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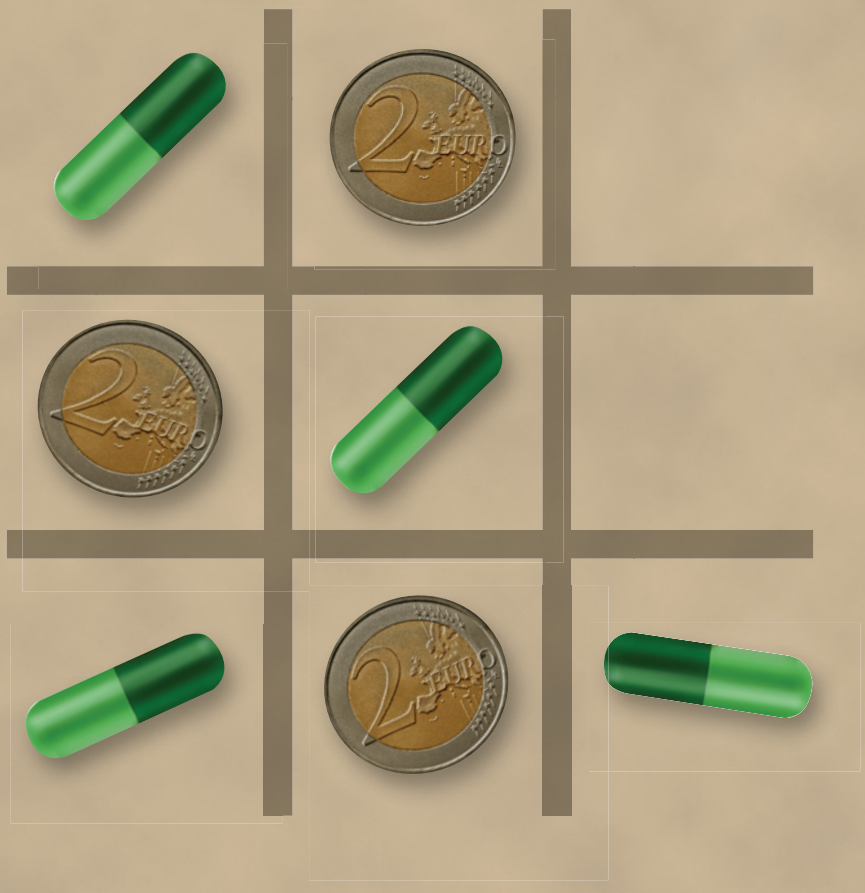
Designing and Implementing Health Care Provider Payment Systems

How-To Manuals



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THE WORLD BANK
USAID
FROM THE AMERICAN PEOPLE

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Preface

This volume grows out of an initiative in the World Bank on resource allocation and purchasing ("RAP"), which started in 2000, and continues to publish articles and books related to strategic purchasing.

The initiative emerged from such questions in developing economies as: Why do individuals need help in purchasing health services from providers? Is the "middleman" really necessary? Can people not just buy health services in the same way they would go to the local market to buy bread, milk, or fruit—especially since, throughout most of history, that is what most people did? When sick, they contacted local healers directly.

Public policy historically was limited largely to protecting the sick against charlatans and was enforced through ethical codes such as the Hippocratic oath. There was no expensive technology, and most serious conditions led to death. Loss of employment and burial costs were the most expensive parts of illness. With industrialization and the scientific revolution, all this changed. As understanding about the causes, prevention, and treatment of illness expanded, interventions become more complex and expensive. Health care was no longer the exclusive domain of traditional healers.

Other actors became involved, including policy makers, institutions for regulation and financing, complex organizations specializing in delivery of services (such as hospitals, clinics, and diagnostic centers), and a range of specialist providers (such as doctors, nurses, pharmacists, dentists, and allied health workers). Through this process, the health system slowly became differentiated beyond the simple patient-healer relationship. And of course, these changes required increasingly sophisticated approaches to organization and financing.

Though often merged in a single organization or agency under a government department, health care financing can be broken down into several activities, each with its own set of objectives, priorities, and constraints, such as collection of revenues, pooling of funds, and the subsequent use or allocation of funds within the delivery system.

It is the last activity with which this volume is concerned in that it shows how revenues, once collected and pooled, can then be channeled through specialized financing arrangements or agencies that have substantial purchasing power; that provide a predictable income stream for providers; and that allow strategic decisions to be made about priorities and spending patterns that would not be possible in the case of direct patient-healer financial transactions.

Strategic purchasing is not new. Since the 1980s, all countries in the Organisation for Economic Co-operation and Development have come to rely on such collective financing arrangements for health care. In the last couple of decades, many low- and middle-income countries have been following a similar path. But

this latter group of countries faces special challenges in health financing and purchasing of services, and in reaching poor and vulnerable groups. Many funding departments or agencies still behave like "passive cashiers" (rather like banks' automated teller machines), in that they focus on simply doling out what they are supposed to pay. Someone else decides who benefits, what services should be included, which providers are eligible for reimbursement, what prices are to be paid, and which payment mechanism should be used.

In contrast, strategic purchasing is far more active and iterative. It involves a continuous search for the best ways to maximize health system performance by deciding which interventions should be purchased, from whom these should be purchased, and how to pay for them. In such an arrangement, the passive cashier is replaced by an intelligent purchaser that can focus scarce resources on existing and emerging priorities rather than continuing entrenched historical spending patterns.

The World Bank, in *Good Practices in Health Financing* (P. Gottret, G. Schieber, and H. R. Waters 2008) has documented emerging global "best practices" in health financing and purchasing in such low- and middle-income countries as Chile, Colombia, Costa Rica, Estonia, the Kyrgyz Republic, Sri Lanka, Thailand, and Tunisia. The exact models and the mix of policy choices in each country differ. The details and pace of reforms vary. And because the science and practice of medicine are so dynamic, purchasers in these countries are constantly pilot-testing new approaches. But whether best practice or not, many countries have experimented with different ways of paying providers of health care services.

Partly because of the complexities involved, the World Bank's new Health, Nutrition and Population strategy has noted that "Countries increasingly not only want to know what to do [with health systems] but also how to do it, particularly how to design and manage the transition from current to reformed systems."[1] This volume is a step in that direction, to help countries design, manage, and implement reforms related to strategic purchasing with an emphasis on changing their provider payment systems.

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NOTE

1. "World Bank Strategy for Health, Nutrition and Population Results: Background Note for a Briefing to the Committee on Development Effectiveness on the Preparation of the New Bank HNP Strategy." May 30, 2006. World Bank, Washington, DC. http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1154048816360/HNPStrategyBackgroundNoteFinaltoCODEJune7.pdf.

Acknowledgments

The idea for this volume came over a decade ago from George Schieber of the World Bank. He was often asked not only about new payment methods, but how to develop them. Later, Tina Cleland funded a first initiative through the United States Agency for International Development (USAID). In the late 1990s, Alexander Preker initiated the Resource Allocation and Purchasing ("RAP") initiative in the Bank, which developed tools and methods for strategic purchasing of health services. He nurtured the idea and encouraged the authors to complete the manuals. The authors were chosen because each of them at the time was working on actual implementation of one of these methods with clients around the world. More recently, Pablo Gottret understood the importance of publishing and disseminating these manuals to a wider audience. His leadership allowed the book to realize completion and publication.

Chapters 1 and 2

The two provider payment manuals in these chapters represent the cumulative effort and experience of many dedicated professionals over nearly 15 years of implementing health reform in the Central Asian republics. The authors would like to thank their colleagues in Central Asia who shared their experiences in provider payment reform. The authors are also grateful to the entire ZdravPlus team across three consecutive projects over 13 years, all members of which contributed to this large task. The authors would like to acknowledge the staff of USAID/CAR for their long-standing support of health reform in Central Asia, their recognition that time and flexibility was needed to implement comprehensive health financing reform, and their support for disseminating the implementation experience to the widest possible international audience. Abt Associates Inc. provided its corporate dedication and support to the Central Asia team over the life of the ZdravPlus Program, and the World Bank partners in Central Asia were committed to a productive collaboration that harnessed the strengths of all of the international partners.

Chapters 3 and 4

The author would like to recognize the contribution made by the many colleagues with whom he has had the privilege of working on World Bank projects. They have stimulated discussions on the subject of global budgeting, and have through discussion and practice assisted in the formation of the ideas presented in this chapter. In particular, his thanks go to Loraine Hawkins, who assisted in his development of these ideas.

Chapter 5

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Abbreviations (see also Glossary)

ADP	Additional Drug Package
DRG	Diagnosis-related group
EU	European Union
FGP	Family group practice
FMIS	Financial management information system
GDP	Gross domestic product
HIS	Health information system
HMIS	Health management information system
ICD	International Classification of Diseases
MDC	Major diagnostic category
MHIF	Mandatory Health Insurance Fund
MOH	Ministry of Health
No.	Number
OECD	Organisation for Economic Co-operation and Development
PFI	Private finance initiative
PHC	Primary health care
R&D	Research and development
RAP	Resource allocation and purchasing
SHCDP	State Health Care Development Program
STI	Sexually transmitted infection
USAID	United States Agency for International Development
WHO	World Health Organization

All dollar amounts are U.S. dollars unless otherwise indicated.

Glossary

Term	*Abbrev.*	*Definition*
Allocation basis		A rule used to allocate indirect costs to a cost center (hospital clinical department) in the step-down cost-accounting process
Allocation statistics		The data needed to apply the allocation basis to allocate indirect costs to a cost center (hospital clinical department) in the step-down cost-accounting process
Average length of stay	ALOS	Average number of days per hospital stay
Base per capita rate (for primary health care)	BPCR	The average amount of primary health care funds available per person enrolled with primary health care providers included in the payment system (total primary health care funds/total population)
Base rate (for hospitals)	BR	Aggregate average cost per hospital case across a group of hospitals
Bottom-up costing		A costing method that determines the unit cost of a service by summing the cost of all inputs used to provide the service in the most recent year and divided by the annual total number of the services provided
Budget neutral		A payment system designed so that the total payment to providers in the health sector, or a subsector such as the hospital sector, in a budget period is equal to the total amount of resources allocated to the sector
Bundling of services		Grouping health care services into a higher aggregated unit (such as hospital bed-days and all tests and procedures grouped into a "discharge"), and charging or paying for the group of services rather than for each individual service
Capitated rate	CR	The amount of funds paid to a provider to deliver the defined package of services per person enrolled with the provider for a fixed period
Case-based payment method		A hospital payment method that reimburses hospitals a predetermined fixed rate for each treated case
Case group	CG	A group of hospital cases defined for a case-based hospital payment system to include cases with similar clinical characteristics and resources required to diagnose and treat the cases, or to complete a phase of case management
Case group weight	CGW	The ratio of the average cost per case in a given case group divided by the global average cost per case, which reflects the resource intensity of diagnosing and treating cases in the case group relative to the average
Case mix	CM	The relative complexity and intensity of services required to treat patients in a hospital due to diagnosis, disease severity, and personal characteristics such as age
Case mix index	CMI	A summary measure that describes the number and types of patients treated in a hospital according to the complexity and intensity of services required to treat the patients due to diagnosis, disease severity, and personal characteristics such as age
Clinical grouping of cases		A set of criteria and a process for allocating hospital cases into clinical groups that have similar clinical characteristics and resource intensities

Term	*Abbrev.*	*Definition*
Coefficient of variation	CV	The variation (standard deviation) of a variable expressed as a percentage of the average (mean) of that variable
Comorbidity		A condition that is not related causally to a patient's principal disease process, but increases a patient's total burden of illness
Diagnosis-based case group		A classification of hospital case types into groups that are clinically similar and are expected to have similar hospital resource use. The groupings are based on diagnoses, and may also be based on procedures, age, sex, and the presence of complications or comorbidities
Direct costs		Costs that can be directly attributed to a cost center (such as a department, process, or product). Examples include salaries, social taxes, medicines and supplies, and food
Economic adjustment coefficient		An adjustment factor multiplied by the base rate in a provider payment system to adjust for economic factors external to the health sector that would affect expenditures, such as inflation or regional variations in resource cost
Enrollment period		The fixed period for which an individual is enrolled with a health care provider before the next opportunity to choose the same or a new provider
Global budget provider payment method		The allocation of a payment fixed to a health care provider to cover the aggregate costs over a specific period to provide a set of services that have been broadly agreed on. A global budget may be based on inputs or outputs, or a combination of the two. Typically, providers have flexibility to make decisions about how to allocate funds across expenditure categories
Hard budget cap		The amount of resources allocated to the health sector, or a subsector such as the hospital sector, which serves as a firm limit on expenditures in that sector during the budget period
Health purchaser		An entity that transfers pooled health care resources to providers to pay for services for a defined population
Hospital pool	HP	An estimate of the amount of funds that will be available to pay for hospital services in a defined administrative or geographic region for a specified time period
Incentive		An economic signal that directs individuals or organizations (economic entities) toward self-interested behavior
Indirect costs		Costs, such as utilities, that are difficult to attribute directly to specific cost centers (hospital departments, for example), products, or processes
International Classification of Diseases	ICD	A system of categories used to classify morbidities according to established criteria. The classification system is currently in its 10th edition (ICD-10) and is published by the World Health Organization.
Line-item budget provider payment method		The allocation of a fixed amount to a health care provider to cover specific input costs (such as personnel, utilities, medicines, and supplies) for a certain period. Typically, providers have limited flexibility to move funds across line items.
Major diagnostic category	MDC	A category of diagnoses generally based on a single body system or disease etiology that is associated with a particular medical specialty
Open enrollment		The process by which individuals select a health care provider and are then assigned to that provider for a fixed period (the enrollment period)
Open enrollment registration period		The designated fixed time during which individuals can enroll (or reenroll) with a health care provider

Term	*Abbrev.*	*Definition*
Outlier case		A hospital case with an atypically long or atypically short length of stay for a particular case group. The outlier case threshold is sometimes called the trim point.
Per capita payment method		A payment method in which all providers in the payment system are paid, in advance, a predetermined fixed rate to provide a defined set of services for each individual enrolled with the provider for a fixed period. (Also known as capitation payment.)
Pooling of health care funds		Accumulating all state or public funds allocated to pay for health services for the entire population of an administrative or geographic area in a single budget. Pooling includes horizontal consolidation of the budget across all parts of the health care system, and vertical consolidation across levels of local administration in a given area.
Primary health care	PHC	As defined in the Alma Ata declaration: "Essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally available to individuals and families in the community through their full participation and at a cost that the community and the country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination"
Primary health care pool	PHCP	An estimate of the amount of funds that will be available to pay for PHC services in a defined administrative or geographic region for a specified time period
Prospective payment		The payment rate for a set of services determined prior to the services being delivered
Provider payment method		The mechanism used to transfer resources from the purchasers of health care services to the providers
Provider payment system	PPS	The provider payment method combined with all supporting systems, such as information systems and accountability mechanisms, considered in the context of surrounding payment systems (for outpatient services, for example) and referral rules
Reserve fund		A portion of the hospital pool that is set aside and not used to calculate the base rate of the case-based payment system. The reserve fund is used to accumulate funds in surplus months and to pay for budget overruns in deficit months. Also referred to as a risk pool or contingency fund
Retrospective payment		The payment rate for a set of services determined after the services are delivered
Risk adjustment		A correction tool that uses a measure of risk (expected cost) variation to compensate health plans or health providers appropriately for the expected cost of providing necessary services for their enrolled population
Risk adjustment coefficient		The ratio of the average expected cost of a particular risk group to the average expected cost of all groups used to scale up or scale down the base per capita rate
Risk selection		The practice of insurers or other risk bearers of encouraging low-risk individuals to join or discouraging high-risk individuals from joining the risk pool
Soft budget cap		The amount of resources allocated to the health sector, or subsector such as hospitals, which serves as a target, but providers are compensated for overruns if expenditures exceed the target in the budget period
Top-down allocation		The proportion of total available funds allocated to a sector, or subsector such as hospitals, determined administratively rather than based on the actual share of total costs

Term	*Abbrev.*	*Definition*
Unbundling of services		Ungrouping aggregated, or "bundled," units of health care services into individual service components (for example, hospital discharge that is ungrouped into bed-days and into all tests and procedures), and charging or paying for the individual services rather than the higher-level "bundled" unit
Unit cost		The average cost per service provided (total cost/number of services provided)
Unit-level information	ULI	Basic information (regarding the health care encounter) such as services provided, diagnosis, and care provided. Patient information includes name, address, age, past medical history, medications being taken, and allergies.
Upcoding		The practice of assigning hospital cases to a case group that is reimbursed at a higher rate than the case group to which the case actually belongs based on the observed clinical characteristics of the case

OVERVIEW

What, How, and Who: An Introduction to Provider Payment Systems

John C. Langenbrunner, Cheryl Cashin, and Sheila O'Dougherty

AIMS AND READERSHIP OF THIS VOLUME

Many countries have adopted a general purchasing health services framework (Preker and Langenbrunner 2005), which specifies several components of purchasing, specifically:

- Core policy characteristics or "policy levers" that can be used for allocating resources by purchasers across geographic areas or directly to providers
- Organizational characteristics of providers and the incentive regimes within provider organizations and provider markets
- Institutional characteristics embedded in the transactions that occur between different organizational units emanating from the government and across both public and private sectors. This area is similar conceptually to that outlined in *The World Health Report 2000—Health Systems: Improving Performance* (WHO 2000), which discussed this area as "stewardship" of the health sector.

