

Pricing Health Services For Purchasers: A Review of Methods and Experiences

Hugh Waters and Peter Hussey

September 2004



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Health, Nutrition and Population (HNP) Discussion Paper

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Pricing Health Services for Purchasers: A Review of Methods and Experiences

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

Abstract: This paper reviews methodologies and international experience related to costing and pricing health services. Several factors affect the determination of the prices purchasers pay for health services. These include: the method of provider payment; the availability of information on costs, volumes, outcomes, and patient and provider characteristics; methods used to calculate providers' costs; and characteristics of purchasers and providers—including the regulatory environment, provider autonomy, negotiating power, and the degree of competition. The paper focuses on methods for setting levels of payment under different provider payment mechanisms. Line item and global budgets remain the most common reimbursement methods in developing countries. However, many of these countries are implementing mixed payment systems that have greater information demands. The principal payment types used in high-income countries—capitation, payments per case or diagnosis, and fee-for-service—are reviewed here, and implications for low- and middle-income countries discussed. To minimize incentives for under- or overutilization, prices that purchasers pay for health care services should be related to the unit costs of services. However, establishing the true unit cost of health services is complicated, and detailed data needed to correctly allocate indirect costs to the units of services are not generally available in developing countries. The organizational characteristics of health care providers and their relationships with purchasers strongly influence the way prices for health services are determined. Pertinent characteristics include provider autonomy, provider negotiating power, and the degree of competition. The principal constraint on the development of provider payments systems in developing countries is the limited availability of information on costs, volumes, and patient characteristics. However, international experiences reveal a variety of options for setting prices for health care purchasers in developing countries that are reforming their payment systems.

Keywords: resource allocation and purchasing; health care financing; pricing; provider payment; health system reform

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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 – *Pricing Health Services for Purchasers: A Review of Methods and Experiences* by Hugh Waters and Peter S. Hussey – 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, Waters and Hussey look at different ways to price health services, under both market forces and managed competition.. They suggest that selective and differential pricing can be used to achieve desired policy objectives during resource allocation and purchasing.

Alexander S. Preker

Lead Economist
Editor of HNP Publications

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INTRODUCTION

This paper reviews methodologies and international experience related to costing and pricing health services from the perspective of health care purchasers. The discussion is illustrated using examples from a variety of international settings, with widely-ranging availability of information on health service utilization, expenditures, and costs. The paper highlights approaches and experiences pertinent for purchasers in low- and middle-income countries,¹ with an emphasis on pricing health services in relation to their true costs with appropriate health care production and utilization incentives.

Pricing health services is a key component of the broader activity of resource allocation and purchasing in health care systems. Preker and others. (2001) describe four core policy questions relevant to resource allocation and purchasing decisions in health care:

1. For whom to buy (demand)?
2. What to buy, in which form, and what to exclude (supply)?
3. What price to pay and how to pay (prices and incentive regime)?
4. From whom to buy, at what price, and how much (factor and product markets)?

This paper directly addresses the third of the core policy questions—what price purchasers should pay for health services and how these prices can be calculated. However, this question is inseparable from the others. The paper focuses on calculating *levels of payment* under a variety of provider payment mechanisms—prospective and retrospective. The question of how to set prices is considered here for various units of service (what to buy) and taking into account the characteristics of providers (from whom to buy) and their effect on pricing services.

The result is a summary of tools and experiences relevant for pricing in countries with varying mechanisms for purchasing and delivering health services. An understanding of the dynamics underlying price setting is increasingly important for purchasers in many countries with rapidly evolving health systems. Many low- and middle-income countries are moving beyond line-item budgets for provider reimbursement, exploring fee-for-service (FFS) mechanisms for outpatient care and per diem (per day) for inpatient care. Experiences from these countries and from Organization for Economic Cooperation and Development (OECD) countries show that fee-for-service generally leads to increases in health expenditures as the purchaser, rather than the provider, bears the financial risk.

THE IMPORTANCE OF PRICING

From a public health view point, there are three essential objectives in pricing health services:

- To ensure that providers are fairly reimbursed for their work.
- To ensure that the prices accurately reflect the costs of correctly provided services and promote system sustainability.

¹ This discussion classifies countries by income level using the following categories from the 2000 World Development Report (World Bank, 2000): low-income—\$755 per capita or less; lower middle-income—\$756 to \$2,995; upper middle-income—\$2,996 to \$9,265; and high-income—\$9,266 or more.

- To ensure that the pricing structure supports the practice of appropriate medicine and rewards care that leads to good health outcomes.

Regardless of the type of provider payment system, purchasers need an effective mechanism to link prices paid for services to the actual costs of those services. If prices do not reflect actual costs, and public health objectives are not taken into consideration in pricing health services, a range of undesired consequences may result:

- Providers may charge informal payments to compensate for inadequate formal payments.
- Providers may avoid treating sicker patients.
- Inappropriate referral patterns may develop between different levels or sites of service.
- Services provided may be of suboptimal quality.
- Services may be either under- or overutilized, depending on the relationships between the price, the actual cost of services, the value of services to individuals, and the presence of positive externalities for services—such as immunization—in which society has an interest in ensuring provision.

Purchasers in a variety of countries have experimented with alternatives that transfer some or all of the insurance risk to the provider or the patient—including global budgets with set parameters for price and volume, and fixed-price payments for definable health service products such as inpatient stays and specific outpatient procedures (Jegers, et al., 2002). Some low- and middle-income countries—including Thailand and Indonesia—have employed capitated payments.

