



H N P D I S C U S S I O N P A P E R

# Principles of Capital Financing and Capital Charging in Health Care Systems

Jon Sussex

September 2004





# **PRINCIPLES OF CAPITAL FINANCING AND CAPITAL CHARGING IN HEALTH CARE SYSTEMS**

**Jon Sussex**

**September 2004**

## Health, Nutrition and Population (HNP) Discussion Paper

This series is produced by the Health, Nutrition, and Population Family (HNP) of the World Bank's Human Development Network ([HNP Discussion Paper](#)). The papers in this series aim to provide a vehicle for publishing preliminary and unpolished results on HNP topics to encourage discussion and debate. The findings, interpretations, and conclusions expressed in this paper are entirely those of the author(s) and should not be attributed in any manner to the World Bank, to its affiliated organizations or to members of its Board of Executive Directors or the countries they represent. Citation and the use of material presented in this series should take into account this provisional character. For free copies of papers in this series please contact the individual authors whose name appears on the paper.

Enquiries about the series and submissions should be made directly to the Editor in Chief. Submissions should have been previously reviewed and cleared by the sponsoring department which will bear the cost of publication. No additional reviews will be undertaken after submission. The sponsoring department and authors bear full responsibility for the quality of the technical contents and presentation of material in the series.

Since the material will be published as presented, authors should submit an electronic copy in a predefined format as well as three camera-ready hard copies (copied front to back exactly as the author would like the final publication to appear). Rough drafts that do not meet minimum presentational standards may be returned to authors for more work before being accepted.

The Editor in Chief of the series is Alexander S. Preker ([apreker@worldbank.org](mailto:apreker@worldbank.org)); For information regarding this and other World Bank publications, please contact the [HNP Advisory Services](#) ([healthpop@worldbank.org](mailto:healthpop@worldbank.org)) at: Tel (202) 473-2256; and Fax (202) 522-3234.

ISBN X-XXXXXX-XX-X

© 2004 The International Bank for Reconstruction and Development / The World Bank  
1818 H Street, NW  
Washington, DC 20433

All rights reserved.

# Health, Nutrition and Population (HNP) Discussion Paper

## Principles of Capital Financing and Capital Charging in Health Care Systems

Jon Sussex<sup>a</sup>

<sup>a</sup> Associate Director, Office of Health Economics, London, United Kingdom

Paper prepared for the World Bank's Resource Allocation and Purchasing Project

**Abstract:** Most health care systems could improve their efficiency in using physical capital - buildings and equipment. Health care systems in which assets are provided by governments or donated by aid organizations generally have only weak incentives for those assets to be used efficiently. Wrongly located or inappropriate facilities, poorly utilized and maintained, are a result. This Discussion Paper summarizes the principles of effective, efficient, and equitable capital financing and capital charging in health care systems. It reviews the options for putting these principles into practice and refers to the limited literature on the impacts of those options. The objectives, principles, and practicalities of implementing capital charging arrangements are set out. The relative benefits and costs of points along the following dimensions are described and summarized: applying capital charges just to newly acquired assets or also to those already in existence; using notional or real capital charges; the time profile of charges; and the asset valuation basis adopted.

**Keywords:** resource allocation and purchasing, health care financing, health care, capital, investment, finance, charging

**Disclaimer:** The findings, interpretations and conclusions expressed in the paper are entirely those of the authors, and do not represent the views of the World Bank, its Executive Directors, or the countries they represent.

**Correspondence Details:** Jon Sussex; Office of Health Economics, 12 Whitehall, London, SW1A 2DY, United Kingdom; Tel: +44 (0)20 7747 1412; Fax: +44 (0)20 7747 1419; Email: <mailto:jsussex@ohe.org>; Web: <http://www.ohe.org/>



## **Table of Contents**

<b>FOREWORD.....</b>	<b>VII</b>
<b>ACKNOWLEDGMENTS .....</b>	<b>IX</b>
<b>INTRODUCTION.....</b>	<b>1</b>
<b>COMMERCIAL APPROACHES TO CAPITAL FINANCING AND CHARGING .....</b>	<b>1</b>
<b>PRINCIPLES .....</b>	<b>2</b>
<b>OPTIONS.....</b>	<b>5</b>
CAPITAL FINANCING .....	5
CAPITAL ALLOCATION .....	6
CAPITAL CHARGING.....	7
<b>CAPITAL CHARGING: INCLUDING EXISTING ASSETS? .....</b>	<b>7</b>
<b>NOTIONAL VS REAL CAPITAL CHARGES? .....</b>	<b>9</b>
<b>TIME PROFILES OF CAPITAL CHARGES.....</b>	<b>10</b>
<b>CAPITAL CHARGING: ASSET VALUATION.....</b>	<b>12</b>
VALUATION.....	12
REVALUATION.....	13
<b>CONCLUSIONS .....</b>	<b>14</b>
<b>REFERENCES.....</b>	<b>15</b>



## FOREWORD

Great progress has been made in recent years in securing better access and financial protection against the cost of illness through collective financing of health care. This publication – *Principles Of Capital Financing And Capital Charging In Health Care Systems* by Jon Sussex – is part of a series of Discussions Papers that review ways to make public spending on health care more efficient and equitable in developing countries through strategic purchasing and contracting services from nongovernmental providers.

Promoting health and confronting disease challenges requires action across a range of activities in the health system. This includes improvements in the policymaking and stewardship role of governments, better access to human resources, drugs, medical equipment, and consumables, and a greater engagement of both public and private providers of services.

Managing scarce resources and health care effectively and efficiently is an important part of this story. Experience has shown that, without strategic policies and focused spending mechanisms, the poor and other ordinary people are likely to get left out. The use of purchasing as a tool to enhance public sector performance is well documented in other sectors of the economy. Extension of this experience to the health sector is more recent and lessons learned are now being successfully applied to developing countries.