In the short term, the use by purchasers of core policy levers can bring about significant impacts in the delivery of care services. Core policy levers include consideration of:

- Demand or "population coverage" (*for whom* to buy)?
- Supply or "benefit package" (*what* to buy, in which form, and what to exclude)?
- Factor and product markets or "contracting" (*from whom*, at what price to buy, and how much to buy)?
- Prices and incentive regime or "provider payment systems" (at what price and *how* to pay)?

This volume focuses on the issues and experiences of one dimension (or policy lever) regarding the move to a strategic purchasing arrangement in a low- or middle-income country (or even geographic region), or within a public or private organization. Many argue that this dimension is one of the most important.

The volume also looks at issues of how to set prices and design the incentive regime or "provider payment systems" (box 1). Incentives can fundamentally change provider behavior, but purchasers must still set prices and decide exactly *how* to pay.

This volume—in this overview and in five chapters[1]—is dedicated to helping countries understand how to pay providers and how to design, build, and run new provider payment systems. It has chapters on three of the most popular provider payment systems: primary care per capita (capitation) payment, case-based hospital payment, and hospital global budgets. These systems have been widely adopted in Western Europe and across the Organisation for Economic Co-operation and Development (OECD) countries generally (see, for example, Langenbrunner et al. 2005), and are increasingly being adopted in developing countries, both low- and middle-income, as well as in transition economies such as the new member states of the European Union (EU). The volume furthers provides a chapter that is a "primer" on a second policy lever, namely, contracting. Specifically, the primer is developed in the context of supporting and implementing one provider payment method, hospital global budgets. The volume's final chapter provides an outline for designing, launching, and running a health management information system, the necessary infrastructure for strategic purchasing, and for enabling and fully completing the new provider payment systems.

The purpose of this volume is to provide step-by-step guidelines for developing appropriate and effective payment systems for health purchasers in low- and middle-income countries. In order to allow for adaptation to different contextual factors within and outside the health care system in different countries, the volume provides guidance for a range of options, from the simplest to more complex systems.

The intended readership includes health policy makers in low- and middle-income countries, and donor representatives or technical assistance specialists tasked with the design or implementation of health financing projects that include hospital payment reform, as well as (for health management information systems) technology managers.

BOX 1 INCENTIVES

Incentives are the economic signals that direct individuals and organizations toward self-interested behavior. The idea of incentives, therefore, is based on the assumption in microeconomics that individuals and organizations attempt to optimize and take actions that further their own self-interest.

All provider payment systems create economic signals, and individual providers respond to those signals to maximize the positive—and minimize the negative—effects on their income and other interests. Provider payment systems can be designed to create economic signals that lead providers to self-interested behavior that is also in the interest of the purchaser, the patients, and ideally in the interest of the health care system as a whole.

PROVIDER PAYMENT SYSTEMS AND METHODS: AN OVERVIEW

Provider payment systems can be powerful tools to promote the development of health systems and achieve health policy objectives. A *provider payment system* may be defined widely as the payment method combined with all supporting systems, such as contracting, accountability mechanisms that accompany the payment method, and management information systems. In the context of health systems, therefore, provider payment systems accomplish far more than simply the transfer of funds to cover the costs of services. A *provider payment method* may be defined more narrowly as the mechanism used to transfer funds from the purchaser of health care services to the providers.

The incentives that are created by the provider payment methods and the responses of the providers to those incentives, the management information systems to support the provider payment methods, and the accountability mechanisms established between providers and purchasers can have profound effects on the way in which health care resources are allocated and services are delivered.

Payment systems should help achieve health policy objectives by encouraging access to necessary health services for patients, high quality of care, and improved equity, while promoting the effective and efficient use of resources and, where appropriate, cost containment. With these aims in mind, payments to health care providers can be approached in three ways:

- Direct payment to the provider by the patient
- Direct payment to the provider by the patient, but with later full or partial reimbursement
- Direct payment to the provider through intermediate provider payment arrangements, with only a limited copayment or informal charge paid by the patient.

Direct payment by the patient sends the consumer a clear signal about the price of the service. However, poor patients or patients receiving expensive care for major illnesses may not have the funds to pay. Even full or partial reimbursement later may not be able to bridge the period between paying for the service and receiving the reimbursement. With direct payment to the provider primarily through intermediate provider payment arrangements (rather than by the patient), the payment incentives and mechanism used, rather than prices and demand, create the behavioral environment for suppliers of services.

Because of information asymmetry, neither providers nor consumers have full information about preferences, prices, or the market in which they operate. The intensity, mix of services, and quality of care for patients can typically be ascertained only after the fact, and the good health of the individual depends on other factors besides the health services consumed. Physicians act as agents for their patients (Arrow 1963), but often not even they know the full impact of the interventions that they are recommending. Both provider and consumer behav-

ior is therefore important. Pricing and payment mechanisms provide an opportunity to shape the behavior of both through incentives.

In the following subsections, popular payment methods for both outpatient (particularly primary health care or PHC) and inpatient care are presented.

PHC Payment Methods

There are three main types of PHC (including outpatient) payment methods: line-item budget; fee-for-service (with or without a fixed-fee schedule); and per capita (table 1). It is also possible to pay PHC providers per case or treatment episode, but such payment methods are rarely used for PHC services because they do not correspond to the fundamental PHC set of services, which should be oriented toward health promotion, disease prevention, and case management. Also, per case payment methods are too complicated to design for PHC and outpatient care, and would place an excessive administrative burden on the purchaser, as most chronic conditions do not have a discrete endpoint, and a separate payment system would have to be developed for preventive services.

TABLE 1 PHC Payment Methods, Characteristics, and Incentives

	Characteristics			
Payment method	*Payment rate set prospectively or retrospectively?*	*Payment to providers made prospectively or retrospectively?*	*Payment based on inputs or outputs?*	*Incentives for providers*
Line-item budget	Prospectively	Prospectively	Inputs	Underprovide services; refer to other providers; increase inputs; no incentive or mechanism to improve the efficiency of the input mix; incentive to spend all remaining funds by the end of budget year
Fee-for-service (fixed-fee schedule and bundling of services)	Prospectively	Retrospectively	Outputs	Increase the number of services including above the necessary level; reduce inputs per service
Fee-for-service (no fixed-fee schedule)	Retrospectively	Retrospectively	Inputs	Increase number of services; increase inputs
Per capita (and see chapter 1 this volume)	Prospectively	Prospectively	Outputs	Improve efficiency of input mix; attract additional enrollees; decrease inputs; underprovide services; refer to other providers; focus on less expensive health promotion and prevention; attempt to select healthier enrollees

Sources: Adapted from Kutzin 2001; Maceira 1998.

The three most common types of payment methods, their characteristics (see the section, *Main Characteristics of Provider Payment Methods*, below), and the incentives that they are likely to create for providers are outlined in table 1. Each type of payment method has variations that may create a different set of incentives; the payment methods may be used in combination to enhance or mitigate the incentives that are created by each one individually.

Line-item budget

A line-item budget provider payment method is the allocation of a fixed amount of funds to a health care provider to cover specific line items (or input costs), such as personnel, utilities, medicines, and supplies, for a certain period. Line-item budgeting is therefore input-based with payment to providers both set and made prospectively. It offers strong administrative controls, which are often valued in government-run systems. In theory, technical and allocative efficiency of health interventions can be optimized by manipulating the government budget lines over time to increase delivery of cost-effective health interventions and decrease delivery of less cost-effective interventions. This assumes that governments can track and understand the right combination to achieve these results. But in reality, they often cannot for lack of good monitoring information.

Rules generally limit the ability of providers to transfer funds across line items, therefore offering no incentive or mechanism for the provider to achieve the most efficient input mix. Because providers are not accountable for their resource allocation decisions, they do not even have the incentive to determine what that most efficient mix would be. Once the budget is allocated to the provider, there is usually little accountability for the volume and quality of services provided.

The level of payment is not related to output (such as bed-days or cases), although budgets may be adjusted in the current year to reflect changes in input use or outputs (called "open-ended line-item budgeting"), or in subsequent years to reflect the level of inputs and outputs in previous years. The incentives may therefore be ambiguous, depending on the period over which providers respond, and the degree to which budgets are adjusted on the basis of current or historical costs and output. For example, if next year's budget reflects changes in costs or output, the provider may increase inputs or output in the current year to expand the budget in the future.

The line-item budget method was common in the United Kingdom in the 1980s; in the Eastern bloc and former Soviet Union republics (table 2); and is still common in many other countries such as Egypt, the Philippines, Vietnam, and some African countries. It is also found to this day in many government-run systems in all regions of the world, regardless of income (such as Bahrain, Bangladesh, Mozambique, and Saudi Arabia) (Preker and Langenbrunner 2005).

TABLE 2 Basis for Allocating Resources by Line Items in Former Soviet Union Republics

Budget line item	*Basis of funding level*
1 & 2. Salaries and social security	Number and grade of staff in post
3. Operating expenditures	Last year's budget
9. Meals	Bed-days
10. Medicines	Bed-days
12. Equipment	Number of beds
14. Furniture and fixtures	Number of beds
16. Maintenance	Number of beds

Source: Ensor and Langenbrunner 2002.

Fee-for-service

In fee-for-service methods, the provider is reimbursed for each individual service provided. They may be either input-based or output-based. They are input-based if there is no fixed-fee schedule and if services are not bundled (that is, where health care services are not grouped into a higher aggregated unit). In this case, providers are permitted to bill purchasers for all costs incurred to provide each service. This is often called "retrospective cost-based" payment, a term commonly applied in the United States, among other countries.

The method can also be output-based if there is a fixed-fee schedule (as in Canada, Germany, and Japan) and services are bundled to some degree: the provider is paid the fixed fee for the predefined service regardless of the costs incurred. In this type of fee-for-service arrangement, the provider has an incentive to increase the number of services overall during the encounter and to reduce the inputs used per service. Services that can be provided most efficiently and generate a surplus will be expanded most quickly. Fees can be set so that the prices paid to the providers are congruent with the costs of producing those services, such that surpluses are not excessive. In practice, however, numerous individual services are provided, and it is difficult, and not necessary, to obtain accurate cost information on each service. The more services are bundled, the greater the range in cost of production, and the less it is expected that the prices of the services will match the actual costs per individual encounter.

Although fee-for-service payment has been shrinking since the early twentieth century, it is still popular in such countries as Canada, China, Japan, and the Republic of Korea; among private insurers in the Gulf States such as Saudi Arabia; the United States (under indemnity plans); and parts of Western Europe (such as Austria and Germany).

The experience in industrial economies, and increasingly in other parts of the world, is that fee-for-service correlates with a pronounced increase in volume and overall health expenditure, as seen, for example, in the Czech Republic and Taiwan, China. One short-term response to this expenditure growth has been to cap overall spending on the supply side (Croatia, Japan), and to encourage some

patient cost sharing to minimize moral hazard (the Philippines, some provinces in Canada). However, as long as the purchaser (or insurer) has all the risk and is willing to pay, the costs of the health provider are likely to continue to increase. The incentives to provide more services and use more expensive inputs make this type of payment method unsustainable in most health systems.

The fee-for-service method has advantages, however. First, it can be easily developed and implemented, with little capacity required. Available fee schedules abound. Community financing schemes in Asia and Africa have used it at start-up (Diop 2002). Second, it more accurately reflects the work actually done and the efforts expended (Ron, Abel-Smith, and Tamburi 1990) than line-item budgets, thus encouraging providers to work longer hours and/or provide more services. Third, the fee-for-service method is thought to improve access and utilization for underserved areas (such as rural areas in the Philippines), for underserved populations (the poor) as in Cambodia and the Lao People's Democratic Republic, and for high-priority services (Czech Republic, Denmark, Haiti, United Kingdom) (Eichler, Auxila, and Pollock 2001).[2] Fourth, if costs are understood, scheduled fees can be set to encourage the provision of cost-effective services, as in Japan. If costs do not correlate with fee levels, however, the opposite impacts are possible, such as an emphasis on high-technology care relative to primary care (China) (Wagstaff 2007).

Per capita

In per capita (or capitation) payment systems (addressed more comprehensively in chapter 1), the provider is paid, in advance, a predetermined fixed rate to provide a defined set of services for each individual enrolled with the provider for a fixed period. Per capita payment systems are output-based, and the unit of output is the coverage of all predefined services for an individual for a fixed period, usually one month or one year. The key principle is that the payment to a provider is not linked to the inputs that the provider uses or the volume of services provided. Therefore, some risk is shifted from the purchaser to the provider. If the provider incurs costs that are greater than the per capita budget, the provider is liable for them. The corollary is that if the provider achieves efficiency gains and incurs costs that are lower than the per capita budget, it can usually retain and reinvest this surplus.

In a per capita payment system, the provider has the incentive to increase output or attract more patients to enroll, which increases its total payment received. It may attract these enrollees through improved quality of care, additional services that are not typically covered, or other measures that patients may perceive as increasing the benefit of enrolling with that provider rather than with another provider. Because the provider does not receive additional payments for these service enhancements, it is at risk for all inputs, and therefore has an incentive to reduce the inputs used per individual covered. It may do this by improving the input mix to reduce expenditures in order to provide the same level of services and quality; by shifting services to less costly health promotion and prevention activities to keep enrolled individuals well and to reduce

their need for more expensive curative services; or by reducing the quality of care or underprovide needed services. It may also reduce inputs and expenditures by taking measures that attract healthier individuals to enroll (known as risk selection or "cherry picking"), unless some form of risk adjustment is added to the per capita payment system to compensate providers for variations in predictable health needs across different population groups, such as age and sex groups.

Hospital Payment Methods

There are five main types of hospital payment methods. Two discussed above—line-item budget and fee-for-service—can be applied to inpatient services. The three other methods are per diem, case-based, and global budget. The broad types of payment methods, their characteristics, and the incentives that they are likely to create are outlined in table 3. Each type of payment method has variations that may create a different set of incentives, and the methods may be used in combination to enhance or mitigate the incentives that are created by each method individually. The three other methods are now discussed briefly.