For all of these provider payment types, purchasers need to be able to approximate the true costs of the services that they are paying for, in order to rationally set their prices and predict their expected costs on an actuarial basis. Regardless of the type of provider payment mechanism employed, calculating the costs of specific health services or of packages of services requires a methodology for allocating indirect costs to the services that are directly consumed by patients and paid for by purchasers.

FACTORS INFLUENCING PRICING DECISIONS

Several types of factors affect the determination of the prices purchasers pay for health services. These include:

- The method of provider payment
- The availability of information—including costs, volumes, and outcomes—and methods used to calculate providers' costs
- Characteristics of purchasers and providers—including the regulatory environment, provider autonomy, negotiating power, and the degree of competition.

All three of these factors influence how health care prices are determined. Moreover, they are interrelated—the calculation of costs varies by provider payment method, and characteristics of providers and purchasers influence the process and methods of provider payment in addition to the absolute levels of reimbursement. The remainder of this paper discusses these three sets of

factors, drawing conclusions for pricing decisions in low- and middle-income countries and presenting applications in these countries.

OVERVIEW OF PROVIDER PAYMENT METHODS

For setting prices, the most important characteristic of a payment system, in addition to the unit of payment, is whether the payment is *retrospective* or *prospective*. Retrospective payments are calculated and paid after the service is delivered, while prospective payments are made before delivery of the service. This characteristic is typically associated with the payment method—for example, capitation payments are always prospective—although some methods of payment may be either retrospective or prospective. The key distinction for pricing services is that for prospective payments, the price must reflect the anticipated costs of services provided, whereas in retrospective payments the price should reflect the actual costs. The goal of price setting for a prospective payment system is to account for as much predictable variation in costs as is possible.

A second dimension of provider payment systems with an effect on price setting is whether the system is *variable* or *fixed*. In variable payment systems, the aggregate amount of payment services is proportional to the volume of activity; in fixed systems, there is a limit on total payments (Jegers, et al 2002). Fixed and variable reimbursement systems have opposite implications for calculating prices per unit of service—in variable systems, the price per service is fixed, while in fixed systems the price per service varies in relation to the volume of services so that total payments fall within the fixed reimbursement ceiling. Table 1 summarizes provider payment methods and their incentives for provider behavior.

Table 1 Provider Payment Systems

Mechanisms	Retrospective/ Prospective	Fixed/ Variable	Incentives for Provider Behavior		
			Prevention	Delivery	Cost Containment
Line item budget	Prospective	Fixed	+/-		+++
Global budget	Prospective	Fixed	++	--	+++
Capitation (with competition)	Retrospective	Variable	+++	--	+++
Per case (diagnostic related payment)	Either	Variable	+/-	++	++
Fee-for-service	Retrospective	Variable	+/-	+++	---

Source: Adapted from WHO (2000) and Jegers, et al (2002).

As the table shows, provider payment methods can be classified according to the units of the services paid for. The unit of service can be each health service provided (*fee-for-service—FFS*), all services related to a diagnosis (*per case*), all services for a patient over a period of time (*capitation*), or all services provided to all patients over a period of time (*global or line-item budgets*).

Line-item and global budgets are prospective, fixed aggregate payments for a certain period (Kutzin 1995). The level of payment is generally based on previous payment levels, adjusted by an inflation factor (Preker and Feachem 1996). The difference between the two is that line-item budgets do not allow for reallocation of resources across service categories, while global budgets do. Line-item and global budgets are the most common reimbursement methods for hospitals in low- and middle-income countries (Barnum and Kutzin 1993; Bitran and Yip 1998; Wouters 1999). Line-item and global budgets allow purchasers to control overall payments levels and give providers strong incentives to contain costs. However, by themselves they provide no incentives to ensure quality. They may encourage the underprovision of important health care services, and they tend to lock in historical levels of resource use (Langenbrunner and Wiley 2002; Kutzin 1995).

Capitation payments are prospective, fixed aggregate payments per patient for a defined period of time. Capitation provides for strong controls on the price and volume of services, but may also encourage under-provision or poor-quality care if payment levels are too low (Langenbrunner and Wiley 2002). Payments *per case* are prospective or retrospective variable payments made per hospital discharge, usually weighted by diagnosis (Jegers, et al 2002). These payments ensure that costs are limited by type of service, but may encourage increased hospital admissions. *Fee-for-service* payments are retrospective, variable payments made for each service provided. They are administratively straightforward, but can encourage overproduction of services (Langenbrunner and Wiley 2002).

The features of these basic payment systems can be combined, mixing incentives for both providers and patients.² The following sections illustrate the application of payment systems using specific country examples before proceeding to discuss how the level of prices is set in each case.

EXAMPLES FROM HIGH-INCOME COUNTRIES

Setting Prices for Fee-for-Service Payments—Germany

The German health care system combines elements of fee-for-service reimbursement with an overall limited global budget. Separate reimbursement systems exist for hospital-based and ambulatory physicians. Ambulatory care physicians are reimbursed retrospectively per service provided. Two national fee schedules determine the prices paid. The first—for the private sector—is determined annually at the national level and sets the price per service in currency units (Kamke 1998). The private sector mainly serves individuals above a certain income

² More detailed descriptions of payment systems have been published elsewhere—for example Kutzin 1995; Bitran and Yip 1998; Wouters 1999, Jegers, et al. 2002; Langenbrunner and Wiley 2002.

threshold—approximately 9 percent of the population—who opt out of the public insurance system for private coverage (Anderson, et al. 2002).

The second fee schedule applies to payments to physicians by sickness funds, the publicly-financed insurers that cover the most of the population. In Germany, setting the prices paid via a fee schedule involves two main steps: determining relative price weights of different services and establishing the base levels of prices. Each service is given a relative value through negotiations at the national level between federal associations of sickness funds and physicians. The Federal Committee of Physicians and Sickness Funds determines what services are covered, and a separate committee of physicians and insurers, the Valuation Committee, determines the relative value scale (European Observatory 2000).