The shift from hiring staff in the public sector and producing services “in house” from non governmental providers has been at the center of a lively debate on collective financing of health care during recent years. Its underlying premise is that it is necessary to separate the functions of financing health services from the production process of service delivery to improve public sector accountability and performance.

In this Discussion Paper, Sussex reminds the reader that most health care systems have room for improving efficiency in the use of physical capital — not only buildings and equipment, but increasingly also information technology. The processes by which capital is allocated and paid for is often more inefficient than that used to pay for labor, medicines, and other inputs. Often the funds for capital investments are donated by governments or aid organizations. This gives health care providers an incentive to demand more in capital investments than is financially sustainable in terms of the associated recurrent cost requirements. Usually there are no penalties for under use of the resulting infrastructure and equipment. In many low income countries this leads to poorly located facilities, low neglect of maintenance and underutilization of the resulting services. The resulting facilities provide a poor standard of care, divert resources away from where they could be used more effectively, and damage staff morale. The paper concludes with a summary of principles of effective, efficient and equitable capital financing and capital charging, including policy options for putting these principles into practice.

*Alexander S. Preker*

Lead Economist  
Editor of HNP Publications



## **ACKNOWLEDGMENTS**

The author of this Report is grateful to the World Bank for having published it as an HNP Discussion Paper.



## INTRODUCTION

Most health care systems have room to improve their efficiency in using physical capital—particularly buildings and equipment—is put to use. The processes by which capital is allocated and paid for in many systems mean that efficiency incentives are often weaker than for use of labor, medicines, and other inputs.

Where assets are donated by governments or by international or domestic aid organizations, health care providers have an incentive to overdemand capital investments initially and then to undermaintain them. Wrongly located or inappropriate facilities, only partially used and poorly maintained, are a result. Such facilities provide a poor standard of care, divert resources from more effective uses, and damage staff morale, so weakening health services further.

This paper summarizes the principles of effective, efficient, and equitable capital financing and capital charging in health care systems, reviews the options for putting these principles into practice, and considers the comparative merits of alternatives. Capital assets are defined by the fact that they have to be purchased up-front in order to deliver a stream of services over a period of years. This raises issues of financing, depreciation, and maintenance over an asset's lifetime.

When reading this discussion, it is important to retain a sense of proportion. Health care, even in the most technically developed economies, is not capital intensive but labor intensive. Health care professionals have to deliver most care to their patients in person. Acute hospitals delivering specialized secondary or tertiary health care are the most capital-intensive part of health services. But, even there, capital typically represents only around 10 percent of total costs. Labor, mostly, plus medicines and materials, account for the other 90 percent of acute hospital costs. Nevertheless, patients, the public, and health care staff all put great importance in having access to modern and well-equipped hospital and clinic buildings.

## COMMERCIAL APPROACHES TO CAPITAL FINANCING AND CHARGING

Private sector businesses generally base their investment decisions on commercial criteria. They raise capital from debt or equity sources or use retained profits; and they account for the costs of retaining (as opposed to selling off) and using their assets, including the costs of depreciation over their assets' lifetimes.

Firms operating in competitive markets succeed or fail according to their ability to earn enough from their investments to pay for the asset base plus the interest and returns to equity holders due on their invested capital. Accounting standards are enforced to ensure that lenders to, and shareholders in, businesses are informed about the use and cost of capital in those businesses. The incentive to stay in business and earn profits then provides firms' managers with a strong and direct stimulus to invest in and manage capital assets efficiently. The absence or weakness of such clear incentives in many health care systems create the need for explicit policies on capital investment and capital charging to be applied there.

The basic commercial model of capital financing and capital charging has the following characteristics:

- Allocation of capital, both within a sector and between sectors, is the outcome of manifold individual business decisions. It is not planned by any governmental or other central body. Allocative efficiency depends on competitive final markets for the goods and services produced, and efficient private labor and capital markets. Some businesses will fail as a result of making what turn out to be bad (or unlucky) investment decisions, but overall the allocation of capital will be efficient in those circumstances.
- Financing is provided by private capital markets or businesses' retained profits. Private capital markets determine the cost of capital for any given investment project or program according to the risk involved and the balance of capital supply and demand prevailing at the time.
- Capital charging covers both depreciation of assets and payment of a return on the assets—explicitly through interest or dividends or implicitly from increased retained profits.

Health care markets, however, are generally unlike normal commercial markets. There are many reasons for this, which will not be rehearsed here. A concise description and analysis of these reasons is set out in Rice (1998). Even in the United States, which of all countries relies most on private businesses operating in competitive markets to purchase and provide health care, around half of all health care expenditure is by the public sector.

Governments all over the world have long been involved in planning and funding health care. In many places, providers of health care are also state owned.<sup>1</sup> Hence governments are closely involved in the allocation and financing of capital investment in the sector. A variety of approaches to allocating and charging for capital are used. The results in many places leave considerable scope for improved efficiency in the allocation and use of capital.

## PRINCIPLES

The focus of the rest of this paper is on the parts of health care systems that do not rely on commercial market forces to determine the extent and allocation of capital investment in health care provision. In such systems, the problem is to replicate the incentives and constraints that stimulate efficiency in commercial markets, so that:

- Health care providers are allocated the right volume of capital funds and invest them in the right mix of buildings<sup>2</sup> and equipment.

<sup>1</sup> The distinction between public *provision* of health care—owning the assets and employing the staff—and public *funding* of health care is returned to later in the paper. It is possible to have either without the other: for example, public funding but private provision. In practice, public provision funded by private payers is rare and is nowhere more than a small part of the health care system.

