taxes, insurance contributions or direct payments by households. A mix of all three in the same country is commonly found. Insurance contributions might be income based or independent of income. Funds can be assembled into one large pool, many competing pools, or at the extreme, where countries rely largely on out-of-pocket payments, not pooled at all. Services of health providers are ‘purchased’ using a variety of mechanisms including salaries, fee for service payments, capitation or a mix. It is the combination of decisions made on all of these aspects that determines the overall ability of the system to raise adequate funds and to protect people from financial catastrophe and impoverishment.

Figure 1 provides a conceptual framework that shows how these health financing functions are linked to the attainment of overall health system goals. On the left are the four functions of health systems that are included in WHO’s health system framework; financing, revenue generation, service delivery and stewardship or governance. The desired health system outcomes are on the right. The fundamental goal is to improve population health, but systems also seek to reduce health inequalities, improve health system responsiveness and provide risk protection against the financial consequences of illness. Reducing the incidence of financial catastrophe is a goal in itself, linked to the concept of fairness in financial contributions. However, it also helps to improve health and reduce inequalities by removing financial barriers to access. Raising adequate funds for health, the first question discussed above, is key to improving health, reducing inequalities and developing responsive systems of care.

The figure also shows that a number of intermediate outcomes facilitate the process of turning resources into the outcomes people care about. They are listed as transparency and accountability,
the equitable distribution of and access to resources (generally measured in terms of coverage of key interventions), and the quality and efficiency of services. It is the last of these strategic objectives, efficiency, that represents the focus of economic evaluation in health. Greater efficiency is akin to having more resources. It allows the system to move closer to its chosen goals.

**Principles and practice of economic evaluation**

Efficiency is concerned with maximising the use of limited resources for health, and can be framed in terms of two basic questions of interest to policy makers:

- Do the resources currently devoted to health achieve as much as they could?
- How best to use additional resources if they become available?

Economic evaluation provides a set of analytical principles and techniques that can be usefully employed to directly address these questions, which it does by systematically comparing the relative costs and consequences of different health intervention strategies. Analysis of these costs and consequences may be, and usually is, directed at marginal efficiency gains for a particular intervention or disease entity (technical efficiency), or alternatively it may be concerned with establishing an optimal mix of interventions across the health sector as a whole (allocative efficiency).

Economic analysis geared towards assessment of technical efficiency is now regularly undertaken as a way of determining whether new health technologies or strategies aimed at a...
particular disease, risk factor or health problem are cost effective. A variety of meanings, however, are attached to this term in practice. In the event that the new intervention is both less costly and more (or equally as) effective than the alternative, or more costly (or equal cost) and less effective, the answer is clear. In the former case, it can save resources as well as improve overall levels of health, while in the latter case it would not be considered. It is more common, however, that a new intervention both costs more than existing options and produces more health. In such cases the question is whether it is better value for money than other uses of scarce resources, new or existing.

The only way to answer this question properly is to have information on a large number of alternative ways of using the resources. This requires what has been called a sectoral approach to cost-effectiveness analysis, which asks the question of how to achieve the highest possible overall level of population health for the available resources. A new intervention that is more effective yet more costly than existing practice is only cost effective if, for the required resource investment, it will attain greater health than all possible alternatives.

A full sectoral analysis requires much more data and effort to compile a comparable and comprehensive database of costs and effects for a wide range of interventions. As a result, there have been relatively few attempts to do this and often cut points based on some assessment of what a society seems to have been willing to pay to gain a quality-adjusted life year, disability-adjusted life year or year of life have been used instead. Early examples of full sectoral analyses include the work of the Oregon Health Services Commission, the World Bank Health Sector Priorities Review and the Harvard Life Saving Project. Only the World Bank attempted to undertake a global analysis and inform decision making across a range of countries and disease areas, but its value was limited by the fact that cost-effectiveness ratios, and the policy conclusions drawn from them, were derived from analyses which relied on differing methods or assumptions and which were undertaken in very different epidemiological and cost settings.

More recently, a second edition of Disease Control Priorities in Developing Countries (DCP2) has been published, which updated and expanded on the earlier analyses and sought to implement common standards for economic analysis and reporting (for example, results are provided for six geographically determined low- and middle-income regions of the world). Despite the attempt to standardise, there nevertheless remains a level of analytical heterogeneity and inconsistency that impinges on the ability to make strict comparisons of cost effectiveness across a broad range of disease intervention areas.

The other recent development is the WHO-CHOICE project, which, like DCP2, set out to generate comparable databases of intervention cost effectiveness for all leading contributors to disease burden in a
number of world regions. In fact, the DCP project draws on some of the work of CHOICE. A suite of standardised analytical tools and guidelines, together with tight quality control, have produced a high degree of comparability across specific disease analyses. In contrast to conventional practice in economic evaluation, in which analysis is undertaken in order to inform a specific decision maker with a known budget and other constraints, CHOICE implements a generalised approach to cost-effectiveness analysis, which enables the efficiency of current practice to be evaluated at the same time as the efficiency of new interventions (should additional resources become available). This has been a problem with traditional cost-effectiveness analysis; even in the event that a new intervention proves to be less costly and more effective than current practice, the question of whether current practice should have been done in the first place is rarely asked.

Further key contributions of CHOICE include the evaluation of interventions at different levels of coverage, in order to observe economies and diseconomies of scale, as well as the evaluation of interactions that exist when individual interventions are combined, as happens in reality, to incorporate economies or diseconomies of scope. For example, the health effects of population screening and treatment for high cholesterol will depend on whether there is already screening and treatment for high blood pressure in the same population, something that is rarely considered in traditional cost-effectiveness analysis.