The second step in setting the prices physicians are paid is the determination of the price per unit of the relative value scale. Under reimbursement per service, physicians have an incentive to provide more services (Table 1). To counter this incentive, payments to physicians are made from capitated budgets held by regional physician associations. On a quarterly basis, the available budget is divided by the total number of relative value units for services provided by physicians in each regional association—if physicians provide a higher volume of services, their remuneration per service is lower (Sauerland 2001). In addition, the number of reimbursable weighted services per patient is limited, and regional physician associations have some ability to adjust the value scale between specialties, service categories, or both (Busse 1999).

Setting Prices for Payments per Case to Hospitals—Australia

Public sector purchasers in OECD countries are increasingly applying diagnostic-based per case payment methods, notably in Japan, France, and Australia (Imai, et al. 2000; Imai 2002). In Australia, hospital payments are set and allocated at the state level. Each state therefore has a slightly different payment system although all but New South Wales make prospective per-case payments based on an Australian system of classification of diagnoses, the Australian National Diagnosis-Related Groups (AN-DRGs) (Duckett 1998). Victoria was the first state to implement diagnosis-based hospital payment, in 1993, and is the subject of this example.

Key steps in setting prices for diagnosis-based payments include: (1) developing a diagnosis classification system; (2) determining the relative weights of the group; (3) determining the level of payment per relative unit; and (4) establish adjustments to the payment rate. Australia has adapted the DRG classification system used in the United States. This is common among countries implementing diagnosis-based payments; although some countries have implemented U.S. DRGs without adjustment (Wiley 1993). In the state of Victoria, relative weights are established by measuring costs (described below); alternatively, relative weights may be borrowed from the United States or other diagnosis-based payment systems (Jackson 2001). The state makes several adjustments to payments. First, fixed payments to hospitals for overhead costs are separated from the diagnosis-based payments—to circumvent the incentive of diagnosis-based payments to admit more patients (Duckett 1998). Finally, prices in Victoria are adjusted for outliers (patients with exceptionally high costs) and for certain types of hospitals—hospitals with high volumes of patients receive lower payments due to assumed economies of scale (Duckett 1998).

Setting Prices for Capitation Payments—Denmark and the United Kingdom

Capitation payments, simply defined, are prospective, fixed payments to providers to care for a defined population for a defined period of time. The price of services under a capitated payment system is therefore the rate paid to the provider per insured person per time period. If prices perfectly equaled expected costs, any remaining surplus or deficit in revenue for the provider would be due to random events and treatment patterns. If prices are below expected costs, providers can be expected to make up for the deficit by lowering expected costs by selecting lower risk patients.

To set prices as close as possible to the anticipated costs of treatment, payments are often adjusted according to insured persons' characteristics that are associated with costs—a process called risk adjustment. There are four main groups of risk adjusters: (1) demographic information, such as age and gender; (2) prior utilization; (3) actual utilization, used *ex post facto* as a type of reinsurance; and (4) medical conditions, such as diagnosis of diabetes (Cutler and Zeckhauser 2000). Newhouse (1994) estimates that risk adjusters can potentially predict 15 to 20 percent of actual expenditures at the individual level, although most existing risk adjusters only explain 10 percent. For this reason, he advocates a mixed payment system—capitation plus other forms of payment—to mitigate providers' incentive to select healthier patients (Newhouse 1996).

Denmark uses such a mixed payment system for general practitioners. These physicians receive approximately one third of their payment as capitation and the remaining two thirds as fee for service (Davis 2002). The combination mixes the fee-for-service incentives to provide more services with those of capitation to provide fewer. In the United Kingdom, primary care physicians are organized into regional associations called Primary Care Groups or Primary Care Trusts—the latter having a greater degree of managerial autonomy. These groups are paid via a capitated payment from regional Health Authorities—this payment is used to either provide or purchase health services needed for the enrolled population. The price paid per enrolled patient is determined by setting a target based on enrollee characteristics and gradually moving from historical prices to this target (NHS 2002a).

EXAMPLES FROM LOW- AND MIDDLE-INCOME COUNTRIES

The principal constraint on the development of provider payment systems in low- and middle-income countries is the limited availability of information on costs, volumes, and patient characteristics (Maceira 1998). As a result, line-item and global budgets are the most common reimbursement methods for hospitals in low- and middle-income countries (Barnum and Kutzin 1993; Bitran and Yip 1998). Nonetheless, several countries have undertaken innovative payment reforms to avoid the negative incentives associated with unmodified global or line-item budgets.

Kyrgyzstan has adopted a combined system with capitated payments for family group practices and patient choice of primary care physician. Polyclinic services reimbursed according to a fee-for-service schedule, and hospitals are paid on a case-based system (Wouters 1999). In Brazil, the federal Unified Health System (SUS) also introduced a mixed case-based, fee-for-service system to reimburse both public and private providers. However, reimbursement levels have

lagged behind increases in health care cost inflation—resulting in private providers’ leaving the system (Bitran and Yip 1998).

In Chile, public hospitals were traditionally paid through global budgets based on historical patterns and on the number and type of their employees. As a result, the hospitals had little incentive to reduce costs or to meet demand (Bitran and Yip 1998). In 1992, the Chilean public insurance payer, the Fondo Nacional de Salud (FONASA) designed a mixed case-based and fee-for-service system to reimburse public hospitals. This system has been phased in gradually, replacing historical budgets. Hospitals have responded accordingly by monitoring their output and emphasizing efficiency. FONASA pays municipal health centers for primary care services based on capitation, using adjustments for location and patients’ income level (Wouters 1999).