TABLE 3 Hospital Payment Methods, Characteristics, and Incentives

	Characteristics			
Payment method	*Payment rate set prospectively or retrospectively?*	*Payment to providers made prospectively or retrospectively?*	*Payment based on inputs or outputs?*	*Incentives for providers*
Line-item budget	Prospectively	Prospectively	Inputs	Underprovide services; refer to other providers; increase inputs; no incentive or mechanism to improve the efficiency of the input mix; incentive to spend all remaining funds by the end of budget year
Fee-for-service (fixed-fee schedule and bundling of services)	Prospectively	Retrospectively	Outputs	Increase the number of services including above the necessary level; reduce inputs per service
Fee-for-service (no fixed-fee schedule)	Retrospectively	Retrospectively	Inputs	Increase number of services; increase inputs
Per diem	Prospectively	Retrospectively	Outputs	Increase number of days (admissions and length of stay); reduce inputs per hospital day; increase bed capacity
Case-based (and see chapter 2 this volume)	Prospectively	Retrospectively	Outputs	Increase number of cases, including unnecessary hospitalizations; reduce inputs per case; incentive to improve the efficiency of the input mix; reduce length of stay; shift rehabilitation care to the outpatient setting
Global budget (and see chapter 3 this volume)	Prospectively	Prospectively	Inputs or outputs	Underprovide services; refer to other providers; increase inputs; mechanism to improve efficiency of the input mix

Sources: Adapted from Kutzin 2001; Maceira 1998.

Per diem

In a per diem (per bed-day) approach, the dominant incentive is to raise the number of hospital days, in the process increasing bed occupancy. It has secondary effects of, possibly, increasing bed capacity and shifting outpatient and community-based rehabilitation services to the hospital setting. At the same time, providers have an incentive to reduce the intensity of their services for each bed-day. High occupancy rates are achieved through boosting hospital admissions and average length of stay. The incentive to lengthen this period is likely to be stronger than the incentive to raise admissions, because there is also an incentive to reduce inputs per day, and hospital days tend to be more expensive early in a stay than later (Aas 1995).

The average per diem rate is usually easy and quick both to calculate and implement because it is typically based at first on the total historical annual hospital costs divided by the total number of bed-days. The rate may be adjusted to reflect characteristics of patients, clinical specialty, and variations in case mix across hospitals (as, for example, in Estonia in the early part of this decade) (Langenbrunner et al. 2005). It may also vary for different days in the hospital stay, with early days paid at a higher rate than later days.

Yet these adjustments to the per diem rate affect the incentives. For instance, adjusting to relatively higher payment rates for early hospital-stay days may reduce the incentive to increase the average length of stay, but may strengthen the incentive to increase the number of admissions. Indeed, in Brazil where per diem payments were instituted between 1971 and 1981, admissions tripled (Rodrigues 1989). Germany's use of per diem resulted in longer hospital stays (13.1 days in 1987) than in other industrial countries (Schulenburg 1992). As with fee-for-service for physicians, this system may work better when coupled with a budget cap for hospital services (as in Estonia and parts of the Russian Federation) (Langenbrunner et al. 2005). Quality and lengths of stay can be monitored by peer reviewers.

Adjustments to the per diem rate based on case mix may serve as a useful transition mechanism from a per diem payment system to a case-based payment system, the latter of which requires more time, information, and technical capacity. In fact, a per diem hospital payment system may be an appropriate intermediate step in the transition to a case-based system, because it is administratively simple to implement and it can be used to begin collecting the data that are necessary to design a case-based system.

Case-based

Case-based hospital payment systems (reviewed in depth in chapter 2) simultaneously create the incentives to increase the number of cases and to minimize the inputs used for each case. Because providers have more control over resource use per case than over the total number of treated cases, the latter incentive is typically stronger (in terms of availability of provider manipulation), and therefore case-based hospital payment systems have been used as a mechanism to

control costs and reduce capacity in the hospital sector. They are found in Brazil, the Kyrgyz Republic, and Thailand (Srithamrongsawat 2007) and in some countries in Europe such as Hungary and Slovenia (Preker and Langenbrunner 2005). They are being pilot-tested in parts of China, Indonesia, Korea, and Russia (Langenbrunner et al. 2005; Wagstaff 2007).

Evidence worldwide suggests that case-based hospital payment is associated with a reduction in the average length of hospital stay. For example, in the U.S. Medicare system, which provides health services for the elderly, the average length of stay fell by 15 percent in the three years after the diagnosis-related group (DRG) case-based hospital payment system was introduced (Lave and Frank 1990), and researchers found that the decrease in the average length of stay was as much as 24 percent for some diagnoses, such as heart disease and hip fractures (Kahn et al. 1990). A decrease in the crude (unweighted) average length of hospital stay of 4.5–6.0 percent annually was seen in the Kyrgyz Republic after its case-based payment system was implemented (Samyshkin 1999). The observed decrease of the length of stay was statistically significant mainly for chronic conditions and elective hospitalizations; the average length of stay for acute care was not significantly affected.

A case-based system can, though, increase both admissions and unnecessary readmissions. In Hungary, Russia, and many other countries, admissions rose significantly after such a system was introduced. In a case-based system all cases fall into some predefined number of payment categories. Categories are typically defined by levels of average resource use. All cases that fall into an individual category are reimbursed at the same rate. As a result, it is beneficial for hospitals to attempt to admit more inexpensive cases within a payment category, to avoid more costly cases, and to split expensive cases into multiple stays (the last two approaches sometimes creating access barriers for severely ill patients). To counteract these adverse incentives, sophisticated methods for differentiating between cases of different resource intensities, such as DRGs, have been developed and are continually being refined.

Case-based systems have some other disadvantages, including (Normand and Weber 1994):

- "Code creep," where providers are likely to code patients into a group with a high point (or index) to obtain a larger reimbursement (as seen in Croatia, Hungary, and Slovenia)
- "Cost shifting," where providers shift patterns of care and costs to non-DRG patients and non-DRG settings, which leaves the total cost to the purchaser unchanged
- Incentives either to discharge admissions prematurely, where costs are shifted to outpatient services, home service care, and nursing home care (which decreases the quality of care because of the interruption) or to underprovide services.

Incentives in per diem and case-based payment

A principle of both these approaches is that they are intended to provide hospitals with payment that reflects the average cost of producing a unit of output in an average hospital and that may be adjusted to account for regional economic conditions. This payment of average cost per unit of output, such as a discharged case, creates a provider incentive to increase efficiency, whereas paying the actual cost for each case would create little or no incentive for increased efficiency. It is not expected that the payment will match the costs of treating each individual patient, and an efficient hospital will generate a surplus on some cases and incur a deficit on others. Pricing based on the average cost is also administratively desirable, because the variety of patient requirements is so vast and, as health systems develop, the technology for health care changes so quickly that any attempt to match payment with the treatment provided to each patient would be administratively cumbersome.

Per diem and case-based systems that pay a predetermined rate for a defined unit of output can serve as an incentive to stimulate competition across hospitals, because the more efficient hospitals will generate more surplus and thus be able to compete for even more patients by investing their surplus in improving the quality of their services. Yet a payment rate based on average cost per case also provides some incentive to reduce costs on more expensive cases. These two incentives (improving quality and reducing inputs per case) are not necessarily contradictory, however. In the Republic of Korea, for example, the average cost per hospital case declined by 14 percent on average during the pilot phase of a new case-based payment system, and some of that reduction was explained by more rational antibiotic use (Kwon 2003).

In some Latin American countries (such as Argentina and Mexico), case-mix classifications used in case-based systems have been developed to track workloads and quality of care, as well as help governments and insurers set payment amounts for hospital care (personal communication, Charles Griffin, World Bank Health Sector Manager, 2001).

Global budget

A global budget at the hospital level (discussed in greater detail in chapter 3) is set in advance to cover the aggregate expenditures of a hospital over a given period (usually one year) to provide a set of services that have been broadly agreed on by the hospital and the purchaser. It is an overall spending target or limit that constrains the price and sets the quality of the services to be provided. While the concept is simple, the types of global budget vary with budget flexibility, types and number of providers, number of purchasers, budget cap target, and budget basis.

According to the degree of flexibility, global budgets can be divided into two types—soft and hard. In the former, the purchaser assumes the costs of overruns; in the latter, the provider assumes the financial risk. Global budgets can also be

grouped by hospital services, physician services, pharmaceuticals, and both services and drugs. They can, as well, be classified by having single or multiple purchasers.

Global budgets may be based on either inputs or outputs, or a combination of the two. For example, Canada and Denmark determined global budgets largely on the basis of historical costs in the 1990s, whereas France and Germany incorporated measures of output, such as number of bed-days or cases, into hospital global budgets (Saltman and Figueras 1997). Ireland introduced a case-mix adjustment to global budgets for acute hospital services in 1993 (Wiley 1995), and since then nearly all EU countries with global budgets have followed with some case-mix adjustment (Langenbrunner et al. 2005).

Because payment to providers is both set and made prospectively, the incentives are similar to those in line-item budgets. However, a global budget offers flexibility to move funds across expenditure categories, so that there is a mechanism to improve the efficiency of the input mix, although there may not be an incentive to do so. For example, the global budget system in France was found to lead to slower growth in overall hospital expenditures, but this was the result of lower volume of services rather than a reduction in the cost per service (Redmon and Yakoboski 1995).

MAIN CHARACTERISTICS OF PROVIDER PAYMENT METHODS

The above discussion noted that provider payment methods may be categorized by three characteristics:

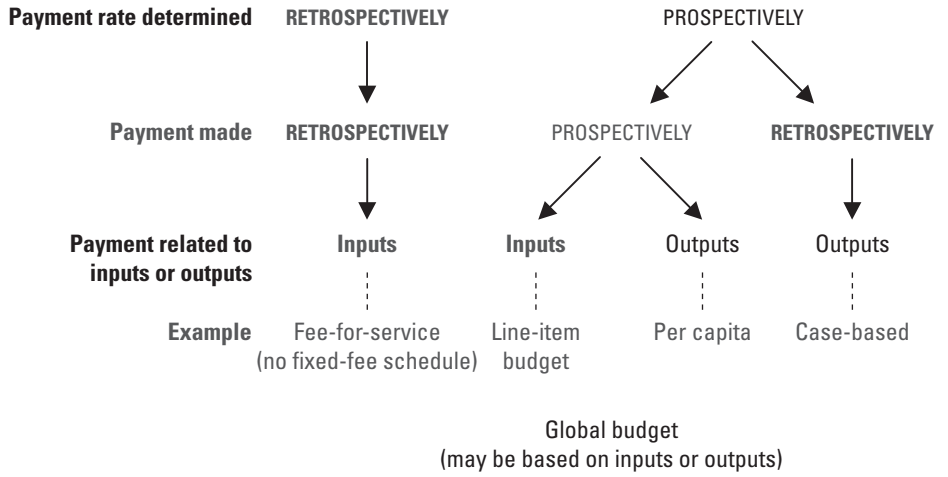
- Whether the price or budget that is paid to providers is *set* prospectively (in advance) or retrospectively (after services are provided)
- Whether the payment to providers is *made* prospectively or retrospectively
- Whether the payment to providers is related to *inputs used* (such as salaries or pharmaceutical costs) or *outputs produced* (services).

The relationship between the three characteristics is shown in figure 1. It is the combination of the three characteristics that shapes the incentives likely to be created by a provider payment method (box 1 above).

Prospective or retrospective rate setting

The first characteristic is whether payment rates for a single service or a package of services are set prospectively or retrospectively. They may be set prospectively through fixed-fee schedules, regulations, or negotiation between providers and purchasers. If rates are set in this way, and services are bundled into a package reimbursed at a fixed payment rate, some financial risk is shifted from the purchaser to the provider.

FIGURE 1 Characterization of Provider Payment Methods



Source: Authors.

Alternatively, payment rates are set retrospectively when the provider is simply reimbursed the amount that is billed. If rates are determined in this way, and the reimbursement rates reflect the cost of providing the services, the purchaser bears all the financial risk.

Prospective or retrospective payment

The second characteristic is whether payment to the provider is made before or after services are provided. With prospective rate setting, the actual payment may be made either prospectively or retrospectively. For example, in a per capita payment system, the price paid to providers to deliver a complete package of services for each individual is set prospectively and the payment is also made prospectively—the provider receives an advance lump-sum payment for each individual covered or enrolled. In a case-based hospital payment system, however, the payment rate for each type of hospital case is set prospectively, but the provider is paid retrospectively.

Input- or output-based payment

The third characteristic is whether the payment that is made to providers is based on inputs used to provide services, that is, the recurrent costs of providing services are financed; or on outputs produced, such as cases treated, bed-days

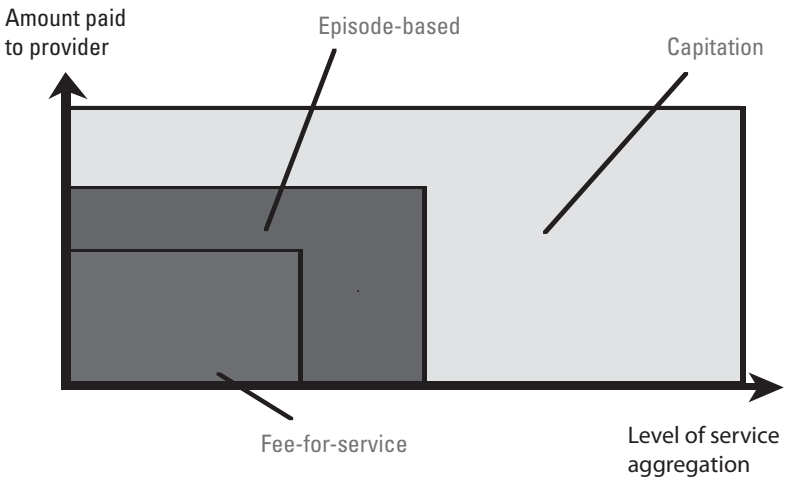
completed, or individual services provided (that is, each test, procedure, or consultation).

An example of input-based payment is where a provider is paid according to a budget to cover operating costs. Input-based payment rates may be set prospectively or retrospectively, and again, payment may be made prospectively or retrospectively. For example, in a line-item budget system, the payment is both determined and made prospectively, but the basis of the budget is projected input use, which may be determined by past patterns of input use or regulations on the level and composition of inputs used. In Australia in the mid-1980s, for example, prior to hospital payment reform, public hospitals were paid by fixed line-item budgets on the basis of regulations of inputs, including specification of the number and type of staff employed in the hospital and controls on nonsalary expenditures (Duckett 1995).

In output-based payment systems, outputs may be defined at different levels of aggregation of services (Bodenheimer and Grumbach 1994). At the most disaggregated level, each individual service is considered separately (which ultimately becomes fee-for-service). More aggregated definitions of output include bed-days completed, treatment episodes, or cases treated. The most aggregated definition of output is at the per capita care level, covering all services for a person for a given period. Figure 2 provides a schematic of an output-based payment system.

In output-based systems, payment rates are determined prospectively, but payments can be made either prospectively or retrospectively.

FIGURE 2 Dimensions of an Output-Based Payment System



Source: Adapted from Preker and Langenbrunner 2005.

Which Payment System to Choose?

The above characterization of payment methods can be applied to funding of both hospital and individual providers (such as physicians). The impacts of these methods should be assessed in the context of objectives such as quality of care, cost, and targeting the poor. But objectives are often multiple and competing and may even be conflictual. Inevitably, tensions arise across the multiple behaviors of purchasers, providers, and patients. Several parties' objectives may be equally desirable but mutually irreconcilable in the sense that payment systems' capacities to achieve each objective are not the same. Among the tensions illustrated by the literature on provider payments are:

- Quality enhancement versus cost containment (Ellis and McGuire 1990)
- Provider risk versus production efficiency (Jack 2001)
- Risk-selection versus production efficiency (Newhouse 1998)
- "Fairness" in payment level versus optimal site of service (Jencks et al. 1984).

Response to incentives

Provider response to payment incentives has been analyzed through both principal-agent and monopolistic competitive models. The advantage of the former is that they recognize and explicitly model the potential conflicts of interest between different actors, emphasizing asymmetry of information as the critical problem in disciplining providers; that of the latter is that they explicitly consider the effects of competition among a plurality of health providers.

Using these models from the perspective of the tensions outlined above, evidence suggests that the retrospective elements of payment systems do better on addressing issues of access, acceptable levels of provider risk, adequate revenues, patient selection, and quality enhancement, while the prospective elements do better on optimal levels of services, efficiency, and cost containment (see, for example, Dranove and Satterthwaite 2000).