<sup>2</sup> Including the land they stand on and in, and any major engineering plant they necessarily contain, e.g. lifts and boilers.

- Financing of capital investment is obtained from the most cost-effective source, whether government, international lending organizations, or private capital markets.
- Assets, once procured, are used efficiently and are maintained, replaced, or disposed of efficiently.

Achieving all three objectives depends on giving managers strong incentives to take full account of the costs, as well as the benefits, of capital investment. In many nonmarket-based health care systems, providers may not have to bear the full economic costs of capital investments: capital is a “free good” to them or a heavily subsidized one. Although obtaining permission from health care payers (e.g. social insurance funds, local or national government) to purchase assets may be difficult, once that permission is given it is commonly accompanied by a grant of the necessary capital funds. In that case, the buildings and equipment purchased with the grant are a “free good” to the health care provider, who does not have to pay anything more to use the assets. No depreciation charge has to be included in the income and expenditure account. No interest has to be paid or other return on the capital earned.

Once assets have been purchased, the health care provider has to find the funds to staff, operate, and maintain them. At that point, the health care provider may decide that it can afford to run its new facility only at less than full capacity. In the extreme case, the provider may decide to mothball the assets and not use them at all. Although there is no cash or accounting cost to doing so, there is a clear opportunity cost, namely the forgone value of other uses to which the resources used to create those assets might have been put. Bringing this opportunity cost home to health care investment decisionmakers and managers is the main purpose of “capital charges.”

Capital charges comprise two main elements: depreciation and the cost of capital.

- *Depreciation* is the extent to which the asset is consumed, or used up, during a year. This is conventionally calculated as one  $n^{\text{th}}$  of the asset’s initial value, where “n” is the assumed useful life of the asset in years. For example a desktop computer may be depreciated over five years, but a hospital building over anything from 25 to 100 years<sup>3</sup>. This is so-called “straight line depreciation.” Alternative depreciation profiles are rarely used and are not discussed further here. Broadly speaking, funds accumulated in a business’s depreciation reserve should be sufficient to enable the firm to replace assets at the end of their lives.
- The *cost of capital* is the opportunity cost of not investing the funds elsewhere in the economy. Every dollar invested in purchasing assets for health care could be invested elsewhere in the economy, where it would be expected to earn a positive rate of return. The cost of capital measures that forgone investment return. As the cost of capital is related to the riskiness of the investment, the relevant cost of capital is the marginal social return expected from investments with the same degree of riskiness as the health care investment being considered.

<sup>3</sup> Land is not usually depreciated in accounts, as in most cases it is not “used up” but should be just as available for further use in a hundred years as it is today. An exception to this is land contaminated by current use, in which case the depreciation of its value should be entered as a cost in accounts.

If health care provider managers have to include depreciation as an expense and have to pay for the cost of capital, they will no longer treat capital investment as a free good. Unless they enjoy the luxury of unlimited budgets, they will have the same incentive to use capital efficiently and to not overinvest, as they do to use staff efficiently and not recruit more staff than they need. If one set of hospital managers wishes to invest in more buildings or equipment than another, they will have correspondingly less to spend on personnel, outside services, and materials, or their total costs will be higher, and transparently so.

The objectives of a capital charging are thus to:

- Make managers aware of the costs of capital, so that they do not treat it as a “free good.”
- Provide managers with an incentive to invest in the most efficient mix of capital and labor, to maintain assets efficiently, and to dispose of them in the way that maximizes their disposal value or minimizes the disposal cost.
- Enable comparison of the costs of different health care providers. This can be an important performance management tool;
- Establish a basis for fair competition between private providers, which cannot avoid the costs of capital and depreciation, and public providers.

All commercial enterprises account for their use of capital. The desirability of doing so is not questioned. Depreciation is a cost on the profit and loss account, as are interest charges on debt. The sources and uses of funds are recorded in the accounts and a balance sheet is kept of the assets owned. Furthermore, it is common managerial practice in private corporations with operations on multiple sites to levy rents or capital charges on individual operating units so that the managers of those units take responsibility for the capital they use.<sup>4</sup>

Where capital charging has been introduced into public sector organizations, it has been deemed a success at achieving some or all of the above objectives while not incurring excessive implementation and administration costs. Heald has published numerous assessments of the implementation of capital charging in the United Kingdom’s National Health Service since April 1991 and concludes that: “capital charging is a valuable but flawed tool, which is much better than the asset invisibility it replaced” (Heald 2000, p.26)

Heald and Scott (1996) also refer to a similar policy initiative that was introduced in New Zealand in July 1991 for all government departments, including the health care system. They quote from assessments of the New Zealand policy by the management consultants Price Waterhouse in 1992 and 1993, which suggest that capital charging was having a beneficial influence on the behavior of public sector managers.

<sup>4</sup> Pratten (1993) provides a useful survey of such practices.

## OPTIONS

A range of options exists for introducing capital charging into publicly owned or publicly funded health care systems and these are intertwined with the sources of capital financing used.

### CAPITAL FINANCING

For ease of description, the remainder of this paper is written in terms of publicly owned health care providers. Public sector health care providers invariably earn the most of their revenues from public sector payers such as the country's national health service or from statutory (quasi-governmental) social insurance funds, rather than from private sector customers.

Privately owned health care providers earn revenues from either or both of public and private sector payers and borrow capital from both sectors. Wherever capital is borrowed from privately owned health care providers account and pay for it in the manner of the commercial model described above. Whatever the mix of private and public funding, privately owned health care providers already de facto have capital charging systems in place and commercial incentives to use capital efficiently. Hence the focus in the rest of this paper is on publicly owned providers, which invariably receive most of their funding from state or "social" (as opposed to private) payers. But it is their public ownership that is the key. When the public sector owns the assets of health care providers, it is public sector managers who must be given incentives to obtain, use, and dispose of capital assets efficiently.