Korea and Taiwan, which have both achieved universal health insurance coverage for their populations, have predominantly used fee-for-service purchasing in the context of expanding public health insurance programs. In both countries, fee-for-service led to rapid cost inflation. In Korea, health spending increased from 2.8 percent of GDP in 1975 to 4.3 percent in 1986 and 7.1 percent in 1991 (Mills, et al. 2000). In Taiwan, the introduction of national health insurance in 1996 slowed the rate of increases in health spending, but total levels of reimbursement to providers continued to go up—by 7.4 percent from 1996 to 1997, and an additional 11.3 percent from 1997 to 1998. Both countries have introduced case-based payment to modify the inflationary incentives of fee-for-service reimbursement.

Counteracting the Inflationary Effects of Fee-for-Service—Taiwan

Case payment and global budgeting have been introduced to complement the fee-for-service payment structure—and to give providers added incentives to control costs. A per case prospective payment system has been gradually phased in, also to provide incentives for increasing providers’ efficiency and cost-effectiveness. The reimbursement level is based on the number of procedures in a given period, the distribution in the average length of stay for the procedure, data from orders for medical equipment and supplies, and hospital-specific factors that might raise or lower costs. At the end of 1998, fee-for-service reimbursement represented 72.6 percent of total payments to providers by the Bureau of National Health Insurance, and per-case payment accounted for an additional 6.5 percent.³

In addition to the fee-for-service and per-case payment systems, the BNHI introduced a global budget system for outpatient dental care in 1998. Intended to rationalize the rapid growth of payments for dental care, the calculation of the first year’s global budget was based on the previous year’s total outpatient dental care payments, plus a ceiling of 8 percent annual growth.

Introducing Capitation—Thailand

Capitation is an alternative means to controlling health care costs, while avoiding complex demands imposed by case-based payment. Public health insurance programs in Argentina,

³ The BNHI has followed clearly defined principles in gradually implementing this per-case payment system: (1) Surgical procedures should be the first to be reimbursed on a per-case basis, followed progressively by internal medicine procedures. (2) Services that have a high utilization rate and a low level of variation in actual costs are appropriate for per-case payment.

Brazil, Nicaragua, and Thailand have adopted capitation. Nonetheless, documentation of experiences introducing capitated payments in low- and middle-income countries is very limited (Mills, et al 2000). In Thailand, the Social Security Act, passed in 1990, provided for the Social Security Administration to pay capitated payments to contracted public and private hospitals on behalf of insured workers. Social security health insurance covers government workers and employees in private companies with more than 10 workers, with mandatory enrollment. The government, employer, and employee each contribute 1.5 percent of wages. Capitated payments to contracted hospitals cover all inpatient and outpatient services that are not necessitated by a work-related illness (Wouters 1999; Bitran and Yip 1998).

In Thailand, capitation has increased the use of ambulatory services while decreasing the use of inpatient services. The system is intended to encourage competition among providers, with each employee choosing a provider. However, the limited availability of information on provider performance has led to a system where employers, rather than employees, choose the providers—limiting the positive effects of competition (Wouters 1999). There is evidence, based on in-depth interviews with providers and patients, that health facilities operating under the capitated system limit the inputs used to provide services to levels below what is medically desirable (Mills, et al 2000).

CALCULATING COSTS—METHODS AND INFORMATION AVAILABLE

The prices that purchasers pay for health care services should be related to the actual unit costs of services in order to minimize incentives for under- or overutilization. Establishing the true unit cost of health services is a complicated proposition—because of the difficulties involved in correctly tracking and allocating administrative overhead and other indirect costs to the units of services. This section provides an overview of methodologies used to measure unit costs and continues with country-specific examples. Accurate costing is important to the success of all types of provider payment mechanisms other than global and line-item budgeting. For capitation, costing is critical for both bidding and management of contracts in the context of competition (West, et al 1996). Per case payments and DRGs depend on a realistic picture of the cost of the various inputs for the case or condition in question.

TOP-DOWN VS. BOTTOM-UP COSTING

Methods for tracing costs in health care can be classified into two general groups—top-down and bottom-up methodologies. Top-down costing involves disaggregating total expenditure to units of service such as patient visits or patient hospital days. This is accomplished by allocating costs to “cost centers” (units of service activity such as hospital wards), determining the amount of units of service per cost center, and finally allocating costs to units of service (Wiley 1993). Bottom-up costing involves aggregating the costs of each input used to provide a service. The major difference between the two methods is that, for bottom-up costing, patient-level utilization data are used to estimate both the number and type of service provided to each patient per cost center (Wiley 1993). The inter-patient variability in costs is thus preserved (Jackson 2001). Yazbeck (2002) provides a general comparison the advantages and disadvantages of each approach:

Table 2 Yazbeck comparison of top-down vs. bottom-up costing

	Top-Down	Bottom-Up
Level of Detail	Lower	Higher
Accuracy (for each intervention)	Higher	Lower
Completeness	Better	May exclude elements
Cost	Cheaper	More expensive
Time	Faster	Longer

Either of these general costing approaches can be used with prospective and retrospective payment systems. For example, bottom-up costing studies could be used to determine the average cost per DRG using patient-level activity data. Top-down methodologies could also be used by allocating costs to cost centers and dividing by the number of DRGs per cost center. Bottom-up costing of capitation payments is theoretically possible but would require the forecasting of all expected services used per patient (Telyukov 2001).