The objective of cost-effectiveness analysis is not to save money per se, but to improve efficiency, to gain more health for the available resources or to increase health to the greatest possible extent using new resources. It will sometimes be possible to release resources for other health-improving activities by replacing a less efficient intervention with one that is more efficient, but this is not the objective of the exercise. Moreover, cost-effectiveness analysis is not about money per se, but about the value of the resources consumed, or opportunity costs. For example, a new intervention might reduce the time a health provider must spend in a particular activity. While this releases a scarce resource, health provider time, there may well be no money savings that result because providers reallocate that time to other health-improving interventions. They can now achieve more with their allotted time, which is beneficial to society, but there are no financial savings.

Uses of cost-effectiveness analysis
In the preceding sections, two fundamental questions of health financing policy have been asked: raising sufficient resources for health; and raising them in a way that provides financial risk protection for the population. To facilitate these objectives, the question of efficiency becomes fundamental. Ensuring that scarce resources are used efficiently reduces the need to find additional resources, and gets the country closer to its chosen objectives. It has also been emphasised that the objective of economic evaluation is not to save money, but to ensure that resources are used efficiently.
In terms of the key health financing challenges, there are a number of logical inputs that economic evaluation could focus on by way of a response:

- **Changing landscape of disease:** economic evaluation is concerned with how to make the best use of scarce societal health resources. In order to make these judgments at the population level, cost-effectiveness analyses need to be undertaken for a broad range of identified public health priorities as well as for a wide selection of interventions ranging from health promotion, prevention, treatment, rehabilitation and even intersectoral actions to promote health. Analysts also need to be responsive to the changing landscape of disease; for example, by modelling the economic costs and effects of tackling emerging epidemics. Furthermore, analysts need to recognise that interventions are rarely undertaken in isolation; analysis that does not take into account possible synergies between interventions that can be expected to be undertaken together is not likely to be useful for decision making.

- **Current levels of resource use:** the few examples of sectoral analysis suggest that many countries undertake interventions that are not very cost effective, while not fully implementing some that are cost effective. Yet most analyses focus only on marginal changes that require additional resources. Understanding the extent to which the current mix of interventions is efficient is critical in understanding if more could be achieved with the same resources. It can also be used to assess the cost and impact of essential packages of interventions that could be subsidised by government or included in health insurance packages.

- **Composition of health intervention costs:** many economic analyses take a single agency perspective, whether that be the government, the health service, an insurer or an employer. In order to lay bare the opportunity costs of health interventions that are faced by households, governments and other relevant agents or stakeholders, economic analysis needs to be undertaken from a multiple agency perspective. In addition, analysis of the costs and effects of intervention for different socioeconomic groups (stratified by income, for example) would contribute to debate concerning health financing policies aimed at protecting the poor.

**Conclusions**

Economic evaluation is sometimes perceived to be an end in itself rather than a tool that is part of an approach to overall health system financing. Accordingly, this policy review set out a number of central components of health financing and used these to consider the role and value of cost effectiveness in the planning, management or monitoring of health systems. The two key roles of health financing systems are to raise sufficient funds for health and to do so in a way that allows people to access services without the risk of financial catastrophe or impoverishment.
Reducing costs is not a goal of health policy. Improving efficiency, however, is desirable in that it facilitates the ability of the system to reach these goals, although it too is not an end in itself.

A number of other issues specific to cost-effectiveness analysis emerged from this review. First, although there are now a large number of completed economic evaluations, the value of this accumulated body of evidence to policy makers has been restricted by the inconsistent methodologies that have been used, and by the fact that traditional analysis does not examine either the efficiency of current interventions or economies of scale and scope. This limits the practical value of the results as well as restricting comparability across studies and the generalisability of results to different settings.

Second, there are many potential policy uses of economic evaluation, ranging from the specific to the quite general (technical versus allocative efficiency). In order to address pressing financing issues facing health systems worldwide, there are a number of analytical advantages associated with a sectoral approach to cost-effectiveness analysis, especially the assessment of the extent to which existing health strategies themselves represent an efficient use of resources.

Third, while the explicit purpose of economic evaluation is to address the health financing facilitating objective of efficiency, its application can be usefully extended to other health system goals, including financial protection (specification of core public healthcare packages for universal insurance) and equity in financing (assessment of intervention costs and effects by stakeholder or socioeconomic group).

On a final note, economic evaluation focuses on only one outcome, population health. There are many other outcomes people also care about; inequalities in health outcomes, utilisation of services, responsiveness and fairness of financing, for example. Therefore, the results of economic evaluation cannot be used to set priorities by themselves but should be introduced into the policy debate to be considered along with the impact of different policy and intervention mixes on other outcomes. Such multi-criteria priority setting is usually undertaken in a strictly qualitative way, for example, with reference to a series of second-stage criteria such as strength of evidence, equity, feasibility and acceptability. Recent work has sought to develop more quantitative methods that introduce these other goals explicitly into the cost-effectiveness calculus, but it is too early to assess the extent to which it usefully guides the policy-making process. Whichever approach is adopted, the conclusion to be drawn is that there is a clear need to go beyond cost-effectiveness considerations only, and that the way to most appropriately accomplish this is by carefully considering the priority to be accorded to interventions from a number of locally determined perspectives (in isolation and then in conjunction with each other).
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