Input-based payment methods with payments both set and made prospectively, such as a line-item budget (figure 1 above), usually stimulate providers to behave differently than if the payment method is output-based with payments set prospectively and made retrospectively, such as case-based payment. In payment methods in which the payment rate is set retrospectively, such as fee-for-service, it is implied that the provider's recurrent costs will be covered, and therefore the provider has little incentive to decrease costs or improve productivity. When payment rates are set prospectively, providers have an incentive to reduce costs and decrease the intensity of care. (See also tables 1 and 3 above.)

A payment method that pays providers for inputs creates incentives to increase the number of inputs. A payment method that pays providers for out-

puts creates incentives to increase the number of services. An output-based payment method has stronger incentives to increase the number of services, the lower the level of aggregation at which services are defined as output.

The market structure (that is, the level of competition and choice in the system) and the ability of providers to select or refuse care to patients enhance or soften the incentives created by provider payment methods. For example, per capita payment systems (which are based on the number of people covered rather than services provided), with payment rates to providers both set and made prospectively, create incentives to provide fewer services or refer patients to other providers once an individual is enrolled, unless performance targets are set and monitored by the purchaser. If there is competition and choice in the system, however, providers lose financially if patients become dissatisfied and move to another provider, and therefore the negative incentive to underprovide services is mitigated. Providers will also have the incentive to reduce their costs by encouraging healthier individuals to enroll for their services and discourage individuals with costlier health problems.

In the context of low- and middle-income countries, however, providers are often government-owned monopolies and effective choice is limited. Choice may be particularly restricted in isolated or remote geographic areas with only one provider available and thus no competition. Dissatisfied users therefore have little opportunity to change provider. In such cases the health purchaser may intervene and establish performance targets and monitor performance, for example, through clinical audits, as part of the payment system.

Conversely, the provider payment method may, in its turn, influence the level of competition and choice: some methods facilitate them, others inhibit them. For example, per capita and case-based hospital payment systems create the conditions for competition and choice, because the money "follows the patient." It is the next step in increasing competition to allow the patient's choice, or the patient's agent's choice, to determine to which providers the money flows. If the money follows the patient, and there is choice, providers will compete for patients, presumably with higher-quality care and patient-centered services.

Typically, however, input-based payment systems do not foster competition and choice because the money is not directed to follow the patient. They lead instead to resource allocations that reflect historical patterns and political priorities, often independent of changes in need, demand, or utilization. Still, input-based budgets have stimulated competition in some systems, because the budgets were based on the historical volume of care provided. For example, one study showed that hospital managers paid according to a line-item budget in Israel engaged in competitive strategies to attract patients, then used higher admissions and turnover rates to successfully argue for increases in the following year's budget (Chinitz and Rosen 1993).

Historically, provider payment systems have moved from paying for inputs to paying for performance, either on the basis of measurable outputs or health out-

comes. Provider payment systems have also gradually moved to elements of prospectivity to contain costs.

Consequences and context

No single set of incentives will address the multiple objectives of purchasers, providers, and patients. As a result, purchasers and policy makers must understand and address policy objectives explicitly, while remembering that provider payment systems may lead to both intended and unintended consequences, such as incentives to increase the number of services provided beyond what is necessary or to reduce the inputs used. Other unintended consequences may include "gaming" (that is, manipulation of rules by the providers), cost shifting, or increased paperwork for providers.

The effects of provider payment approaches on the health care system vary widely depending on contextual factors, including the level of resources available for health care, the degree of competition and choice, and the opportunities and constraints facing providers to respond to provider payment incentives. The way in which the provider payment systems are designed, scaled up, and run, and the extent to which the contextual factors are addressed, strongly influence how successfully the provider payment methods contribute to achieving health policy goals.

Other considerations and constraints

Before choosing the provider payment system, purchasers must first decide on the policy objectives—increased revenues, efficiency, cost-containment, access, quality, administrative simplicity, or some combination—that are to be addressed at that particular time. The system's incentives must be chosen in tandem with other factors, such as improved knowledge by providers about clinical outcomes, cultural factors, and providers' professional ethics.

In practical terms, due to asymmetry of information between providers and purchasers, payments are often linked to outputs, which are more easily observable and verified (by both parties) than the attainment of policy objectives. These outputs are often intermediate to full health status outcomes, such as services provided or hospital discharge.

Information constraints

When purchasers have to develop a payment system, they rarely have enough time or technical resources to design an optimal one. They may lack technical capacity and sound baseline information on costs and volumes of needed care. Their decisions on incentives must revert to options based on readily available information, technical capacity, and time available to design, build, operate, and then monitor the payment system. Table 4, for example, shows that different provider payment methods require different types of information.

TABLE 4 Different Information Requirements of Different Payment Methods

Payment method	*Information needs*
• Salary	• Staff characteristics
• Fixed budgets	• Budgets and case mix
• Fee for service	• Classification of services
• Per diem payment in hospitals	• Budgets and number of days
• Capitation	• Population characteristics
• Episode based, e.g. DRGs	• Diagnoses, treatments, costs, demographics
• Pay for performance	• Services/performance characteristics

Source: Adapted from Schneider (2007).

Management capacity and autonomy of providers

Countries that have experience in new payment systems as described in this volume have recognized that all the achievable efficiency gains do not happen automatically. These gains require some formal delegation of management responsibility to primary care clinics and to hospitals. In turn this relies on hospitals having sufficient management capacity to realize the potential of the new system. Decentralization of management capacity and of responsibility is an important prerequisite for obtaining micro-efficiency. Further, explicit measures and tools (such as decisions on investments, and use and retention of revenues), are usually critical and should be built into the payment framework to provide incentives for cost-effective behavior.

Relative levels of risk for purchaser and provider

Over the last two decades, new and more sophisticated payment systems have evolved as units of payment and of services have become more aggregated and as payments have increasingly been set prospectively. Many purchasers have adopted fixed-price payment for definable products that cover entire clinical episodes, such as an outpatient surgery (for example, Lebanon) and more often, for inpatient stays (for example, Brazil, Hungary, the Kyrgyz Republic, and Portugal). Global budgets fix price as well as volume for, say, all inpatient services, as in Taiwan (China), the Republic of Korea, and parts of Russia; or for outpatient services, as in China. Some countries also use per capita payments: examples are Indonesia and Thailand, as well as many of the managed care schemes in Argentina, other South American countries, and the United States (Bitran and Yip 1998; Langenbrunner and Wiley 2002).

In every case, part of or all the financial risk is transferred from the purchaser back to the provider and patient. Most observers caution against full risk sharing but encourage some "supply-side cost sharing" only, with the purchaser and provider sharing in risk arrangements to address moral hazard issues (Ellis 1998; Newhouse 1998). An alternative is to impose high copayments or user fees, but in developing countries that quickly erodes financial protection.

THE WAY FORWARD

Policy makers have been striving to find an equilibrium among conflicting objectives with regard to provider payment arrangements. A "consistent finding from the literature is that mixed provider payment systems are necessary to optimally balance multiple objectives such as cost and quality" (Dranove and Satterthwaite 2000).

Though far from the context of the developing world, EU countries provide an interesting example of such a mix of systems. Most EU-15 countries use fee-for-service for "priority services" such as preventive care and selected primary care services, and prospective per capita payments for other types of primary care. These countries then use prospective payments to set rates and cap expenditures for inpatient care services, but adjust the case mix for variations in severity and resource use across facilities (Langenbrunner and Wiley 2002).

Will the EU states serve as models for low- and middle-income countries? To a degree, yes, but because issues vary by setting, policy makers need to carefully fit the correct provider payment method and system to the context of an individual country or region. Whatever method selected, countries need to closely monitor and evaluate any new payment systems for identifying and resolving issues and unintended consequences. New payment models lacking adequate monitoring and evaluation face potential problems from both the standpoint of technical precision and political economy.

Miller (2007) has identified 12 potential goals for effective health care payment systems, which may serve as a checklist for any country embarking on a new payment system:

- Enable and encourage providers to deliver accepted procedures of care to patients in a high quality, efficient, and patient-centered manner
- Support and encourage providers to invest, innovate, and take other actions that lead to improvements in efficiency, quality, and patient outcomes and/or reduced costs
- Not encourage or reward overtreatment, use of unnecessarily expensive services, unnecessary hospitalization or rehospitalization, provision of services with poor patient outcomes, inefficient service delivery, or choices about preference-sensitive services that are not compatible with patient desires
- Not reward providers for undertreatment of patients or for the exclusion of patients with serious conditions or multiple risk factors
- Not reward provider errors or adverse events
- Make providers responsible for quality and costs within their control, but not for quality and costs outside their control
- Support and encourage coordination of care among multiple providers, and discourage providers from shifting costs to other providers without explicit agreements to do so

- Encourage patient choices that improve adherence to recommended care processes, improve outcomes, and reduce costs of care
- Not reward short-term cost reductions at the expense of longer-term cost reductions and not increase indirect costs in order to reduce direct costs
- Not encourage providers to reduce costs for one purchaser by increasing costs for other purchasers, unless the changes bring payments more in line with costs for both/all payers
- Minimize the administrative costs for providers in complying with the payment system rules
- Multiple payers should align standards and methods of payment to avoid unnecessary differences in incentives for providers.

Miller also suggests three important issues that need to be resolved before a desired payment system is implemented:

- How should payment changes be phased in?
- Should payment changes be required to be "budget neutral" (total payments to providers exactly equal to the level of funding in the system)?
- How will the effects of payment changes be evaluated?

ORGANIZATION OF THIS VOLUME

This volume discusses today's most innovative and widely emulated approaches to developing provider payment methods and systems. It includes models most often found in EU-15 countries, more generally in the OECD countries, and increasingly in demand in low- and middle-income countries. The models are not always easy, nor straightforward, to develop.

The remaining chapters are five "manuals" on the various aspects of conceptualizing, designing, building, running, monitoring, and refining a new purchasing and provider payment system. Each chapter starts from the perspective of input-based systems, such as line-item budgets, with no appropriate contracting, costing, or management and information systems infrastructure. The manuals go through the process step by step with related guidance on the data, contracting, and costing needs. Each manual looks at ways to roll out the new payment system, including a phased approach over time. This phasing can be crucial from a political economy standpoint.

The manuals are based on a synthesis of international evidence and experience with the design and implementation of payment systems. They summarize lessons learned and consolidate specific technical recommendations. Some of the examples and illustrations are drawn from the experience of countries such as the United Kingdom (high income), the Central Asian republics of Kaza-

khstan (middle income), the Kyrgyz Republic (relatively low income), and (for chapter 5) countries in the East Asia and Pacific region. The authors have direct experience in implementing health care financing reforms in these countries. The manuals are written to address similar challenges faced by health care systems in low- and middle-income countries throughout the world.

The payment systems discussed in chapter 1, *Primary Health Care Per Capita Payment Systems*, are particularly important because of the critical role that PHC plays in anchoring the whole health care system, and in furthering equity and basic human rights (WHO 1978). For these reasons, the role of PHC payment systems is not limited to creating financial incentives for providers, and, in fact, these incentives are not even the most important goal or consequence of these systems. Provider payment systems for PHC may be seen more broadly as a mechanism for stimulating shifts in the balance of power between the government, purchasers, providers, and the population, which not only lead to a reorientation of the role of PHC in health system development, but which may also play a role in a country's broader institutional, social, and democratic evolution.

Several methods for paying PHC providers are in use throughout the world, all of which have a variety of strengths and weaknesses, both in theory and practice. In recent years, however, many countries and health purchasers within countries have moved toward some variation of a per capita payment method for PHC services, in which all providers in the payment system are paid, in advance, a predetermined fixed rate to provide a defined set of services for each individual enrolled with the provider for a fixed period.

Because in a per capita payment system the payment to a provider is not linked to the inputs that the provider uses or the volume of services that it provides, PHC providers have greater flexibility and responsibility in using their resources to develop services that meet the specific needs of their populations. Per capita payment has been a valuable mechanism in a wide variety of settings for improving equity in access to basic health care services; for increasing transparency in resource allocation; and for shifting the emphasis of health services to health promotion, disease prevention, and disease management. It has also been used as a tool for increasing the management autonomy and responsibility of primary care providers, particularly those previously paid in a budget-based system, and for promoting individual and community involvement in the health care system through competition and choice.

Per capita payment for PHC services has been an element of comprehensive primary-care centered reforms in many of the countries of Central Europe and the former Soviet Union—public health purchasers in the Czech Republic, Estonia, Hungary, Latvia, and Lithuania all use some variation of this approach. The countries of former Soviet Central Asia (with the focus of chapter 1 on Kazakhstan, the Kyrgyz Republic, and Uzbekistan) have launched and run per capita PHC payment systems as a tool to strengthen PHC as part of comprehensive health reform and restructuring begun in the mid-1990s. Per capita payment has also been central to reform of the public sector delivery system and public social

insurance systems of some Latin American countries. For example, the Ministry of Health of Chile introduced per capita payment for public PHC providers in 1995, while in Costa Rica some public PHC clinics have been transformed into cooperatives, which are paid by the Costa Rican Social Security Institute through a per capita payment system, as a way to introduce market incentives and increase efficiency in PHC.

Chapters 2 and 3 look at hospitals and specifically focus on case-based payment and the global budget. Because the hospital inpatient sector almost always consumes the greatest share of health care resources, the way in which hospitals are paid may have a particularly strong influence on the performance of the health care system as a whole.

Chapter 2, *Case-Based Hospital Payment Systems*, discusses case-based payment. In recent years, many countries have moved toward some variation of this approach, which reimburses all hospitals in the payment system a predetermined fixed rate for each treated hospital case. Case-based payment methods have been valuable in a wide variety of settings for reorienting provider payment from inputs and maintaining hospital infrastructure to paying for outputs, and for introducing efficiency incentives and competition into the hospital sector.

The U.S. Medicare program began reimbursing hospitals with a case-based payment method using DRGs in 1983. These classify cases according to the diagnosis and other characteristics of the case, and the payment rate varies according to the resource intensity of the DRG. Australia and several countries in Europe began experimenting with DRGs by 1985, and by the mid-1990s several countries had started implementing variations of case-based payment systems for paying hospitals (such as Australia and Sweden), for developing hospital budgets (New Zealand), or for allocating funds from central budgets to local health purchasers (Norway).

More recently, some low- and middle-income economies have introduced case-based hospital payment systems, including Hungary, the Republic of Korea, and Taiwan (China). These payment systems reflect varying degrees of complexity and refinements to reflect the differences in the nature of the treated cases and the resources required either to diagnose and treat these cases or to complete a phase of case management.

Chapter 3, *Hospital Global Budgeting*, provides a practitioner's guide, mainly from the perspective of purchasers, to the introduction of a global budget into a hospital setting based on the reforms in the 1980s and 1990s in the United Kingdom's National Health Service, and on experience in countries such as Bulgaria, Macedonia, and Thailand, which have been taking steps from a centrally allocated, line item-type allocated budget. It is applicable to countries in all regions of the world.

Global budgets vary in important ways depending on the budget basis: inputs such as beds and staff (Canada, for example); historical spending and activities (Croatia); and volume of service provided and types of cases (France, Germany, and the United Kingdom).

The preferred approach is the third one, data and purchaser capacity permitting. In Australia and many European countries, the integration of case-mix-adjusted hospital financing with hospital global budgeting is the major form of hospital payment (Frossard 1990; Wolfe and Moran 1993; Hirdes et al. 1996). According to this approach, a hospital payment is based on the product of the number of admissions and the case-mix index. Thus, the more admissions and the more severe the patient's illness, the bigger the hospital's payment, but within the cap set for the distribution of the budget among hospitals. The incentive provided by this approach is similar to per case payment, but because any spending is under a budget cap, this type of global budget is expected to be a powerful tool for controlling hospital costs. The type of hospital global budget in this volume is set on predetermined objective and measurable factors, which are based, where possible, on the health needs of the population served by the hospital.