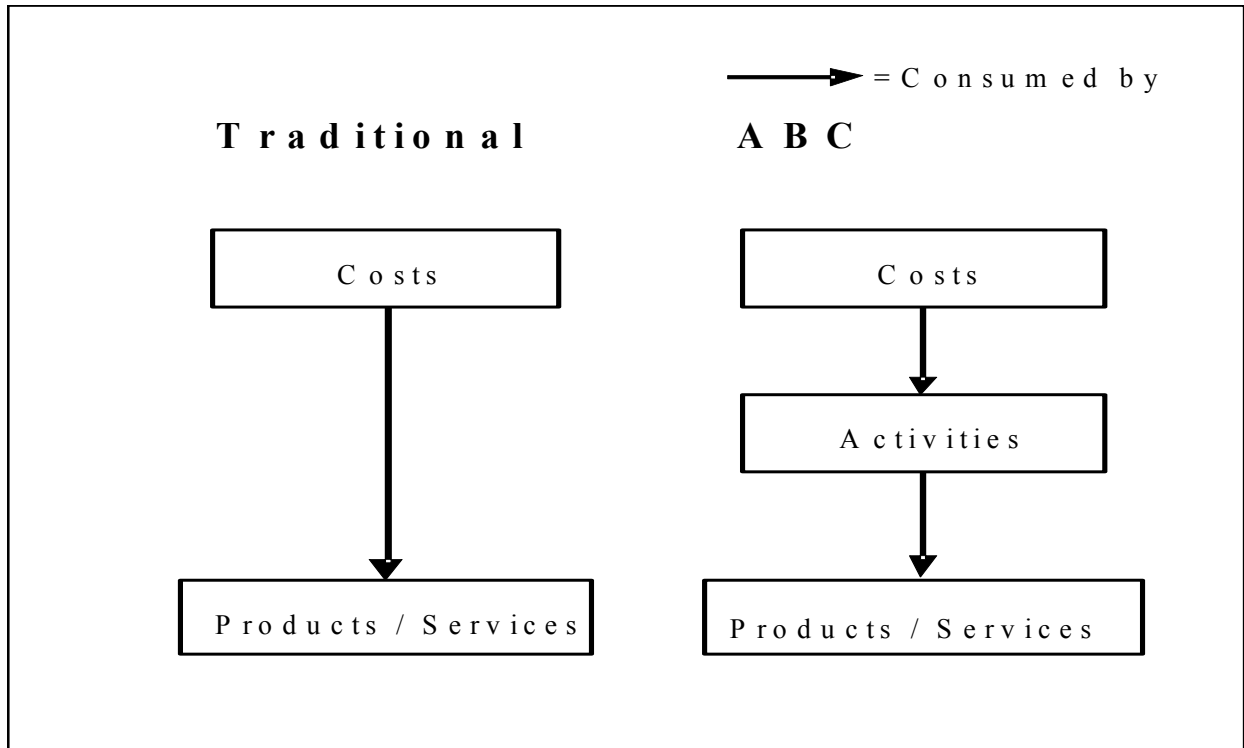
TRACKING AND ALLOCATING COSTS

In both top-down and bottom-up costing, it is necessary to allocate costs to cost centers. *Direct costs* such as drugs and supplies can be allocated directly to cost centers or health services produced. Indirect costs are those that cannot be directly allocated—including administrators’ salaries and support activities such as housekeeping and laundry.⁴ The calculation of accurate unit costs for health care services depends to a large extent on the “correct” allocation of both direct and indirect provider costs. Accounting systems that allocate indirect costs among different types of treatment based solely on production ratios are likely to incorrectly capture the underlying levels of effort and production intensity (Hoyt and Lay 1995).

Activity-Based Costing (ABC), a retrospective approach to allocating costs used to calculate the unit costs of health services in the United States, has been applied in low- and middle-income countries (Player, 1998; Waters, 2001). While traditional costing allocates overhead and indirect costs in proportion to the volume of units or to direct costs, ABC assigns indirect costs based on the main activities within an organization (Figure 1). ABC is typically used to calculate costs for specific services, appropriate for fee-for-service reimbursement but can also be used to calculate the cost of a bundled package of services for the same patient. It seeks to define the principal activities of the individuals who work within the organization, then to trace costs first to these activities and then from the activities to products and services. Human and financial resources within a department (production center) are traced to activities, which are in turn traced to products and services. Allocation of personnel time among the activities becomes the principal means for assigning overhead and other indirect costs.

⁴ The term “indirect costs” is used throughout this paper in the accounting sense of the term—as costs that cannot be directly attributable to a specific product or service.

Figure 1 Traditional vs. ABC Accounting



Traditional costing procedures typically group indirect costs in one pool and allocate these costs to products based on relative production figures. Because of economies of scale in production, this approach attributes too high a cost to high-volume products and too low a cost to low-volume ones. ABC goes further by attributing support costs based on the actual consumption of the goods and services provided (Chan 1993; Cokin 1996), measured by time allocation.⁵ In principle, the costs that ABC attributes to an organization’s products and services are real unit costs, as opposed to the approximations provided by traditional costing.

The structure that underlies ABC is useful for calculating reimbursement levels for health care services that are billed based on DRGs (Chan 1993; Ramsey 1994). Each DRG includes activities that cut across the organizational structure of a health care provider—for example activities related to patient evaluation, admission, and treatment; the preparation, use, and maintenance of medical equipment and facilities; medical procedures; and hospitalization. ABC links activities together in the “production process” related to a patient’s specific condition or DRG.

⁵ A simple example: a company that produces just two products—blue cars and red cars. Nine hundred blue cars are produced each year, but only 100 red cars. Traditional accounting procedures assign 90 percent of the overhead costs to the blue cars. ABC might find that blue cars consume just 60 percent of the time of the company’s personnel because red cars are more specialized and there are fewer of them produced. ABC will more accurately assign the costs of supporting personnel to both types of cars (Chan 1993).