Finance for capital investment by publicly owned health care providers might in principle be borrowed from government,<sup>5</sup> international lending organizations, the private sector, or all three, with or without government guarantees that debts will be honored.

From the perspective of the health care provider, the most cost-effective source of capital finance for any investment project is the one that carries the lowest interest rate—unless when insufficient funds are available. Except in extreme circumstances, funds can always be borrowed from private capital markets, at a price. Governments and international lending organizations, however, typically limit the volume of funds they are willing to lend per time period. If funds from government and international lending organizations are exhausted, the interest rate at which they would have been lent is irrelevant.

From the perspective of a whole national economy, however, the most cost-effective source of capital is not necessarily the one that charges the lowest interest. The interest rates on government borrowing may not accurately reflect the project risk. If private capital markets are reasonably efficient, one line of economic argument goes, then whatever rate of interest the private sector would charge to finance a particular investment is the cost of capital for that investment. If the government offered to lend for the same purpose but at a lower interest rate, it

<sup>5</sup> For the purposes of this discussion no distinction is drawn between borrowings from national or subnational tiers of government. The discussion is phrased in terms of borrowing from national government as sub national tiers are seldom fully self-financing—for example, from local taxes and charges—and so ultimately rely on central government finances to underwrite them.

would be subsidizing the loan, according to this argument. The government is able to offer this subsidy only because it has the power to coerce future taxpayers to pay for it.<sup>6</sup>

However, this theoretical approach may mislead for several reasons, particularly where private capital markets are not efficient. In that case, the cost of a private loan may reflect not just risk but the ability of the lender to extract supernormal profits. Even where private capital markets are well established and reasonably efficient, there may be grounds for the private cost of capital to exceed the public cost by a small amount, even after proper adjustment for risk.<sup>7</sup>

The rate of interest charged by private lenders for a particular health care investment project will depend on the extent of any government guarantees that payments to the private lenders will be met. If the government guarantees to the private lender that the interest charges will always be paid and the principal repaid, there is no more risk to the lender in financing the project than in buying government securities, so the interest rate should be correspondingly low. But a government willing to make such a guarantee might as well lend the capital to the health care provider itself because it gains nothing—transfers no risk—by involving the private sector and will probably have to pay higher transaction costs in doing so. At the other end of the spectrum, if the government makes limited or no guarantees to the private lenders, the rate of interest will be higher because some risk is being transferred to the private sector.

If capital is available from international lending organizations at a lower interest rate than from either the government or the private capital markets, from the national perspective this will be the most cost-effective source. If there is any implied subsidy in the interest rate charged by international lending organizations, the organizations' funders will eventually have to pay for it, rather than the recipient country.

### **CAPITAL ALLOCATION**

The process of allocating resources to different capital investment projects is logically separate from the source of the finance. In the public sector, a system is required both to determine the volume of resources to be invested each year, and where and in what kinds of assets these resources are to be invested. In other words, there has to be a capital planning system of some kind. This remains true wherever the investment funds are borrowed from.

In the commercial model described above, the volume and destinations of investments are business decisions by which a firm will ultimately prosper or fail. Publicly owned health care providers lack this commercial discipline because they do not go bust—the state always picks up the bill in the end. They cannot, therefore, be allowed unregulated access to private capital markets any more than to lending by government or international lending organizations.

Various mechanisms for determining the allocation of capital resources within health care systems are possible, employing a range of criteria for setting investment priorities. The allocation and planning mechanisms can be applied to publicly owned health care providers

<sup>6</sup> See Klein (1997) for a more detailed statement of this argument.

<sup>7</sup> Sussex (2001, chapter 6) sets out this argument for the case of the U.K. National Health Service.

whatever the source of the capital financing and whatever kind of capital charging is employed (or not). A discussion of these mechanisms and criteria would be lengthy and is outside the scope of this paper.

### **CAPITAL CHARGING**

Capital charging requires that health care providers treat as costs both the depreciation of the assets they use and the normal rate of return on those assets that investments of corresponding riskiness would be expected to earn. These two elements of capital charges might be expressed either as separate depreciation costs and interest or dividend payments or be combined into a single “rental” charge. Whether a single rental or separate depreciation and cost of capital elements are charged, options for the precise type of capital charging can be selected along a number of dimensions:

- Should capital charges be applied just to newly acquired assets or also to existing assets?
- Should notional or real charges be used? In other words, this involves choosing a balance between providing managers with information about the assets they are using and giving them direct financial incentives to invest in and use assets efficiently;
- What should the time profile be—should capital charges be levied at a constant rate over the life of an asset? If not, how are they to vary over time?
- On what basis should assets be valued or revalued?

The decision where to locate the capital charging policy on any of these four dimensions can be made independently of the decisions about the remaining three options. Hence the number of possible variants of feasible capital charging systems is very large. The following sections of the paper look at each of these decision dimensions in turn, presenting the pros and cons of alternative options in each case.

### **CAPITAL CHARGING: INCLUDING EXISTING ASSETS?**

Capital charging can be readily applied to newly acquired assets. Their prices are known, as are the terms of any loans to finance their procurement. It is then straightforward to establish an asset register and a balance sheet for all new assets acquired after a certain date and their matching debt liabilities and to enter corresponding depreciation and interest charges in the interest and expenditure accounts. Interest and depreciation would then be included in the expenditures to be recovered in the prices charged for the health services provided. The interest charges would be actual cash payments to lenders, whether government, international lending organization, or private sector. Depreciation would not be a cash charge but would be a cost to the income and expenditure account and would be paid into a depreciation reserve.