The chapter considers how a global budget can be established and managed to generate local ownership and commitment to its implementation. It addresses incentives for both efficiency and performance, and gives examples of different contracting regimes, and how they fit into a global budget framework. It introduces mechanisms for periodically revising the budget to deal with changes in technology, macroeconomic growth, and inflation. It discusses how a global budget can fit into a policy regime, how to cost services, and how to arrange contracts for individual services. It also makes suggestions on how to fund special payments that may vary from year to year, such as those related to capital investment, research and development, and training and education.

Chapter 4 is *A Primer on Contracting*. Contracts are the written formalization of the process of agreements reached between purchasers and providers. The procedures by which the contract is implemented, managed, and monitored are the key to success of the process and can be fundamental to the delivery of the benefits of a global budget or other type of payment arrangement. The effective and efficient distribution and allocation of health care resources depend on this process working well. Contracts, and the terms written into them, must therefore reflect the strategic and policy aims of the purchaser and the provider.

Chapter 5, *Health Management Information Systems: Linking Purchasers and Providers*, looks at the health management information system (HMIS) infrastructure necessary for implementing purchasing arrangements, including payment systems, contracting, and quality assurance systems. Although an HMIS cannot be designed and implemented quickly, this chapter offers some groundwork for the design and implementation of an HMIS infrastructure for purchasing. Clearly, it is impossible to operate an efficient, modern purchasing strategy today without information technology. The chapter leads the architect through the functions of the system's components and environment needed to support purchasing, pausing to justify them at each step. It can be used as a long-term guide through the system's development process as it is not necessary (and likely not possible) to implement all functions at once.

The chapter emphasizes the important role of information technology. Computers are becoming cheaper, and more easily managed—hence more ubiquitous. But telecommunications are also needed. Staff must be trained to operate these new, often-combined, systems.

The challenge in an HMIS is to implement regulations, policies, and procedures aimed at standardizing systems. The days of "one-of-a-kind" custom-built systems are coming to an end, for these are far too costly to build, hard to maintain, and almost impossible to integrate into larger systems as the need arises. Issues that an HMIS must address are confidentiality, standards and their enforcement, and payment for services provided. With the proper policies and procedures, a country can reap great benefits from an HMIS; without them, health care systems may fail to fully exploit the benefits (including cost-savings) of an HMIS.

NOTES

1. Some of these chapters were previously published separately as World Bank Health, Nutrition and Population discussion papers.
2. However, the literature does have some dissenting evidence—Palmer and Mills (2003) found that part-time fee-for-service surgeons in rural South Africa expended minimal time on their public sector patients.

REFERENCES

Aas, I. 1995. "Incentives and Financing Methods." *Health Policy* 34 (3): 205–220.

Arrow, K. 1963. "Uncertainty and the Welfare Economics of Medical Care." *American Economic Review*.

Bitran, R., and W. Yip. 1998. "A Review of Health Care Provider Payment Reform in Selected Countries in Asia and Latin America." Major Applied Research 2, Working Paper 1. Partnerships for Health Reform Project, Abt Associates Inc., Bethesda, MD.

Bodenheimer, T., and K. Grumbach. 1994. "Reimbursing Physicians and Hospitals." *Journal of the American Medical Association* 272 (12): 971–977.

Chinitz, D., and B. Rosen. 1993. "A Tale of Two Markets: Hospital Competition in Israel." Brookdale Institute RR-30-93, Jerusalem, Israel.

Diop, F. 2002. "Community Financing in Rwanda: Early Results." Presentation at the World Bank, Workshop on Community-Based Health Insurance, February, Washington, DC.

Dranove, D., and M. Satterthwaite. 2000. "The Industrial Organization of Health Care Markets." In *Handbook of Health Economics*, ed. A. J. Culher and J. P. Newhouse. Amsterdam: North-Holland.

Duckett, S. 1995. "Hospital Payment Arrangements to Encourage Efficiency: The Case of Victoria, Australia." *Health Policy* 34 (2): 113–134.

Eichler, R., P. Auxila, and J. Pollock. 2001. "Performance-based Payment to Improve the Impact of Health Services: Evidence from Haiti." *World Bank Online Journal*. rru.worldbank.org/documents/publicpolicyjournal/236Eichl-080201.pdf.

Ellis, R. 1998. "Creaming, Skimping, and Dumping: Provider Competition on the Intensive and Extensive Margins." *Journal of Health Economics* 17 (5): 537–555.

Ellis, R., and T. McGuire. 1990. "Optimal Payment Systems for Health Services." *Journal of Health Economics* 9.

Ensor, T., and J. Langenbrunner. 2002. "Allocating Resources and Paying Providers." In *Health Care in Central Asia*, ed. M. McKee, J. Healey, and J. Falkingham. Buckingham, United Kingdom: Open University Press.

Frossard, M. 1990. "Short Communication Hospital Strategy and Regional Planning in France." *International Journal of Health Planning and Management* 5: 59–63.

Griffin, R. P. 1993. "Why Doesn't Performance Pay Work?" *Health Manpower Management* 19 (2): 11–13.

Hirdes, J. P., C. A. Botz, J. Kozak, and V. Lepp. 1996. "Identifying an Appropriate Case Mix Measure for Chronic Care: Evidence from an Ontario Pilot Study." *Healthcare Management Forum* 9 (1): 40–46.

Jack, W. 2001. "Purchasing Health Care: A Conceptual Framework." World Bank, Washington, DC.

Jencks, S., A. Dobson, P. Willis, and P. Feinstein. 1984. "Evaluating and Improving the Measurement of Hospital Case Mix." *Health Care Financing Review: Annual Supplement.*

Kahn, K. L., E. B. Keeler, M. J. Sherwood, W. H. Rogers, D. Draper, S. S. Bentow, E. J. Reinisch, L. V. Rubenstein, J. Kosecoff, and R. H. Brook. 1990. "Comparing Outcomes of Care Before and After Implementation of the DRG-based Prospective Payment System." *Journal of the American Medical Association* 264 (15): 1984–1988.

Kutzin, J. 2001. "A Descriptive Framework for Country-level Analysis of Health Care Financing Arrangements." *Health Policy* 56 (3): 171–204.

Kwon, S. 2003. "Payment System Reform for Health Care Providers in Korea." *Health Policy and Planning* 18 (1): 84–92.

Langenbrunner, J., and M. Wiley. 2002. "Hospital Payment Mechanisms: Theory and Practice in Transition Countries." *Hospitals in a Changing Europe*. Buckingham, United Kingdom: Open University Press.

Langenbrunner, J., J. Kutzin, E. Orosz, and M. Wiley. 2005. "Rewarding Providers." In *Purchasing Health Care in Europe to Improve Health Systems Performance*, ed. J. Figueras, R. Robinson, and E. Jakubowski. Buckingham, United Kingdom: Open University Press.

Lave, J., and R. Frank. 1990. "Hospital Supply Response to Prospective Payment as Measured by Length of Stay." *Advances in Health Economics and Health Services Research* 11: 1–25.

Maceira, M. S. 1998. "Provider Payment Mechanisms in Health Care: Incentives, Outcomes and Organizational Impact in Developing Countries." Major Applied Research 2, Working Paper 2. Partnerships for Health Reform Project, Abt Associates Inc., Bethesda, MD.

Miller, H. 2007. "Creating Payment Systems to Accelerate Value-Driven Health Care: Issues and Options for Policy Reform." Report for the Commonwealth Fund, New York. http://www.commonwealthfund.org/publications/publications_show.htm?doc_id=522583.

Newhouse, J. P. 1998. "Risk Adjustment: Where Are We Now?" *Inquiry* 35 (2): 122–131.

Normand, C., and A. Weber. 1994. *Social Health Insurance: A Guidebook for Planning*. Geneva: World Health Organization.

Palmer, N., and A. Mills. 2003. "Classical Versus Relational Approaches to Understanding Controls on a Contract with Independent GPs in South Africa." *Health Economics* 12 (12): 1005–1020.

Preker A., and J. Langenbrunner, ed. 2005. *Spending Wisely: Buying Health Services for the Poor.* Washington, DC: World Bank.

Redmon, D., and P. Yakoboski. 1995. "The Nominal and Real Effects of Hospital Global Budgets in France." *Inquiry* 32 (2): 174–183.

Rodrigues, J.-M. 1989. "The International Scene." In *DRGs and Health Care. The Management of Case Mix*, ed. M. Bardsley, J. Coles, and L. Jenkins, 61–73. London: King's Fund Publishing Office.

Ron, A., B. Abel-Smith, and G. Tamburi. 1990. *Health Insurance in Developing Countries: The Social Security Approach.* Geneva: International Labour Office.

Saltman, R., and J. Figueras. 1997. "European Health Care Reform: Analysis of Current Strategies." WHO Regional Publications, European Series, No. 72. Copenhagen: World Health Organization Regional Office for Europe.

Samyshkin, E. 1999. "Hospital Payment Reform in Kyrgyzstan." USAID-funded ZdravReform Program, Abt Associates Inc., Almaty, Kazakhstan.

Schneider, P. 2007. "Social Health Protection and Demand Side Strengthening to Increase Quality in Health Care." Paper presented at GTZ/ILO/WHO Conference, October 31, Kigali, Rwanda.

Schulenburg, J.-M. 1992. "Forming and Reforming the Market for Third-Party Purchasing of Health Care: A German Perspective." *Social Science and Medicine* 39 (10): 1473–81.

Srithamrongsawat, S. 2007. "Payment Methods of Health Insurance System in Thailand." Presentation, WHO Health Financing Consultation for Senior Policy Makers, Cairo, Egypt, November 13–15.

Wagstaff, Adam. 2007. "Health Systems in East Asia: What Can Developing Countries Learn from Japan and the Asian Tigers?" *Health Economics* 16: 441–456.

Wiley, M. 1995. "Budgeting for Acute Hospital Services in Ireland: The Case-mix Adjustment." *Journal of Irish Colleges of Physicians and Surgeons* 24 (4): 283–290.

Wolfe, P.R., and D.W. Moran. 1993. "Global Budgeting in the OECD Countries." *Health Care Financing Review* 14 (3): 55–76.

WHO (World Health Organization). 1978. Alma Ata Declaration of Primary Health Care: Report of the International Conference on Primary Health Care. Geneva.

———. 2000. *The World Health Report 2000. Health Systems: Improving Performance*. Geneva.

CHAPTER 1

Primary Health Care Per Capita Payment Systems

Cheryl Cashin, Olga Gubonova, Ninel Kadyrova, Nadezhda Khe, Evgeniy Kutanov, Mark McEuen, Sheila O'Dougherty, Subrata Routh, and Olga Zues

OVERVIEW OF PHC PROVIDER PAYMENT SYSTEMS

This chapter is based on a synthesis of international evidence and experience related to the design and implementation[1] of per capita primary health care (PHC) payment systems. It summarizes lessons learned and consolidates specific technical recommendations. Many of the examples are drawn from experience in the Central Asian republics of Kazakhstan, the Kyrgyz Republic, Tajikistan, and Uzbekistan, where the authors have direct experience in implementing health care financing reform. These four countries have been implementing per capita PHC payment systems since the mid-1990s and have completed several iterations of development and refinement of these systems. Because they inherited many of the same challenges faced by health care systems in other low- and middle-income countries throughout the world, their experience implementing case-based hospital payment systems is relevant for many other countries. The chapter also provides case studies from Kazakhstan and the Kyrgyz Republic.

In order to adapt to different contextual factors within and outside the health care system in different countries, this chapter provides guidance for a range of options, from the simplest average payment per enrolled individual to more complex systems that include age/sex and other adjustors. It also provides experience-based examples from the four Central Asian republics to demonstrate the link between PHC per capita payment and the four axes of the health system: financing, service delivery, institutional structure, and the role of the population (figure 1.1).

DEFINING THE HEALTH POLICY CONTEXT

The PHC sector is the most visible and used part of the health care system. It is also the part of the system that potentially has the largest impact on the population's health. International evidence confirms that a stronger PHC sector, particularly in low-income countries, is associated with greater equity and access to basic health care, higher patient satisfaction, and lower aggregate spending for

the same or better outcomes (Atun 2004). The role of the PHC sector in the health system also sets the stage for the entire interaction between the government, purchasers, providers, and the population throughout the health care system. Therefore, the financing of PHC and the provider payment system(s) that are used plays a critical role in driving health system change well beyond that of financial incentives. It is critical that a per capita PHC payment system be designed in the context of broader health policy goals, the current capacity of the system, and the desired or expected changes in the system.

In addition, the new PHC payment system will stimulate changes in PHC that will be felt in other parts of the health care universe. For example, if the new system creates incentives for keeping the population healthy through increased preventive and chronic disease management services, hospitalization rates—particularly for certain conditions that can be prevented or managed at the primary care level—may decline (Kozak, Hall, and Owings 2001; Weissman, Gatsonis, and Epstein 1992). A new interface and continuum between the primary care sector, outpatient specialty care, and inpatient services will develop, which may improve resource use and quality of care, but may also create tension between specialists and primary care providers. Therefore, planning of the new PHC payment system should include an analysis of the expected impacts and the potential unintended impacts not only within the primary care sector, but also in other parts of the health care system and community.

The following questions should be addressed before a per capita payment method is selected and the new system is designed:

- What is the system, organizational, and policy context of health care services?
- What are the goals of the per capita payment system?
- What steps are required to ensure that the goals will be achieved?
- What changes, both intended and unintended, can be expected in the PHC sector and other parts of the health care system and community after the new payment system is introduced?

Goals of a Per Capita PHC Payment System for Low- and Middle-Income Countries

PHC payment systems are often reformed in response to fundamental shortcomings in the performance of a country's health system that require a major reorientation of overall financing and service delivery. For example, in 2002 New Zealand introduced PHC reforms, which included the formation of new nonprofit PHC entities (called primary health organizations) funded through a per capita payment system, in order to address marked health and health care disparities across socioeconomic and ethnic groups that arose from the fee-for-service payment system (Hefford 2005; Ministry of Health of New Zealand 2001). At the time the PHC reforms were undertaken, the avoidable mortality rate of the indigenous Maori population was 2.3 times that of other New Zealan-

ders, and avoidable hospitalization rates were 60–70 percent higher (Ajwani et al. 2003). As another example, in Costa Rica in the early 1990s rapidly declining quality of health services, low morale among providers, and long waiting lists for diagnostic and other services reflected structural inefficiencies in the health care system, which had previously achieved impressive health gains for the population (Clark 2002; Gauri, Cercone, and Briceno 2004). PHC reforms to address these inefficiencies included the reorganization of public PHC clinics into autonomous cooperatives paid under a per capita payment system.

In the former Soviet Union the combination of historical neglect of the PHC sector, overspecialized and fragmented care, unsustainable hospital infrastructure, and limited involvement of the population in its own health and health care brought about unprecedented declines in health status throughout the region early in the post-Soviet transition period. Infectious diseases, such as tuberculosis and several vaccine-preventable diseases, increased rapidly at the same time as chronic conditions, such as cardiovascular disease, went untreated or were poorly managed. These severe failings were reflected in sharply increased mortality and declines in life expectancy in some population groups (WHO 2001). Many of the post-Soviet countries embarked on comprehensive health financing and service delivery reforms, with the restructuring and strengthening of PHC, supported by new per capita payment systems, at the center of the reform strategy (Borowitz et al. 1999; ZdravReform Program 2000).