A related approach used in lower and middle-income countries is to apply top-down accounting techniques to allocate costs derived from line-item budgets across inpatient departments—avoiding ABC’s need for data on personnel time distribution. An additional technique to allocate costs—employed in Kyrgystan and Kazakhstan—is to develop a simple case mix with weights for different procedures that can be used as a simple DRG system on which purchasers can base reimbursement levels.

ADJUSTING UNIT COSTS—PRICING FOR EXTERNALITIES

Some health services have social costs or benefits that are not directly absorbed by either the provider or the patient. These costs and benefits, which economists call “externalities,” should be included in the price paid in order to encourage the socially optimal volume of these services. For example, an individual’s vaccination will provide a health benefit not only for the individual, but for those around the individual; this benefit is a positive externality. Therefore, a public purchaser, in order to provide the maximum health benefit to society, would pay a higher price for the vaccination than its cost to the provider, encouraging the provider to perform more vaccinations. Externalized costs and benefits are difficult to measure. However, public purchasers may adjust their prices paid for certain services where it is clear that society will benefit from an increased volume of provision than would be found if the prices reflected only the private costs of the service to its provider.

THE IMPORTANCE OF INFORMATION AVAILABILITY—EXAMPLES FROM HIGH-INCOME COUNTRIES

The process of setting prices for health services from the purchasers’ perspective is inextricably linked with the information that is available to the purchaser. Each approach to setting prices has different information input requirements; the availability of information dictates to a large extent the range of choices that purchasers have in calculating costs and setting prices. Information systems are typically the single largest constraint to the implementation of provider payment mechanisms in low- and middle-income countries. For example, top-down costing techniques such as ABC require that providers’ costs be available by department and by category—salaries, drugs, supplies, and so on. In addition, accurate utilization information is essential to calculate unit costs correctly.

Germany and the United States

There are several ways to attempt to align the prices of relative value units used for reimbursement under a fee schedule with the unit costs of the services provided. In Germany, this process is driven mainly by negotiation, with little emphasis on the calculation of actual costs (Busse 1999). The relative value units of services are determined through a mix of expert judgment by physicians and political negotiations between the various specialty societies (Rodwin, et al 1989). The process therefore relies heavily on physicians’ expert knowledge of the costs associated with each service they provide. The price paid per relative value unit is determined directly by the amount of the capitated annual budget allocated to each regional provider. These budgets are also determined through negotiation and are generally allocated in an amount per member of the regional association or per insured person covered (European Observatory 2000).

The Medicare program in the United States uses an alternative methodology for determining the prices paid under a fee schedule. This fee schedule, the Resource Based Relative Value Scale (RBRVS), was informed by an economic study of the resources used to provide each service. Three types of resources are used to set relative values: (1) physician work, including the time, intensity of effort, skill, and risk to the patient associated with each service; (2) practice expenses, including the cost of nonphysician staff, office space, equipment, and supplies; and (3) professional liability insurance (Medpac 1999). Payments are also adjusted for geographic differences in price levels. The amount paid per relative value unit is updated using a formula linking payment growth to that of the national economy (Medpac 2002). The factors used in calculating the amount of each annual update include medical inflation, changes in Medicare fee-for-service enrollment, economic growth, and changes in spending due to changes in laws and regulations (Medpac 1999).

These two approaches to setting prices paid under a fee schedule have very different information needs. The German approach—relying heavily on negotiations—does not require information beyond expert judgments and historical payments, although other information on costs could be and doubtlessly is used by specialty associations. The U.S. RBRVS methodology, on the other hand, required a large national study of the costs of physician services. The main components of this study were a conceptualization of the dimensions of the costs of physician work and how they could best be measured; a national random survey of physicians to measure the resources used for the most common procedures in each specialty; consultations with expert groups of physicians to measure the resources used for all other procedures; and validation of the results (Hsiao, et al 1992). The study results must also be updated periodically. The updates are conducted at least every five years through consultations with expert groups of physicians (Medpac 2002).

Australia

The state of Victoria measures the costs of each DRG using a bottom-up method. This methodology required an investment in information technology to collect patient-level data on resources used. All resources used on behalf of a patient are measured to collect data on direct costs. Indirect costs are attributed to cost centers, then to “intermediate products” of care such as nursing shifts. Finally, indirect and direct cost data are allocated to each patient (Jackson 2001). Annual costing studies collect data from a sample of approximately 15 hospitals to determine costs per DRGs. These sampled hospitals are typically larger hospitals that have invested in the necessary information technology (Jackson 2001). Even among these hospitals, variations in costing methodology and data quality remain. In addition, the costing methodology must be updated to account for shifting patterns of care (Jackson 2001).

A substantial investment in measuring costs is necessary to collect patient-level data for bottom-up costing, as was done in Victoria. Many high-income countries and even other states in Australia have implemented diagnosis-based payments without collecting patient-level data for bottom-up costing. Instead, costs are estimated using a top-down methodology, one of the most common being the Yale Cost Model. This approach involves attributing aggregate hospital financial data to patients treated in each DRG. The data required are aggregate financial data, patient discharge data, and a set of relative resource weights for DRGs that must be imported from other settings (Wiley 1993).

Denmark

In Denmark, prices paid to physicians are negotiated annually at the national level between the association of county councils (purchasers) and the association of general practitioners. This process is informed more by expenditure targets and previous prices than by costing studies (European Observatory 2001). Capitated payments are uniform; there is no risk-adjustment or other adjustment of prices. The lack of risk adjustment lightens the administrative burden but increases the likelihood of selection. In Denmark, since the capitation formula is simply based on age and gender, the only information requirement needed is an accurate roster of enrolled patients with age and gender recorded at enrollment.