Where government is the lender, an alternative mechanism for depreciation is possible. Instead of transferring cash to the health care provider, which then uses it to buy assets, the government could itself purchase the assets for the provider. The “borrowing” health care provider would still make cash interest payments to the government and would need to enter depreciation costs in its income and expenditure accounts, but the government rather than the provider would be responsible for building up the depreciation reserve over time (whether real or notional).

Over time, as old assets are replaced by new, the proportion of the health care provider's asset base on which it pays capital charges would increase. However, it would be many years before all of its assets were on the balance sheet and being depreciated and paid for out of revenues, because assets such as buildings can last a long time. Also, as land is typically not depreciated, the value of land assets would never be accounted for, unless the health care provider relocated and had to purchase a new site. Thus a gradually declining proportion of assets would continue to be a "free good" that managers would have little incentive to use efficiently.

Applying capital charging only to new assets has two other failings. First, the performance of different providers with different mixes of old and new assets could not be compared. A provider that, when capital charging is introduced for new assets, has modern buildings and equipment will have an apparent cost advantage over one with less adequate capital stock. The first provider will need less new investment than the second and will not have to pay as many capital charges. Hence the first provider will appear to be lower cost even if it is actually using just as many resources as the second provider to deliver health care.

Second, if publicly owned providers compete with private providers for any business, whether from public or private sector payers, the private provider will be placed at an unfair competitive disadvantage unless the public provider pays appropriate capital charges on all of its assets. Applying capital charges only to newly purchased assets will progressively reduce this unfair disadvantage but will not remove it completely.

Applying capital charges to all assets, existing and new, is therefore recommended. The only disadvantage to this option is the increased administrative cost of implementing the capital charging system but this cost is small relative to the potential benefits of more efficient use of capital.

The additional administrative costs implied by applying capital charging to existing as well as new assets concern the costs of setting up the initial register of assets. This requires all existing assets to be identified and assigned a value and an estimated remaining useful life over which they should be depreciated. This approach has been adopted in the United Kingdom. The initial asset register creation exercise was undertaken and capital accounting software installed. All of this required manpower and training and other costs, but the exercise proved feasible—after some teething problems due to software and staff training problems—and was largely complete within a year after the policy was announced. The asset registers and capital accounting systems have been in continuous use since then. The New Zealand government has similarly applied capital charging to both existing and new assets in the health care system and the rest of the public sector.

In the unlikely event that the distribution of existing assets (both in quantity and quality terms) among publicly owned health care providers is equal—perhaps all existing assets are so decrepit as to be nearly worthless—and there is no competition between public and private providers, there may be a case for restricting capital charging to new investments. Otherwise, it makes more sense to include both existing and new assets in the charging system.

## NOTIONAL VS REAL CAPITAL CHARGES?

Notional capital charges would meet the objective of informing managers of the costs they are incurring by acquiring and retaining assets. Management accounts could be created to show the balance sheet and include depreciation and the cost of capital (or rental charges) in the income and expenditure account as memorandum items. No cash would actually flow between notional lenders and borrowers. A notional system such as this would give managers information allowing comparison between different publicly owned providers, but it would not give them direct incentives to act on that information. Also, if creating a “level playing field” for competition with private sector providers is a policy aim, notional capital charging is of no help there, only real charges will do.

A notional capital charging system would incur the same administrative costs as a real charging system, where cash changes hands. Assets would have to be identified and valued; accounts would have to be kept. A significant input of time by skilled and senior staff will be required. But if there are too few appropriately skilled people available to set up a real charging system, there are almost certainly will not be enough to set up a notional charging system.

One advantage of a notional over a real charging system is that a notional system avoids the need for working capital. In a real capital charging system for publicly owned health care providers, funds must initially be paid out by government, via whatever agencies it has established for purchasing health care. The element of the prices charged by the public sector providers that is to cover the capital charges will eventually return to the government as lender but only after a time lag. Hence there is no net increase in public expenditure (extra money paid out initially equals extra money paid back to the government later) but there is a requirement for working capital. This requirement can be reduced by having quarterly or even monthly rather than annual payments made by government to providers for health care and by providers back to government for interest, and so on.

In a “real” capital charging system, money changes hands. The publicly owned health care providers have to recover their depreciation and interest costs in the prices they charge for the services provided. Interest is paid to lenders, dividends to equity providers. Depreciation has to be paid into reserves. Or, if a rental approach is used, the rents have to be paid to the “landlord,” i.e. the government.

Setting financial targets for public providers is straightforward. They can be expressed either as breaking even (income equals expenditure) after meeting all capital charges and other costs, or as achieving a particular rate of return on the assets employed. Whether or not a provider achieves these targets is clear. If managers’ career prospects or remuneration, or some other benefit (e.g., a larger discretionary budget to spend on pet schemes) is linked to their ability to hit the financial targets, they then have clear and strong incentives to use capital, and all other resources, efficiently. The commercial market incentives described above are then being closely approximated.

Real capital charges also mean that competition with private providers can be made fair as public providers then have to recover the full costs of the capital they use in the prices they charge.

The balance of pros and cons appears to favor the use of real capital charges rather than relying on a purely notional system of charges, unless severe constraints on government finance make it difficult to supply the working capital needed in a real system. A further qualification to this conclusion is necessary, however. The transition from a world where public health care providers pay no capital charges to one where they do, represents a major change for managers and staff. It is wise to allow time for familiarity to be gained with the implications of capital charging for the running of a hospital or other facility; for the accounting systems and associated computing software to be installed and tested; for staff to be trained. A transition period of a few years is also desirable to give managers time to change the mix and scale of their asset base.