Goals that may be supported by a per capita payment system, particularly in the move from a line-item budget payment system, include the following:

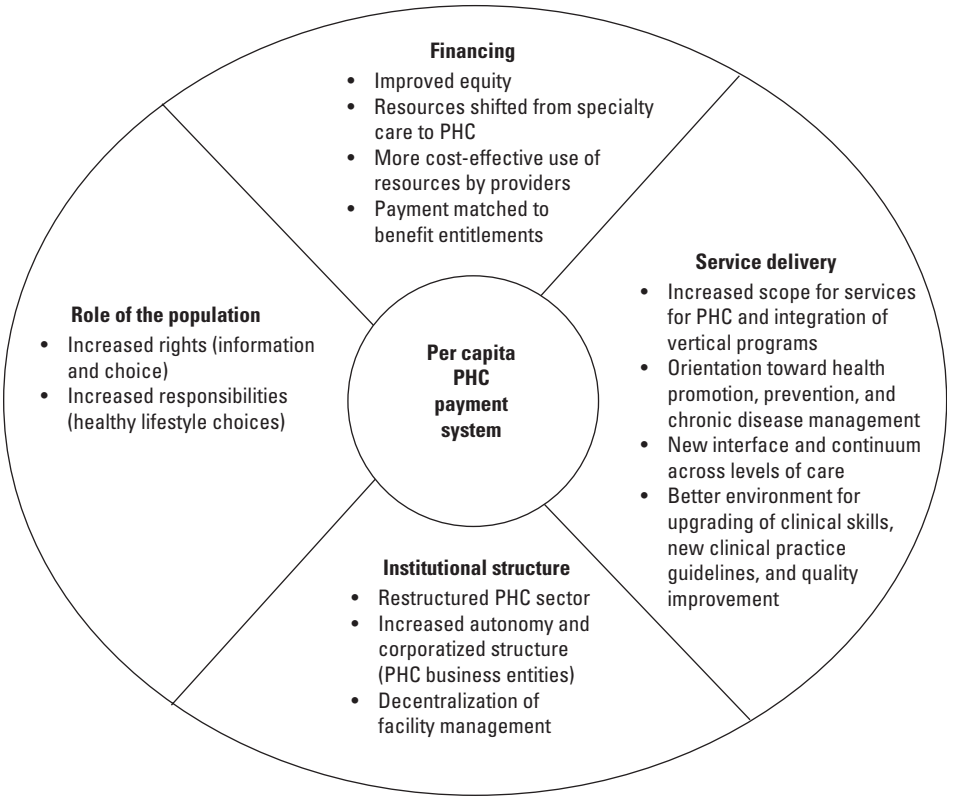
- Improve equity in the distribution of health care resources, access to basic health services, and health status
- Improve the transparency of resource allocation
- Drive restructuring of the health delivery system
- Create or strengthen PHC institutions that have the capability to operate autonomously and provide comprehensive, integrated, first-contact care for individuals and the wider community
- Introduce competition for providers and choice for patients to increase the responsiveness of the health system to patients and the population
- Create incentives for PHC providers to improve efficiency through more rational resource use, including increasing health promotion and disease prevention services, and supplying higher-quality services with the resources available
- Increase provider management autonomy (in effect, decentralize health facility management)
- Improve PHC service delivery and quality of care, and expand the scope of services delivered in PHC
- Engage communities in PHC and change the relationship between the community and providers.

Per Capita PHC Payment Systems as Triggers of Reform

Because they are relatively simple to design and implement and can create rapid changes in the relationships among actors in the health sector, new per capita PHC payment systems can play an important role as a transition- and culture-specific trigger of a much more comprehensive reform process. Designed in this context, they can facilitate major change along the four axes of the health care system mentioned above: financing, service delivery, institutional structure, and the role of the population.

Financing. In health financing, a per capita PHC payment system creates an immediate mechanism for increasing equity in the allocation of resources for basic health care services, for increasing transparency in resource allocation, and for shifting resources to PHC from the outpatient specialty and hospital sectors. A per capita payment system allows the health purchaser to administratively equalize (and possibly risk adjust) the amount of resources allocated per person,

FIGURE 1.1 Axes of Per Capita PHC Payment System Impact



Source: Authors.

and to shift resources to primary care in the process of setting the *capitated rate*. Ultimately, the health financing and provider payment systems should encourage the market to play a role in determining the allocation of resources between PHC and higher levels of care. If the payment systems are designed properly with competition and appropriate economic incentives, funds will flow to where they are used most cost-effectively, which is the PHC sector. In the short term, however, a per capita PHC payment system provides the administrative mechanism to initiate this shift.

When implemented together with increased management autonomy and population choice, a per capita PHC payment system creates financial incentives for providers both to make more cost-effective internal resource allocation decisions to attract more patients, and to keep costs low and generate a surplus.

Lastly, a per capita PHC payment system allows the health purchaser to directly match payment to health services entitled to and received by the population under a government-approved benefit package. This is especially important in environments characterized by input-based budgets, where the connection between payment and the benefit package is not clear and, therefore, the provider does not have financial incentives to serve exempt populations or appropriately manage private payments for nonexempt populations.

Service delivery. Per capita PHC payment systems can drive significant changes in which services are provided and how they are delivered. Such systems link directly to the package of services that providers must offer to their enrolled populations. Therefore, the payment system is a mechanism for defining and gradually increasing the scope of services provided at the PHC level. As the clinical capacity of PHC providers increases, the capitated rate can be increased to pay PHC providers for additional services. The capitated rate can also be expanded to drive the integration of traditionally vertical programs into PHC, such as immunization and tuberculosis diagnosis and treatment. The expanding scope of PHC services, accompanied by an increasing capitated rate, creates a new interface with the other levels of the health care system and creates the foundation for appropriate financing of a seamless continuum of care.

Over time as the financial incentives of the per capita payment system become significant for providers, they will respond with changes in their input use and output mix in order to lower their costs and generate a surplus. These changes in their service mix are likely to favor lower-cost health promotion, disease prevention, and chronic disease management services rather than more expensive curative care. Providers are paid for keeping people well, not just for treating sick patients. If PHC providers keep their populations healthy, they may generate savings, which can be used, for example, to buy more drugs or equipment or to add other services for their populations.

A per capita payment system may also influence how services are delivered. In some cases provider payment systems provide financial disincentives for introducing, for example, new clinical practice guidelines or quality improvement

techniques, or even for using new knowledge and skills obtained by health practitioners. In the former Soviet Union, for example, the provider payment systems rewarded overuse to maintain the excess capacity in the health delivery system. New clinical practices or quality improvement techniques reducing these unnecessary health services resulted in reductions of budgets for health providers. Per capita payment systems can help ensure that financial incentives encourage appropriate use of health services and that more efficient or higher-quality clinical practices are rewarded.

Institutional structure. An issue with which many countries worldwide continue to struggle is determining the optimal roles of PHC practitioners and specialists and their interrelationship. An element of broader health system reforms may be to enhance the role of PHC practitioners and to focus specialists on interventions requiring their expertise. This process may involve changing the basic structure of the health delivery system to enable further development of cost-effective PHC. Financial incentives contained in per capita PHC payment systems can contribute to—or even drive—this restructuring process. In many low- and middle-income countries, publicly funded PHC providers are also publicly owned and managed. The bureaucratic rigidities and centralized decision making that often accompany such a structure can lead to grossly inefficient resource allocation and unmotivated PHC providers.

A per capita payment system should be created in such a way that it is accompanied by greater management autonomy and, possibly, by a more corporatized structure to create an interest among providers in using resources more effectively. PHC providers should be allowed to allocate their lump sum per capita budgets across inputs and outputs in the most cost-effective way and themselves benefit from any efficiency gains that they achieve.

Providers must have some degree of autonomy (also called decision rights) (box 1.1) to manage their inputs and to respond to the new incentives created by the new payment system (Shaw 2004; Jakab et al. 2002). Providers should have increasing autonomy in making the following decisions:

- *Staffing*—hiring and firing, remuneration, and fringe benefits
- *Other inputs*—quantity and type of drugs, supplies, and other inputs used to produce PHC services
- *Physical assets*—disposing of existing capital stock, including buildings and equipment, or acquiring new capital, such as equipment
- *Organizational structure*—management structure and processes, and contracting out of services
- *Output mix*—types of services provided
- *Use of surplus revenues*—manner of using surplus revenues generated from efficiency gains.

BOX 1.1 BALANCE OF DECISION RIGHTS IN COSTA RICA

In Costa Rica the Social Security Institute increased the management autonomy of its PHC providers by converting them to cooperatives owned by the employees. The cooperatives have decision rights over staffing, equipment and other inputs, and surplus revenues. To maintain the public's access to necessary primary health care services, however, the legal agreements establishing the cooperatives limit their activities to "the provision of health services in the public interest." Through the legal status and purchasing agreements, the Social Security Institute has retained some degree of decision rights over the output mix of the primary health care providers.

Source: Gauri, Cercone, and Briceno 2004.

Different agencies may have authority to grant decision rights in these areas. For example, if providers are government employees, the Ministry of Health may not have the authority to grant providers the right to make hiring/firing and salary decisions. This aspect of implementing a per capita payment system therefore requires coordination across multiple ministries or agencies.

Role of the population. A per capita PHC payment system creates the mechanism for increasing the voice and role of the population in the health system and shifting the balance of power from providers to their patients. In particular, if there is free choice in the system, PHC providers that can attract more patients will be rewarded with more financing in a per capita payment system, and providers will have an incentive to better understand (and so meet) the needs and demands of the population. The population also has more responsibility for its own health, as the PHC system shifts its focus to health promotion and disease prevention, which relies on individuals taking greater responsibility for their own health.

METHODOLOGY FOR DEVELOPING A PER CAPITA PHC PAYMENT SYSTEM

In a per capita PHC payment system, all providers in the payment system are paid, in advance, a predetermined fixed rate to provide a defined set of services for each individual enrolled with the provider for a fixed period. The system can be of the simplest form, with PHC providers all paid the same average per capita rate (the base per capita rate), or the system can be more complex, with adjustments to the per capita rate to reflect expected cost variations (risk adjustment). Risk adjustment coefficients may be added to compensate providers for variations in the expected costs of treating different population groups, including

age/sex groups, chronic disease status, historical medical expenditures, or other factors that may be associated with expected individual cost variations. Geographic adjustment coefficients may be developed if there are significant cost variations for delivering the same package of services in different locations, such as rural areas where fixed costs may be higher.

Other adjustments to the per capita rate may be added to achieve specific policy objectives, for example, to provide additional resources or incentives to focus on priority services or populations. In the United Kingdom general practitioners receive target payments in addition to the per capita payment for preventive activities (Greb, Delnoij, and Groenewegen 2006). Per capita payment may also be combined with incentive payments that are supplemental to the per capita rate. In the Czech Republic PHC providers are paid a per capita rate, which is adjusted for age categories, and receive as well a cost-containment bonus for keeping referrals to specialists and diagnostic tests below a specified limit (Szende and Mogyorosy 2004).

The per capita payment system may also be mixed with other payment systems, although this will change its financial incentives. In Estonia, for example, PHC providers are paid by the national health insurance fund through a mixed payment that is based on an age-adjusted per capita rate (about 70 percent of provider revenue), on fee-for-service for some specified services (such as minor surgeries) that PHC providers may purchase from specialists, and on a fixed allowance for infrastructure and equipment (Atun et al. 2006; Szende and Mogyorosy 2004). In this example, the efficiency incentives of per capita payment may be diluted, as they are mixed with incentives to increase those services that are paid separately by fee-for-service.

The overall health financing system and implementation sequencing in a country generally determine whether the per capita payment system is mixed with other payment methods. For example, Uzbekistan has only general budget financing for the health sector and started with most costs in the capitated rate in the initial phase of reforms in the post-independence period (with the exception of capital and a few centrally procured items). The Kyrgyz Republic started its per capita payment system with a mixed system, with only incremental salary and supplies included in the capitated rate from payroll tax revenues. Other costs were paid through a line-item budget. Over time, budget financing was incorporated into the capitated rate to cover all costs, except major capital investments. Tajikistan started its per capita payment system with budget financing, with only variable costs included in the capitated rate. Salaries, utilities, and capital were paid by a line-item budget in order to implement the per capita payment system step by step.

In summary, implementation can move incrementally toward including all sources of financing, all providers, and all types of costs in the per capita provider payment system. This implementation sequencing may provide a step-by-step process that increases country ownership and capacity when the payment reforms are being recommended in the context of donor-funded technical assistance (see the section, *Implementation Sequencing,* later in the chapter).

Components of a Per Capita Payment System

Per capita payment systems have a minimum of three components: definition of the package of services paid for through the per capita rate, the base per capita rate, and a mechanism for determining the number of individuals enrolled with each provider. Systems with risk adjustment also require a set of risk adjustment coefficients and more detailed information on the characteristics of the population enrolled with each provider. The most general formula for computing the base per capita rate in a PHC payment system is as follows:[2]

Base per capita rate = Total funds in PHC pool / Total population

A PHC provider's total per capita budget is determined as follows:

Provider's per capita budget = Base per capita rate x Enrolled population

Figure 1.2 shows the steps in the process of developing a per capita PHC payment system:

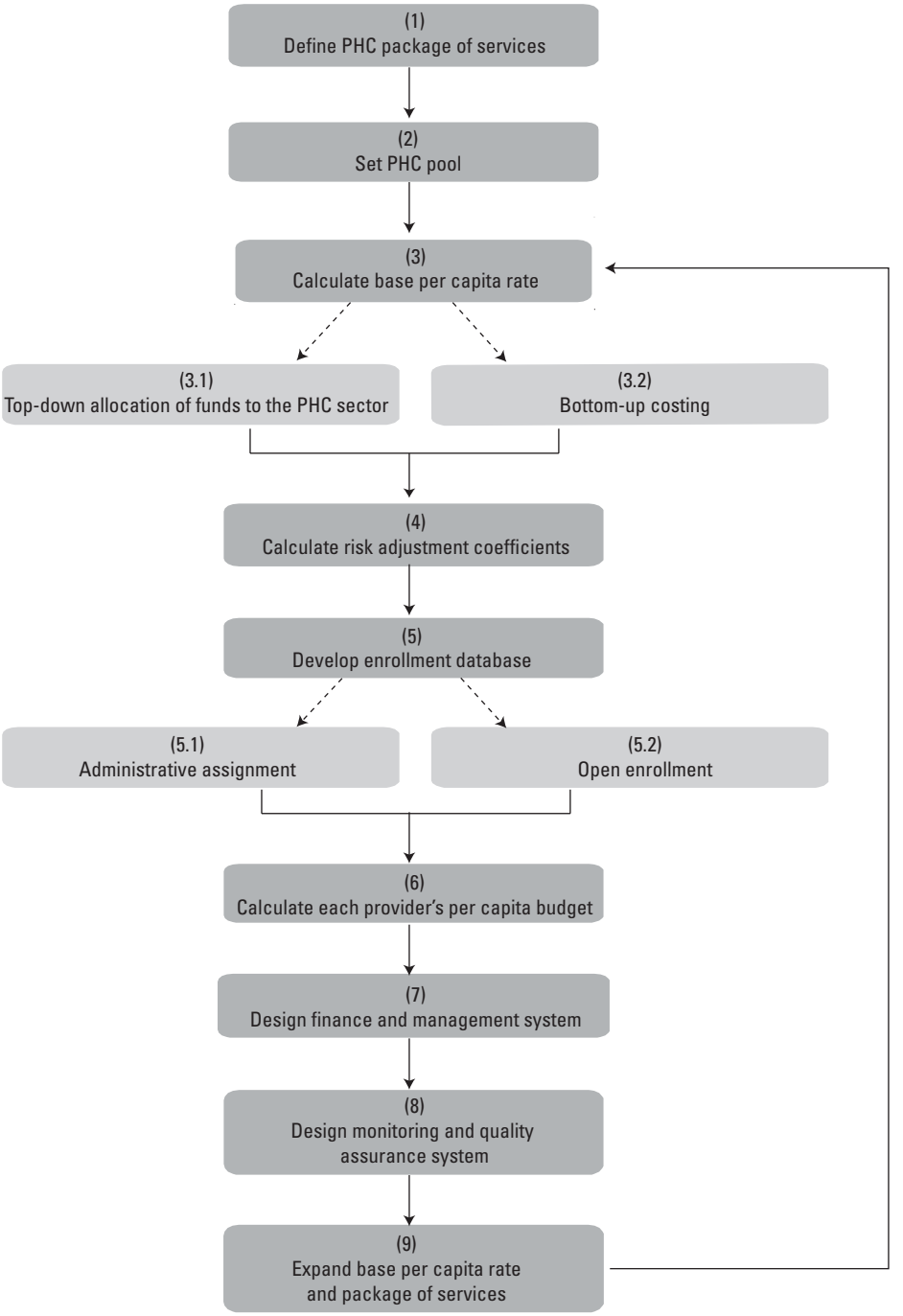
- defining a PHC package of services
- setting the PHC pool
- calculating the base per capita rate
- calculating risk adjustment coefficients
- developing an enrollment database
- calculating each provider's per capita budget
- designing a finance and management system
- designing a monitoring and quality assurance system
- expanding the base per capita rate and package of services.