United Kingdom

In the United Kingdom, the expected costs of treating the enrolled population are calculated using a risk-adjustment formula, although the formula currently used is under review and will probably change (NHS 2002a). The current capitation formula is based on the number of enrolled persons, individual-level data on age and gender, and communitywide data on socioeconomic status and chronic illness levels (Majeed, et al 2001).

Primary care groups and trusts also have a high degree of responsibility for measuring their costs in order to allocate the capitated payments effectively. The unified budget must be allocated among hospital care, prescribing, primary care, and other services. The primary care groups are encouraged to work with the health authorities to determine the appropriate allocation of resources based on cost information (NHS 2002a). To support the new purchasing arrangements, the National Health Service (NHS) provides guidance on a mandatory system of costing for all providers (NHS 2002b). These cost data are meant to be used by both purchasers and providers in the NHS to support monitoring of performance and service delivery and commissioning of health services—services purchased by primary care groups using their capitated budgets (NHS 2002c). National cost data will be used to derive a national price schedule for health services, eliminating price competition in the commissioning of health services. This costing methodology is a top-down allocation of total costs to units of activity. The units of activity are Healthcare Resource Groups (HRGs)—a diagnosis-based classification—for inpatient and outpatient services, and other units for services without HRGs (each client is the unit of activity for some community services) (NHS 2002b).

In the United Kingdom, the information needed for the current capitation formula includes the number of enrolled persons, individual-level data on age and gender, and communitywide data on socioeconomic status and chronic illness levels (Majeed, et al 2001). This requires an accurate count of enrolled persons and data on their age, gender, and address. The address is then linked with community-level census and morbidity data.

EXAMPLES FROM LOW- AND MIDDLE-INCOME COUNTRIES

There is limited documentation of studies costing health care services in order to set prices paid by purchasers in low- and middle-income countries. In the 1980s, a considerable amount of work was done to cost vertical child survival programs—especially Control of Diarrheal Diseases (CDD) and Expanded Program on Immunizations (EPI) programs—in order to establish the cost-effectiveness of those programs. Shepard (1984) provided an overview of costing experiences for

CDD programs. Brenzel and Claquin (1994) reviewed approximately thirty published and unpublished EPI cost-effectiveness studies conducted during the 1980s. At an average cost of \$5 to \$10 per child, they found immunizations through the EPI to be one of the most cost-effective child survival interventions. An earlier study by Brenzel (1989) found that when all donor contributions, vaccines, syringes, cold chain equipment, vehicles, and local training costs are included, the average cost per fully immunized child was \$13.

Waters and others (2001) applied ABC to establish unit costs and compare them to prices for a nongovernmental provider in Peru. Their study found that using ABC is feasible in a developing country setting, yielding results that are directly applicable to pricing and management. However, the study also showed the importance of the availability and organization of cost information. Applying ABC efficiently requires information to be readily available, by cost category and department, since the greatest benefits of ABC come from frequent, systematic application of the methodology to monitor efficiency and provide feedback for management. For most low- and middle-income health care providers, cost and volume information is not readily available in this type of organization.

Shepard and others (1998) provide a detailed guide for calculating unit costs for hospital services in low- and middle-income countries. The ability to determine unit costs in these settings depends on the availability of disaggregated data for both costs and volume. The recommend top-down allocation procedures to assign operational costs, capital costs, and spending from user fee revenues, with allocation of ancillary services such as x-rays and laboratory exams based on actual costs.⁶

CHARACTERISTICS OF PURCHASERS AND PROVIDERS

The characteristics of health care providers and their relationships with purchasers have a strong influence on how prices for health services are determined. Some of the most pertinent characteristics are provider autonomy, provider negotiating power, and the degree of competition.

PROVIDER AUTONOMY

Provider autonomy can be thought of as a continuum from complete ownership of the provider by the purchaser to private ownership with contractual relationships with purchasers. Preker and Harding (2001) describe three market-oriented reforms that have moved health systems along this continuum toward private ownership. *Autonomization* refers to the transfer of many day-to-day management decisions to providers, with increasing reliance on performance-related payments. *Corporatization* is the emulation of private corporations by public organizations, transferring near-complete control over inputs and the production of services to hospital managers. *Privatization* is the transfer of public organizations to private ownership.

In the special case where the public sector combines the functions of purchasing and delivery within the same public sector organization, the differences in the incentives of these two groups

⁶ At least two other practical manuals are available to guide the calculation of program costs at the health district level. One is from UNICEF (Hanson and Gilson, 1993) and the other from WHO (Creese and Parker, 1994).

are minimized. Moving along the continuum toward greater autonomy for providers, their incentives increasingly diverge. Providers with greater autonomy are also more likely to be autonomously responsible for determining the costs of the services they provide and the corresponding prices that are necessary for sustainable provision of high-quality services.

PROVIDER NEGOTIATING POWER

Provider negotiating power is important in many systems for setting prices in which the providers are not directly managed by purchasers but do not tender competitive bids to determine prices. Providers may negotiate with purchasers over the level of payment for services, what services are reimbursed, and how they are reimbursed. In Germany, Switzerland, and Canada, for example, the level of payment is determined through negotiations between purchasers and provider groups. Thus, the prices paid for services provided are directly dependent on how effectively the provider associations can negotiate for resources. The German example is illustrated in greater detail below.