In the United Kingdom, the transition was smoothed by establishing the (real) capital charging system over a few years rather than all at once. The system was set up with real cash flows from day one, in April 1991. Publicly owned health care providers paid interest to the government in cash and also had to recover their depreciation costs from their revenues. However, in the first financial year, 1991/92, the government gave each provider as part of its revenues the exact sum it had to pay in capital charges. In effect, a provider finding itself relatively overendowed with assets was allowed in the first year to charge correspondingly higher prices for its health care services, which were paid for by state-funded agencies. Thus, compared with the previous year, 1990/91, when they paid no capital charges, all providers were made neither better nor worse off financially than they would have been had capital charging not been introduced. Over time this financial “neutrality” was progressively withdrawn until after a few years no further allowance was made for differences between providers in capital charges. By that time, the a provider’s capital charges were, in effect, deemed to be the result of informed management decision rather than an accident of history.

Thus in 1991/92 when 100 percent funding neutrality was maintained the U.K. NHS capital charging system was effectively a notional system, even though cash was changing hands. When it was only 50 percent neutral (i.e., providers’ revenues were adjusted so as to close only half of any gap between the capital charges they faced and the revenues they would earn if they were treated equally with all other NHS providers), real financial incentives started to bite. When funding neutrality was fully abandoned, the full financial incentives of a real capital charging system came into play.

## **TIME PROFILES OF CAPITAL CHARGES**

Various depreciation profiles are possible, but health care providers have little reason to depart from the conventional straight line approach. Thus the annual depreciation charge is one “ $n^{\text{th}}$ ” of the total value of an asset with an assumed lifetime of “ $n$ ” years.

The question is then how to profile the cost of capital element, and hence the total annual capital charge. For any given required rate of return over the lifetime of an asset, there are two main time profile options:

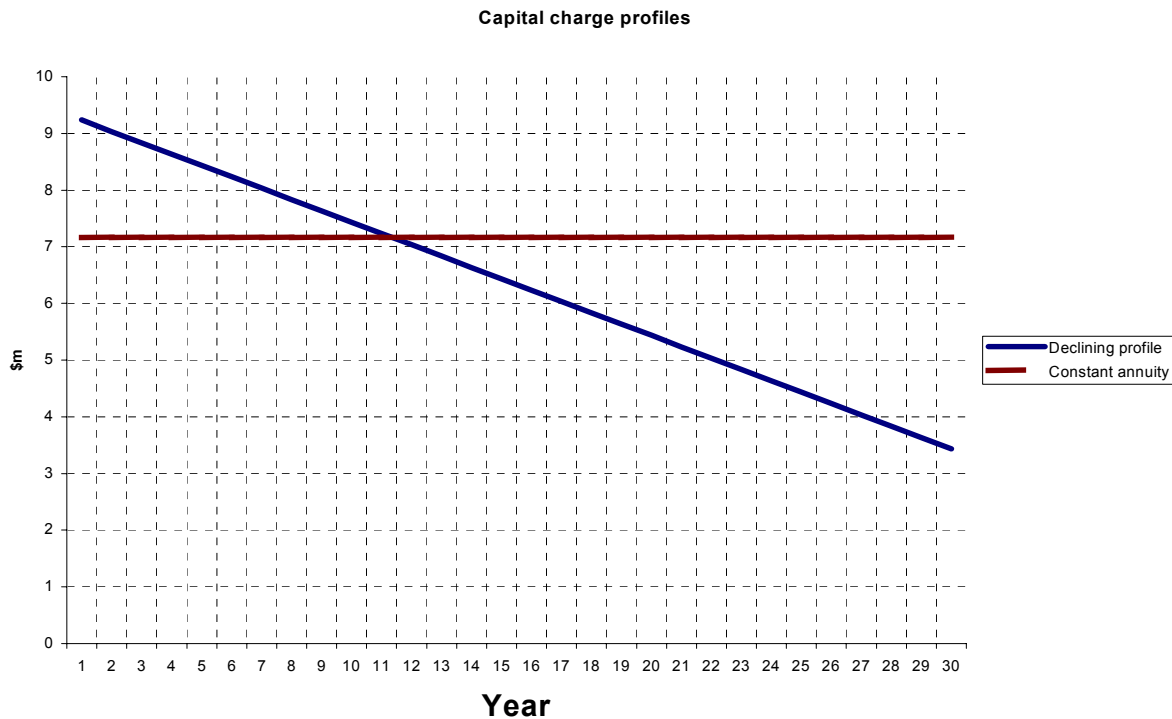
- Levy an interest (or dividend) charge on the average net, i.e., depreciated, value of the assets employed during the year. As the net value of an asset, other things being equal,

declines by one  $n^{\text{th}}$  each year as a result of straight line depreciation, this means that the annual interest charge, and hence the total capital charge (= depreciation + interest) levied on a particular asset also declines each year;

- Charge a constant annuity (or rental) throughout the life of the asset.

These options are illustrated in figure 1. Both profiles shown have the same discounted net present value assuming, for illustrative purposes, a 6 percent annual discount rate and interest rate.

**Figure 1. Time Profiles of Capital Charges**



If an asset is assumed to deliver broadly the same service throughout its life, a constant annuity is the more appropriate profile. The declining capital charge profile resulting from the first method is appropriate only if the value of the annual service provided by the asset is expected to decline, and at that particular rate, year by year. There is in general no reason to expect this to be the case, however. Using the declining profile would mean that a health care provider with older assets would be able to charge lower prices. When they eventually replaced their major assets, such as buildings, their capital charges would jump up, and hence so would their prices have to, even if they were continuing to produce the same volume and quality of health care services as before.