These steps are described in detail in the remainder of this chapter. Although the steps are depicted in the figure as a sequence, in fact they represent an ongoing, iterative process of collecting and analyzing data, developing payment parameters, implementing the system, monitoring, and refining the system. In addition, several of the steps may well be carried out simultaneously. For example, while the information is being collected to calculate the base rate, work should begin to establish the enrollment database.

DEFINING A PHC PACKAGE OF SERVICES

The definition of the services included in the PHC package of services and paid for through the capitated rate should reflect the current capabilities of the PHC providers, the desired expansion and integration of the PHC scope of services,

FIGURE 1.2 Steps in the Design of a Per Capita PHC Payment System



Source: Authors.

and the priorities for improving the health of the population. Defining the PHC package of services is an opportunity to clarify the boundary between primary and outpatient specialty services, to shift priorities in service delivery, and to drive the integration of vertical programs into primary care. Defining the package is also linked to the benefit package that the population covered by government funds is entitled to receive for free or with copayments. Therefore, the population should be aware of the PHC package of services, its entitlements, and its responsibility for copayments.

Most definitions of the PHC package of services are broad and emphasize basic health promotion, prevention, first-line services for diagnosing and treating illness and injury, and chronic disease management. In general there must be a balance between over- and underspecifying the package of services. Specific services may include basic first-contact medical care, emergency services, maternal and child health, gynecology, home care, and preventive services such as immunization and screening. Whether specific diagnostic services, such as X-rays and laboratory services, are included depends on the equipment and capabilities of providers, as well as the entitlements specified in the government-approved benefit package.

The PHC package of services may be linked to the types of facilities in the delivery system that have historically delivered PHC, but this is not necessary. Different types of providers, both public and private, may be eligible to participate in the payment system if they have the capability (or a license) to deliver the package of services, so the package should be applicable to all such providers. The package of services may also be linked to evidence-based clinical guidelines that specify the appropriate boundaries between primary and higher levels of care.

SETTING THE PHC POOL AND CALCULATING THE BASE PER CAPITA RATE

In the simplest per capita payment system, all PHC providers in a defined geographic or administrative area are reimbursed at the same per capita rate—the base per capita rate. The base per capita rate for a year is computed from an estimate of the amount of funds that the purchaser has available in one year to pay for PHC services from all providers included in the payment system in that area—the PHC pool—divided by the total number of enrolled individuals across all providers in that region:

$$BPCR_R = \frac{PHCP_R}{\sum_p Population_{p,R}}$$

where

$BPCR_R$ = annual base per capita rate in region R
$PHCP_R$ = primary health care pool for the given year in region R
$Population_{p,R}$ = total population enrolled in PHC provider p in region R

The PHC pool is a commitment of resources for PHC services, excluding direct out-of-pocket payments, and applies collectively to all PHC providers in the payment system. The PHC pool may include funds for capital expenditures, or as is more common, the PHC pool may fund only operational expenditures with capital expenditures allocated separately. The population estimate used to calculate the base per capita rate should be exactly equal to the sum of the population enrolled in each primary care provider in the payment system (either administratively or through open enrollment—see the section, *Developing an Enrollment Database,* later in the chapter) in order to maintain the budget neutrality of the payment system. (A budget-neutral payment system is one that generates total payments to providers that are exactly equal to the level of funding in the system.)

There are two main approaches to setting the PHC pool: bottom-up costing and top-down allocation of funds. A combination of the two approaches may also be used.

Bottom-Up Costing

The costs of all inputs used to provide PHC services in the most recent year (or years) are estimated and aggregated. The costs can be based on actual expenditures in the previous year(s) or projections from historical expenditures and utilization. These methods of bottom-up costing assume that the historical cost structure reflects the actual cost of production of services, and that this cost structure can (and should) be maintained. Yet because PHC services are often underfunded, this approach may not provide an accurate estimate of the funds needed for the PHC pool.

More complicated methods of imputing costs based on desired expenditure patterns can also be used to simulate and project changes in the cost structure of PHC services. It is possible that if the bottom-up costing includes clinical assessment of what services should be included rather than what services are actually included, the exercise may estimate costs significantly greater than available resources. In general, bottom-up costing does not provide an appropriate estimate of the PHC pool in low- and middle-income countries for two reasons: the data are insufficient to establish the true costs of delivering the package of PHC services; and the current cost structures (both within the PHC sector and between PHC and other levels of care) are usually inefficient, and the objective of the new payment system is to drive a new cost structure.

Top-Down Allocation of Funds

The proportion of the purchaser's budget that will be allocated to PHC services is defined in advance. If the PHC pool is derived from a top-down allocation from the overall health care budget, there is a clear mechanism to increase the share of resources allocated to PHC services. In this approach, the PHC pool is typically specified as a percentage of the total health care budget, which can then be

used as a policy tool to administratively direct health care resources toward primary care (box 1.2). The percentage of the health care budget allocated to primary care is a policy variable that can be set to initially shift resources to PHC to jumpstart the upgrading of clinical capacity or make inputs more available that were previously in short supply, such as drugs. The allocation can be adjusted over time either as PHC expands its scope of services into, for example, additional diagnostic tests; or to integrate vertical programs such as immunization, reproductive health, or infectious disease services. In addition, allocating a fixed percentage of the health budget to primary care ensures that PHC does not disproportionately bear cuts in the general health care budget.

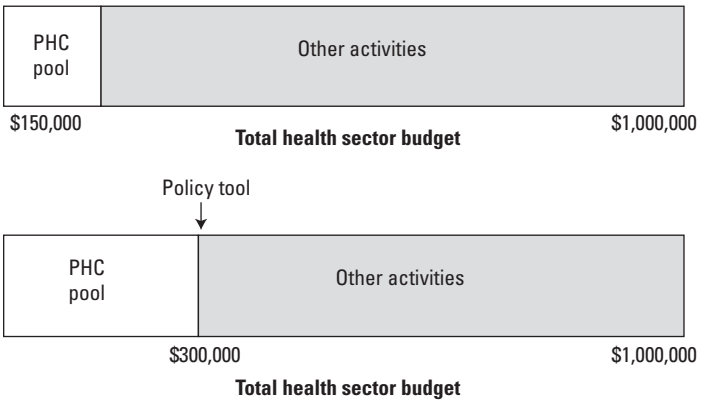
Combination of Approaches

The PHC pool may also be set through a combination of bottom-up costing and top-down allocation. Initially, a bottom-up calculation is made to determine the

BOX 1.2 TOP-DOWN ESTIMATION OF THE PHC POOL AS A HEALTH POLICY TOOL

Primary health care (PHC) is underfunded in many countries, particularly relative to hospital services. The top-down approach for estimating the PHC pool is a powerful tool for priority setting in the health sector, and it makes explicit the trade-off between expenditures on PHC and on other parts of the health system. For example, if the total health sector budget is $1 million, a PHC pool estimated from bottom-up costing based on historical expenditures might total $150,000, or 15 percent of the budget.

If PHC is identified as a priority and has been previously underfunded, the health purchaser may decide to expand the allocation of the total health sector budget to PHC. For example, the purchaser may decide that 30 percent of the health sector budget should be allocated to PHC. In that case the base rate is calculated from a PHC pool that is determined from a top-down allocation of 30 percent of available health care resources.



minimum cost per person of providing basic primary care services. This minimum can then be expanded by increasing the total allocation of resources to PHC as a percentage of the government health care budget in a given area (that is, a top-down approach). Combining the two approaches gives a budget-neutral resource allocation mechanism that is linked to the costs of services provided in PHC but not tied exclusively to historical funding patterns.

Using either approach or in combination, it is useful to define the starting point, namely the purchaser's historical allocation of total health care funding on PHC. However, because in some cases it may be difficult to separate the historical expenditures on PHC and on outpatient specialty services, it may be necessary to develop and apply an algorithm for identifying and computing historical PHC expenditures made by facilities providing both PHC and outpatient specialty services.

CALCULATING RISK ADJUSTMENT COEFFICIENTS

To ensure that the per capita payment system promotes the appropriate incentives and compensates providers for serving populations with different health care needs, some method of risk adjustment may be applied to the base per capita rate. Risk adjustment is a correction tool that uses a measure of risk variation (expected cost) to compensate health plans or health providers appropriately for the expected costs of providing necessary services for their enrolled populations (Lee and Rogal 1997). Risk adjustment coefficients are applied to the base per capita rate to scale up or scale down the payment for an individual on the basis of the relative expected costs of the particular risk group to which that person belongs.

Ideally, risk adjustment coefficients reflect true variations in health needs across different population groups and the actual costs of meeting those needs. Variations in health care needs and resource consumption are most accurately predicted by patterns of disease and mortality by age and sex (Fowles et al. 1996; Hornbrook and Goodman 1996). The resources required to meet those needs include the full costs of adequate diagnosis and treatment, as well as outreach and prevention services. To analyze variations in true health care needs, therefore, data are required from the entire population, including both users and nonusers of the health care system. Such data can only be obtained from population-based surveys. When resources are limited, however, health services utilization is a possible proxy to predict health care resource needs.

At PHC level, much of the predictable cost variation is accounted for by age and sex (Vargas and Wasem 2006; van Vliet and Lamers 1998). It can be expected that children and women of reproductive age use more PHC services than average, whereas young adult men typically use fewer PHC services than average (Cashin et al. 2002). Therefore, significant improvement in the per capita PHC payment system can be achieved by adding age/sex risk adjustment coefficients

to the base per capita rate. Such coefficients can be developed for the specific country or region, or coefficients can be adapted initially from other systems.

In the rest of this section, one methodology for constructing age/sex risk adjustment coefficients specific to local conditions is presented. The methodology applies only to payment for PHC services, and if PHC providers are also at risk for referrals and hospitalization, it may not be appropriate. Other methodologies may be used that include hospitalization rates, mortality, and socioeconomic characteristics. The preferred method depends on the specifics of the local context and the resources available for data collection. In general, however, methodologies that use variations in hospitalization or mortality to predict variations in PHC service utilization may underestimate the PHC resource needs of infants and children, who require significant preventive services but generally have much lower hospitalization and mortality rates than adults.

Methodology for Developing Age/Sex Risk Adjustment Coefficients

This methodology for a per capita PHC payment system combines PHC service utilization by age and sex with the unit costs of services to calculate the relative per capita annual resource use in each age/sex group. The methodology was tested and applied in three geographic areas (two rural and one urban) in Kazakhstan and Uzbekistan (Cashin et al. 2002). The age/sex adjustment coefficients developed have been in use throughout the Central Asian region since 1998. In Kazakhstan the age/sex adjustment coefficients were initially developed for one rural region and one urban area, but they are now included in national legislation on per capita PHC payment (Government of Kazakhstan 2000). In Uzbekistan the adjustment coefficients developed from this methodology are being used for national roll-out of rural per capita PHC payment (Ministry of Health of Uzbekistan 2005a and 2005b; Government of Uzbekistan 1999). Tajikistan is implementing rural PHC reforms and developing age/sex adjustment coefficients on the basis of experience in Kazakhstan and Uzbekistan.

The methodology involves the following activities, which are described in the rest of this section:

- define aggregated groups of PHC services
- determine unit costs of services
- determine total utilization of services by age and sex
- combine utilization with unit costs to obtain per capita cost by population group and calculate relative coefficients
- combine groups to create age/sex adjustment coefficients.

Each activity may rely on existing data or require new data. New data can be collected through a health facility survey (of individual PHC visits), which collects information on the characteristics of patients, services provided, and resources used to provide those services.

To collect the necessary utilization and cost data, regional health departments in Kazakhstan and Uzbekistan conducted PHC surveys, which collected both health facility data and detailed information on all PHC visits over a two-week to one-month period. It was necessary to collect information on each visit during the sample period, so that the utilization could be extrapolated to an annual rate to use the cost-accounting methodology (see table 1.4 below) to fully allocate annual expenditures to services and population groups. The survey samples are summarized in table 1.1.

Health facility data were collected on annual budgets, the size and demographic structure of the population served, and the use of space and available equipment. For each visit, a patient questionnaire was completed by all PHC providers who had contact with the patient. Information was collected on the age and sex of the patient, diagnosis, drugs prescribed and dispensed, transportation and travel time of the provider for home visits, and the time spent by medical personnel on all consultations, procedures, and analyses completed during the visit (figure 1.3).

Define Aggregated Groups of PHC Services

Services that are delivered by PHC providers in the payment system should be aggregated into groups that are clinically meaningful and that can be expected to have similar unit costs. In Kazakhstan and Uzbekistan, a monitoring system stakeholder group of health policy makers and PHC physicians developed a list of about 40 services that they agreed was an accurate representation of the services delivered by most PHC providers. As the costing methodology was applied, this detailed list (figure 1.3, side 2) was collapsed into eight aggregated service categories (table 1.2). This aggregation was necessary to allocate some types of costs, such as utilities or administration, to the more disaggregated services.

Determine Unit Costs of Services

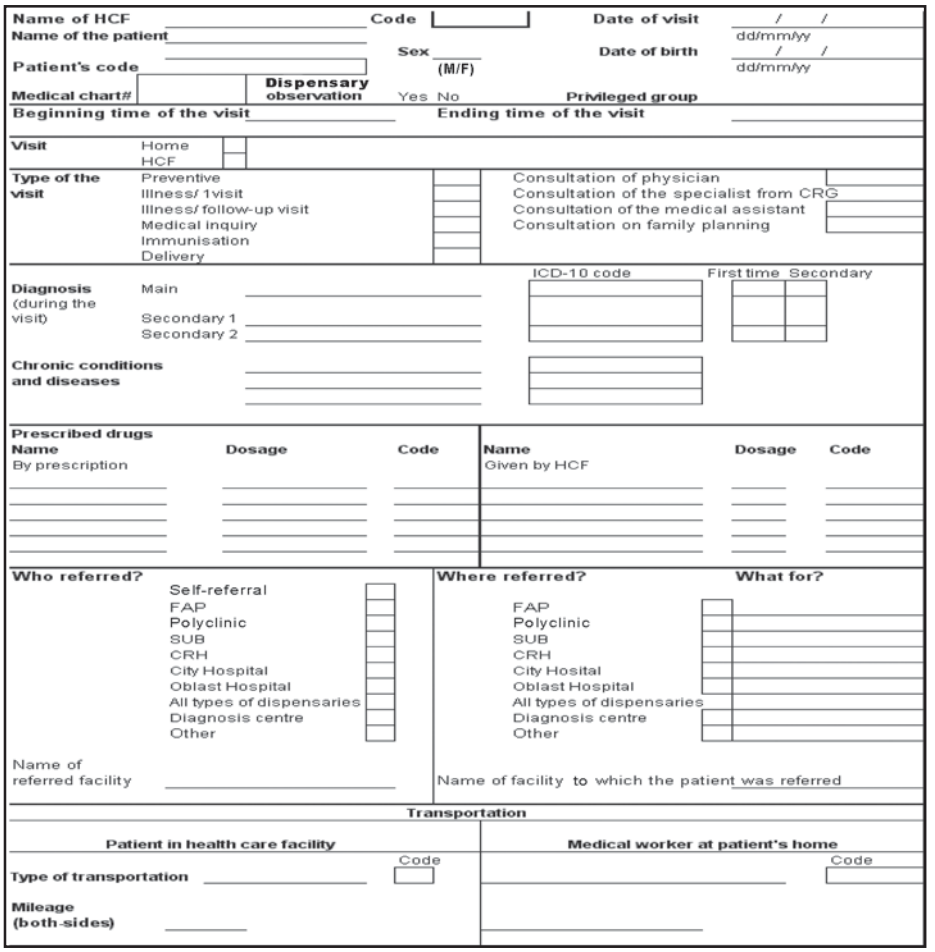
Developing risk adjustment coefficients that increase the fairness of per capita payment by more closely approximating the cost of service for different age/sex groups requires the unit cost of the health services to be determined. Because the

TABLE 1.1 Health Facility Survey Samples in Kazakhstan and Uzbekistan

	Urban Kazakhstan	*Rural Kazakhstan*	*Rural Uzbekistan*
Length of study period	1 month	1 month	2 weeks
No. of PHC facilities	8	5	24
No. of visits	15,699	3,782	16,278
Population enrolled (no.)	89,756	8,961	153,535

Source: Authors.