PROVIDER COMPETITION

Provider competition affects prices in systems where prices are determined through a process where autonomous providers tender bids. In a perfect market, competitive bidding would be expected to produce socially optimal price levels. However, health care markets include many well-documented market failures—with subsequent justification for government intervention. An example of a competitive bidding process for provision of health services can be found in the United States. U.S. hospitals enter contractual relationships with private health insurers. Regulation by the states affects many aspects of this process. Keeler and others (1999) showed that hospital prices were lower in areas on California with relatively low levels of hospital competition. This illustrates the importance of the number of providers on the price effects of the competitive bidding process. If a hospital is the only provider for a region, for example, it could use its monopoly power to obtain higher prices for its services through a unilateral bid for a contract rather than through a negotiating process with a purchaser.

EXAMPLES FROM HIGH-INCOME COUNTRIES

Germany and the United States

The prices of ambulatory services in the German system are related to the relative negotiating power of providers and purchasers. Furthermore, multiple interrelated areas of negotiation affect prices—including the amount of the regional capitated budgets, the services remunerated, and their relative values. Chancellor Gerhard Schroeder commented after his recent reelection that he would like to decrease the negotiating power of the National Association of Statutory Health Insurance Physicians, potentially bypassing the association by contracting directly between sickness funds and individual doctors (Reuters 2002). Such a change would be a return to the negotiation system used in the early years of the German public insurance system in the late 19th century (Busse 1999). Reforms in 1989 sought to increase the negotiating power of the purchasers vis-à-vis the providers by centralizing all negotiations (Busse 1999). Physicians are not permitted to strike, but in previous negotiations they have publicly threatened to ration care by placing patients on waiting lists (Reuters 2002).

Denmark

Similar to the German process, prices paid to Danish general practitioners depend to a great extent on their negotiating power. If the physician association and county councils cannot reach agreement, the federal Ministry of Health fixes payment amounts unilaterally until agreement is reached (Ruble 1995). Since these physicians earn one third of their revenue through capitation, they have some incentive to enroll more healthy patients to increase their revenue, although there is no published evidence of a selection bias toward healthy patients.

Australia and the United States

Provider autonomy and negotiating power are important in determining the level of payment per DRG in Australia. Although the price per relative unit of weight can be informed by costing studies, as in Victoria, it is also determined through political processes. In addition, payment levels can be affected by adjustments for special types of hospitals—for example, a politically powerful teaching hospital association may be able to adjust its payment levels upward. Competition may affect prices in some systems. For example, providers in the United States may contract for different prices per DRG with private insurance companies than the amounts paid through the Medicare program.

United Kingdom

Frequent reforms of the NHS have drastically changed the roles of providers and purchasers. The most recent incarnation of the NHS, with devolved purchasing and a high degree of provider autonomy in managing the health of an enrolled population, will continue to provide lessons for other countries (Dixon and Preker 1999). Primary care groups will have to increase their managerial capacity to adjust to their new autonomy in order to set prices appropriately for the services provided (Wilkin 2002). Meanwhile, the method used to set the price of their capitated budget is also evolving. Future capitation rates will depend on negotiating power of the provider groups as well as expert input.

CONCLUSIONS

Setting the prices paid for health services at appropriate levels is essential for the fair reimbursement of providers, for promoting system sustainability, and for encouraging the provision of appropriate, high-quality medicine. This paper has summarized a range of methods and experiences in setting prices in different payment systems.

The main factors influencing how prices are set are the unit and method of payment, the measurement of costs, and the characteristics of purchasers and providers. These factors are strongly interrelated. For example, many low- and middle-income countries use global and line-item budgets for hospital payments. This payment system is simple to administer since it does not rely heavily on measuring costs; prices paid are determined mainly from historical levels. However, since global and line-item budgets are generally not aligned with the costs providers actually incur, they provide an incentive to underprovide health services, and do not encourage managerial flexibility (Langenbrunner and Wiley 2002; Kutzin 1995). For these reasons, most high-income countries that formerly used fixed budgets to reimburse hospitals have moved to more sophisticated payment systems.

This paper has provided examples from the United States, Australia, and the United Kingdom demonstrating approaches taken to setting prices under payment systems with intensive information demands. One approach has been to undertake costing studies to align prices with actual costs. The state of Victoria in Australia has used several different costing methodologies to determine the appropriate price paid for each diagnosis-related hospital discharge. The U.S. Medicare program conducted a detailed costing study to set the price levels for its fee schedule for physician reimbursement.

Other high-income countries, however, do not use such information-intensive approaches to setting prices. In Germany, the price-setting system depends on two main components—negotiations and a mixed payment system. A system of annual negotiations helps to ensure that providers are fairly reimbursed. At the same time, an overall cap on the amount of physician reimbursement mitigates the incentive to overproduce services in a fee-for-service payment system and constrains overall costs. The U.S. Medicare program has also relied on negotiations and expert consultations to update its original fee schedule costing study and uses an overall volume cap on services. In Denmark, capitation payments to individual physicians—which potentially involve the greatest information needs to ensure appropriate price levels—are based only on age and gender. The negative effects that could result from inappropriate capitation price levels are mitigated through a mixed payment system and annual negotiations over prices.

These experiences reveal a variety of options for setting prices for health care purchasers in low- and middle-income countries that are reforming their payment systems. Unit costing studies are essential for setting prices proportionate to costs; but in cases where accurate unit costs are not available, other options exist for setting prices appropriately. Some techniques exist for simpler estimation of costs, such as importing reimbursement systems in use in other countries. For example, the reimbursement weights per diagnosis from the U.S. Medicare program have been used or modified for use in many other countries. Finally, safeguards such as mixed payment systems and price negotiations can help to minimize the undesired consequences—under- and overutilization—that arise from inappropriate price levels.

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