The declining profile option has been used by the U.K. NHS, but the only apparent rationale for this choice was a mistaken belief that it is administratively simpler than a constant annuity and

more closely replicates normal commercial practice. Both options require the same information: asset value, life, and required rate of return. Administrative costs are therefore the same. The constant annuity, or rental, option is the method that commercial businesses, including private health care providers, tend to use. In the absence of specific reasons to do otherwise, commercial providers will try to use their assets to the full throughout their lives. They do not generally assume, at least for accounting and management purposes, that more will be earned from an asset in its first year than in the second, in the second year than in the third, and so on.

It is therefore recommended that capital charges be levied on each asset at a constant annual rate throughout the asset's life unless there are (exceptional) reasons to do otherwise.

## CAPITAL CHARGING: ASSET VALUATION

### VALUATION

Commercial organizations in low-inflation economies use *historical cost* (HC) to value their assets. The asset is simply entered onto the balance sheet at the price at which it is purchased. Depreciation is applied to that HC value, which remains unchanged whatever happens to the level of prices in the economy generally or to the prices of the particular assets. This means that over time the book value will increasingly understate the asset's true value, both in the sense that the value of the outputs it helps produce is rising in nominal terms as a result of general price inflation, and also in the sense that the cost of replacing the asset when it wears out is probably also rising in nominal terms. Historical cost is therefore a poor way of representing asset value, particularly where assets are long-lived and/or inflation is significant. This under representation of asset value and hence of the costs of using them will give health care providers with older assets an apparent but unwarranted cost advantage over those with newer assets. Furthermore, in many places it will be impossible to attribute historical cost values to existing assets as records of their original acquisition costs will not have been kept.

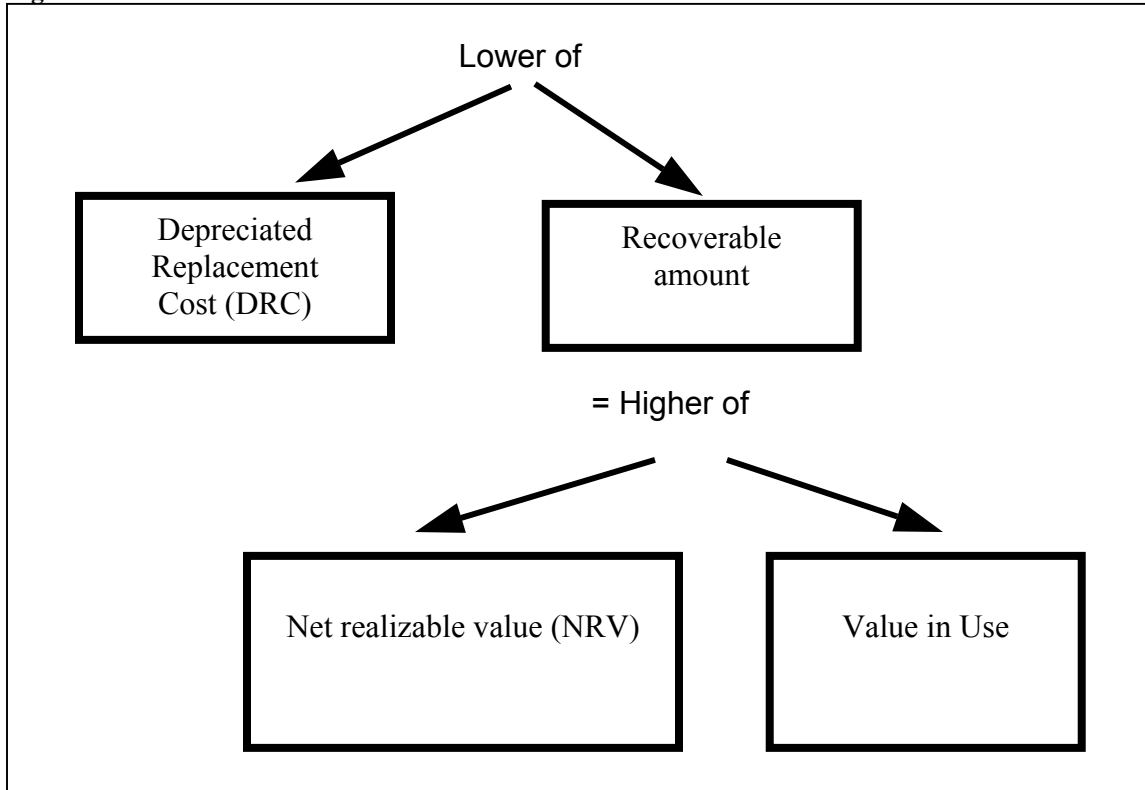
Given the inappropriateness and impracticality of historical cost valuation, it is generally preferable to use some form of current cost (i.e., inflation-adjusted) accounting for publicly owned assets. Determining the current values of assets, particularly buildings used by publicly owned health care providers, is not, however, entirely straightforward.

Most major health care assets, particularly hospitals, are highly specialized with no significant second-hand market. Hence an open market value is practically impossible to determine in their existing (health care) use. The only open market value that might realistically be obtained is the price the building would fetch if sold for conversion to commercial or residential use. But this open market value in alternative use is unrelated to the value of the hospital's outputs and is likely to be only a small fraction of what it would cost to build the hospital, i.e., its replacement cost. Thus, an open market value in alternative use is relevant only where the asset concerned is no longer needed for health care and, as surplus, can be sold to the highest bidder.

A preferable approach is to value assets at their *depreciated replacement cost* (DRC)—the estimated cost of replacing the asset, reduced to take account of how much of the asset's expected total life has been used up—unless an asset's DRC exceeds its *value in use*. If the value

of the services derived from the asset, i.e., its value in use, is less than its DRC then that value in use is what the asset is worth. That is unless the asset could be sold for some other purpose for a higher *net realizable value* (equal to the sales proceeds realizable on the open market, net of selling expenses). As explained, this is unlikely in the case of hospitals and other health service assets. The U.K. public sector, including the National Health Service, adopts this well-established valuation basis. That is, assets are valued at the lower of the DRC and the “recoverable amount,” where the recoverable amount is in turn defined as the higher of the value in use and the net realizable value. This is expressed diagrammatically in figure 2.

**Figure 2. Valuation of a Health Care Asset**



In practice, this means that almost all buildings and equipment are valued at their DRC, with the exception of buildings that have become surplus to requirements (i.e., their value in use is at or near zero). Surplus assets not yet disposed of are entered into the books at their net realizable value, i.e., their open market value in alternative use net of any transaction costs of selling the asset.

### REVALUATION

An asset’s replacement cost part way through its life can be estimated either as its initial purchase cost revalued in line with an index of the inflation in prices of such assets over the intervening period, or by directly estimating the cost of building that asset today. The U.K. NHS re-estimates asset values every five years. In interim years, an appropriate price index is applied to revalue assets. Valuation is undertaken by a government agency although it subcontracts much of the work to private firms of surveyors.

This approach to valuation may cease to be appropriate if a modern substitute for an asset would be markedly different from the existing asset. In that case, the *modern equivalent asset* (MEA) may be desirable as the starting point for valuation rather than the cost of replacing like for like. It is inevitably a judgment call when technological progress or changes in practice have been such as to make it better to use an MEA valuation basis. Determining what the relevant MEA is may also be a matter of judgment. In the U.K. NHS, the use of MEA valuation is permitted but is expected to be exceptional (see NHS Executive, 2001, paragraphs 2.7.12-15). A more liberal approach to use of MEA has been adopted by the New Zealand government.

## CONCLUSIONS

Finance for investment in the physical capital of health care provision may be available from government, international lending organizations, or the private sector. But whatever the source of finance, the application of capital charging for publicly owned health care providers is a practical and worthwhile measure that has the potential benefits of:

- Making managers aware of the costs of capital so that they no longer treat it wastefully as a “free good.”
- Improving the efficiency with which capital is used and ensuring an appropriate mix of capital and labor in the delivery of health care
- Enabling comparison of costs in different health care providers, and hence improved benchmarking and performance management.
- Establishing a basis for fair competition between public and private sector providers.
- A range of options exist for the precise form that capital charging may take. The balance of pros and cons between these options suggests the following recommended approach in most cases:
  - Apply capital charges to existing assets, as well as new investment.
  - Aim for real, rather than notional, capital charges, but allow a transitional period when capital charging is first introduced to allow time for training and experience to be gained and for adjustments in the asset base to take effect.
  - Use a constant annuity (or rental) rather than a declining time profile of capital charges over an asset’s life.
  - Use a depreciated replacement cost basis for valuing assets, other than those which become surplus to requirements, with annual revaluations.

## REFERENCES

A very helpful and detailed example of how a capital charging system for publicly owned hospitals and other health care assets is being applied operationally is set out in *The NHS Finance Manual: NHS Trusts Capital Accounting Manual*. This is the reference NHS Executive (2001) shown below.

Heald D (2000). *Capital charging in public healthcare*. Aberdeen Papers in Accountancy, Finance & Management Working Paper 00-16. University of Aberdeen, Department of Accountancy, available on website [http://www.abdn.ac.uk/~acc025/web\\_pgs/public/dept/Wps/Working\\_Papers.htm](http://www.abdn.ac.uk/~acc025/web_pgs/public/dept/Wps/Working_Papers.htm)

Heald D, Scott D (1996). Assessing capital charging in the National Health Service. *Financial Accountability and Management* 12(3), August 1996, pp.225-244.

Klein M (1997). The risk premium for evaluating public projects. *Oxford Review of Economic Policy* Vol. 13, No. 4, Winter 1997, pp29-42.

NHS Executive (2001). *NHS Finance Manual—NHS Trusts Capital Accounting Manual, April 2001*. London: Department of Health. Also downloadable and printable from the website at: <http://tap.ccta.gov.uk/doh/finman.nsf>

Pratten C (1993). Accounting for property assets in the private and public sectors. University of Cambridge Department of Applied Economics Working Paper, September 1993.

Rice T (1998). *The economics of health reconsidered*. Chicago: Health Administration Press.

Sussex J (2001). The economics of the Private Finance Initiative in the NHS. London: Office of Health Economics.







HEALTH, NUTRITION,  
AND POPULATION



HUMAN DEVELOPMENT NETWORK

THE WORLD BANK

---

**About this series...**

This series is produced by the Health, Nutrition, and Population Family (HNP) of the World Bank's Human Development Network. The papers in this series aim to provide a vehicle for publishing preliminary and unpolished results on HNP topics to encourage discussion and debate. The findings, interpretations, and conclusions expressed in this paper are entirely those of the author(s) and should not be attributed in any manner to the World Bank, to its affiliated organizations or to members of its Board of Executive Directors or the countries they represent. Citation and the use of material presented in this series should take into account this provisional character. For free copies of papers in this series please contact the individual authors whose name appears on the paper.

Enquiries about the series and submissions should be made directly to the Managing Editor Joy de Beyer ([jdebeyer@worldbank.org](mailto:jdebeyer@worldbank.org)) or HNP Advisory Service ([healthpop@worldbank.org](mailto:healthpop@worldbank.org), tel 202 473-2256, fax 202 522-3234). For more information, see also [www.worldbank.org/hnppublications](http://www.worldbank.org/hnppublications).



**THE WORLD BANK**

1818 H Street, NW  
Washington, DC USA 20433  
Telephone: 202 473 1000  
Facsimile: 202 477 6391  
Internet: [www.worldbank.org](http://www.worldbank.org)  
E-mail: [feedback@worldbank.org](mailto:feedback@worldbank.org)