FIGURE 1.3 Individual Patient Data Collection Form for Health Facility Surveys
Side 1:


Name of HCF ____ Code ____ Date of visit ____ dd/mm/yy
Name of the patient ____ Sex ____ (M/F) Date of birth ____ dd/mm/yy
Patient's code ____
Medical chart# ____ Dispensary observation Yes No Privileged group
Beginning time of the visit ____ Ending time of the visit ____

Visit: Home / HCF

Type of the visit: Preventive; Illness/ 1visit; Illness/ follow-up visit; Medical inquiry; Immunisation; Delivery
Consultation of physician; Consultation of the specialist from CRG; Consultation of the medical assistant; Consultation on family planning

Diagnosis (during the visit): Main; Secondary 1; Secondary 2 — ICD-10 code — First time — Secondary
Chronic conditions and diseases

Prescribed drugs
Name By prescription — Dosage — Code
Name Given by HCF — Dosage — Code

Who referred?: Self-referral; FAP; Polyclinic; SUB; CRH; City Hospital; Oblast Hospital; All types of dispensaries; Diagnosis centre; Other
Where referred?: FAP; Polyclinic; SUB; CRH; City Hosital; Oblast Hospital; All types of dispensaries; Diagnosis centre; Other
What for?
Name of referred facility ____
Name of facility to which the patient was referred ____

Transportation
Patient in health care facility: Type of transportation ____ Code; Mileage (both-sides) ____
Medical worker at patient's home: ____ Code

(*Figure continues on the next page.*)

unit cost of the list of 40 services described above is unavailable from existing financial information, a cost-accounting methodology must be used to allocate costs, estimate the total cost of each service, and calculate the unit cost of each PHC service.

This cost-accounting methodology is generally more developed for inpatient or hospital services than it is for PHC or outpatient specialty services, for two main reasons. First, defining the unit of service for hospital care is more clear or standardized (usually a treated case) while defining the unit of service in PHC is less clear or standardized. Second, the subdivisions within hospitals also tend to

FIGURE 1.3 Individual Patient Data Collection Form for Health Facility Surveys
Side 2:

Procedures, analyses and other services		Type of the medical staff	Code	Beginning	Ending
1. Consultations					
Consultation of physician					
Consultation of the specialist from CRH					
Consultation of the medical assistant /midwife					
Consultation on Family Planning					
2. Laboratory examinations					
General blood analysis					
General urine analysis					
Microscopic stool examination					
Blood sugar test					
Syphilis test					
3. Fuctional diagnosis					
X-ray					
ECG					
4. General procedures					
Injections subcutaneous, intramuscular					
Intravenal injections					
Dropper					
Enema					
Compress					
5. Gynaecological procedures					
IUD withdrawal					
Speculum vaginal examination					
Vaginal irrigation					
Vaginal smear for flora					
6. Surgical examinations					
Primary surgical treatment of the wound					
Furuncle, carbuncle dissection					
Phlegmon dissection					
Panaritium dissection					
Stitches removal					
Novocaine blockade					
Bandaging					
7. Traumatological manipulations					
Plastering (gypsuming)					
Plaster removal					
8. Urological manipulation					
Urinary bladder catheterization					
9. Otorhinolaryngological manipulations					
Ear-wax removal					
Removal of the foreign body from the nasal cavity, stomatopharynx					
10. Ophthalmological manipulations					
Keenness vision examination					
Removal of the foreign body from the eye surface					
11. Physiotherapy procedures					
Inhalations, Aerosoltherapy					
Paraffin therapy					
UHF tharapy					
Exercise therapy					
Massage					
12. Preventive vaccination					
13. Other procedures and analyses					
Other:					
Other:					
Other:					
Other:					

TABLE 1.2 Aggregated Service Categories Used for Age/Sex Adjustment Coefficient Development in Kazakhstan and Uzbekistan

Consultation (in health facility)
Gynecology/family planning
Laboratory testing
Functional diagnostics (such as X-rays)
Procedures
Physiotherapy
Preventive visit (including immunization)
Home visit

Source: Authors.

be clearer or more standardized than in PHC; for example, hospitals usually have departments, which can collect costs, whereas PHC providers tend to be more loosely organized. Therefore, the cost-accounting methodology used to determine the unit cost of services in PHC relies very much on the specific environment. As long as this methodology starts with the total annual budget or actual expenditures for all PHC services and ends with costs allocated to defined PHC services in a logical and consistent manner, the objective of determining the total, and then unit, cost of PHC services will be accomplished.

The rest of this section describes the cost-accounting methodology used in Kazakhstan and Uzbekistan to determine the total and unit costs for the 40 services. The example is based on real data and analysis, but it was adjusted to give a simpler and more manageable illustration. For example, the list of eight aggregated service categories shown in table 1.2 was reduced to four aggregated service categories that included six specific PHC services (table 1.3).

The detailed PHC cost-accounting example described below consists of seven steps. All the steps are described in reference to table 1.4, which is based on data collected in Kazakhstan in 1996 and are denominated in Kazakhstani tenge. Data collection should be performed across multiple PHC providers and then averaged across providers, but to keep the example simple only one PHC provider is shown.

Step 1: Obtain annual budget or annual expenditures. Under step 1 in table 1.4, the total annual budget for a PHC provider is shown. The budget is broken down into line items (also simplified for the purposes of this example), which are standard for Kazakhstan's health system: salaries, payroll tax, utilities, and drugs and supplies. It is important to ensure that the budget (or expenditures) allocated to the services is only for PHC; if any outpatient specialty costs are included in the budget (expenditure) data, they should be separated out in this step.

Step 2: Separate into direct service delivery and fixed/administrative costs. Costs need to be separated into direct service delivery and fixed/administrative costs,

TABLE 1.3 PHC Services Used for Age/Sex Adjustment Coefficient Development in Semipalatinsk, Kazakhstan

Aggregated service categories	*Specific PHC services*
Consultation (in health facility)	Physician office consultation
Home visit	Home visit
Procedures	Injection
	Stitches removed
Laboratory testing	Blood test
	Urine test

Source: Authors.

TABLE 1.4 Cost-Accounting Exercise to Determine Total Cost of PHC Services (Kazakhstani tenge)

Step 1: Obtain annual budget or annual expenditures

Total	*Budget amount*	*% of budget*
Budget line item name		
Salaries	440,200	65.8
Payroll tax	132,060	19.7
Utilities	74,000	11.1
Drugs and supplies	23,016	3.4
Total	669,276	100.0

Step 2: Separate into direct service delivery and fixed/administrative costs

Admin		*Direct*	
Budget line item name	*Budget amount*	*Budget line item name*	*Budget amount*
Salaries	39,618	Salaries	400,582
Payroll tax	11,885	Payroll tax	120,175
Utilities	74,000	Utilities	0
Drugs and supplies	0	Drugs and supplies	23,016
	125,503		543,773

Step 3: Determine allocation statistics

	Budget line item name				
	Salaries	*Payroll tax*	*Drugs and supplies*	*Utilities*	*Admin*
Allocation statistic	Time	Time	Number used	Space	Space
Description	To be allocated	Consultation	Home visit	Injection	Stitches removed
Blood test					
Urine test					

Step 4: Allocate salary costs

		Service					
	Total	*Consultation*	*Home visit*	*Injection*	*Stiches removal*	*Blood test*	*Urine test*
Salaries/payroll tax	520,757						
Allocation statistic (time)	1.00	0.35	0.40	0.09	0.04	0.06	0.06
Allocation		182,265	208,303	46,868	20,830	31,245	31,245

Step 5: Allocate other direct service delivery costs—drugs and supplies

		Service					
	Total	*Consultation*	*Home visit*	*Injection*	*Stiches removal*	*Blood test*	*Urine test*
Drugs and supplies							
Amount to be allocated	23,016						
Allocation statistic (no.)	1.00			0.38	0.16	0.25	0.22
Allocation		0	0	8,631	3,596	5,754	5,035

Step 6: Allocate fixed/administrative costs

Fixed/administrative costs							
Amount to be allocated	125,503						
Aggregated groups		*Consultation*	*Home visit*	*Procedures*	*Laboratory tests*		
Allocation statistic (space in square meters)	447	284	0	105	59		
Coefficient	1.00	0.63	0.00	0.23	0.13		
Service		*Consultation*	*Home visit*	*Stitches removed*	*Injection*	*Blood test*	*Urine test*
Allocation		79,689	0	14,680	14,680	8,227	8,227

Step 7: Determine total cost per PHC service

Service	*Consultation*	*Home visit*	*Stitches removed*	*Injection*	*Blood test*	*Urine test*
Salaries/payroll tax	182,265	208,303	46,868	20,830	31,245	31,245
Drugs and supplies	0	0	8,631	3,596	5,754	5,035
Fixed/administrative costs	79,689	0	14,680	14,680	8,227	8,227
Total cost	261,954	208,303	70,179	39,106	45,227	44,507
Cross-check on total cost	669,276					

Source: Authors.
Note: Some rows and columns may not add up due to rounding errors.

because these different types of costs are allocated using different criteria (allocation statistics). In this example, the main fixed cost is utilities. Administrative costs are determined by separating salary costs of administrative personnel from total salaries and adding utility costs. Adding up administrative salaries and dividing by total salaries indicate that 9 percent of salaries are for administration costs (in this example). Therefore, 9 percent of the total salary and payroll tax costs are separated out from salaries for direct service delivery.

Step 3: Determine allocation statistics. After the costs are separated, the next step is to determine which criteria (allocation statistics) will be used to allocate each type of cost to the PHC services. In PHC, the major resource used to serve patients is the time of health professionals. The allocation statistic for direct service salary and payroll tax costs is health professional time spent on each of the PHC services; that for drugs and supplies is the number of services provided for each type of service; and that for both utilities and administrative costs is the amount of space in the health facility used by the aggregated group of PHC services that includes the specific PHC service. Aggregated PHC services here are used to allocate utility and administrative costs, as it was not possible to determine the exact space used by each of the 40 specific PHC services.

Step 4: Allocate salary costs. The calculation of health professional time spent on each PHC service is based on the health facility survey described above. The amount of time PHC staff spent on each service was recorded on the patient questionnaires at the time of contact. The amount of time spent on each different type of PHC service is summed and then converted to a percentage, or coefficient, by dividing the total time spent on each PHC service by the total time spent on all PHC services. The direct service delivery salaries and payroll taxes are then allocated to each of the PHC services using this coefficient.

In reality, because there are likely to be different levels of health professionals with varying salaries spending different amounts of time on each of the services, the time of each type of health professional should be allocated separately. This simple example, however, combines all types of health professionals. In practice, separate lines to allocate the salaries of doctors, nurses, midwives, laboratory technicians, and other health professionals would be necessary. Finally, only time actually spent with patients was used to develop the allocation statistics. The use of noncontact time was not recorded, so the issue of excess capacity or underused staff time, which may be an important source of inefficiency in some settings, is not addressed here (Cashin et al. 2002).

It is important to assess the coefficients for reasonableness, that is, are they consistent with the reality of clinical practice and operational processes? For example, the former Soviet Union's health care system had policies mandating a high level of home visits. Such visits are extremely time-intensive, which emerges in the results of the survey in Kazakhstan and Uzbekistan. Analysis of the allocation of salary cost to PHC services by time also illuminates the rela-

tionship between high-volume services and time-intensive services: injections, for example, are high-volume, low time-intensive services, while stitch removals are low-volume, high time-intensive services. The general point is that each specific environment has its own service delivery and operational peculiarities, and a check of validity should verify whether the results make sense in that context.

Step 5: Allocate other direct service delivery costs—drugs and supplies. The costs of pharmaceuticals and supplies are allocated to services by the number of services provided for each type of service. The coefficient is calculated by adding up the encounters using drugs or supplies in each PHC service and converting it to a percentage. By definition, physician office consultations and home visits only include health professional time, so there are no drugs or supplies allocated to these PHC services. Drugs and supplies are allocated to each of the remaining PHC services using the coefficient as shown under step 5.

Step 6: Allocate fixed/administrative costs. The basis for allocating utility costs to each of the PHC services is the space occupied, because there is a strong correlation between them. It is not possible to determine the space occupied for each PHC service individually, and so they are separated among the aggregated service categories. The health facility survey provided information about which groups of services were delivered in which rooms, as well as the size of the rooms in square meters. The amount allocated to each specific PHC service in a particular aggregated service category is the same. Administrative costs are also allocated based on the amount of space occupied by the aggregate service category to which the specific PHC service belongs. In step 6, using a coefficient based on the relative amount of space occupied, the combined costs of utilities and administration are allocated first to the aggregated service categories and then equally to the specific PHC services contained in the aggregated service categories.

Step 7. Determine total cost per PHC service. After allocation of the costs of salaries and payroll tax, drugs and supplies, and utilities and administrative costs to each PHC service, the total cost for each specific PHC service is determined by summing these three cost elements. It is important during this step to check the cost-accounting worksheet for internal consistency in order to ensure that the total cost or budget, both before and after the allocation of costs, are the same (see the line "Cross-check on total costs").

The unit cost of each service is calculated by dividing the total cost of the service by the total number of the service provided during the study period (extrapolated to an annual level):

$$\text{Unit cost}_X = \frac{\sum_i \text{Total annual cost of service X in facility } i}{\sum_i (\text{No. service X delivered in facility } i \text{ over 1-month study period}) \times (12 \text{ months})}$$

The global average unit cost is calculated as the total cost of all services over the study period divided by the total number of all services over the study period:

$$\text{Global average unit cost} = \frac{\sum_i \sum_X \text{Total cost of service X in facility } i \text{ over study period}}{\sum_i \sum_X (\text{No. of service X delivered in facility } i \text{ over study period}) \times (12 \text{ months})}$$

To generalize the unit costs, they can be converted into relative weights by dividing the unit cost for each service group by the overall average:

$$\text{Relative unit cost}_X = \frac{\text{Unit cost of service X}}{\text{Global average unit cost}}$$

The relative unit costs (which are more general than currency-denominated unit costs) for the eight aggregated service categories in Kazakhstan and Uzbekistan are shown in table 1.5.

Determine Total Utilization of Services by Age and Sex

Determining total utilization of services by age and sex requires tabulation of the total number of each service delivered by loosely aggregated age/sex groups. There is no best experience in defining these groups, and the process depends on what data are available and on the commonly accepted groups in the country context. In general more groups will lead to more precise but more difficult calculations. In Kazakhstan and Uzbekistan, for example, utilization was tabulated by 5-year age increments. The total utilization should be extrapolated to match the period of the cost data that will be allocated to the services. In these two

TABLE 1.5 Relative Unit Costs for Aggregated Service Categories in Kazakhstan and Uzbekistan

Service category	*Urban Kazakhstan*	*Rural Kazakhstan*	*Rural Uzbekistan*
Consultation (in health facility)	1.07	1.00	1.06
Gynecology/family planning	0.81	1.14	0.96
Laboratory testing	1.16	0.41	1.18
Functional diagnostics (such as X-rays)	0.96	0.00	2.74
Procedures	0.77	0.44	0.95
Physiotherapy	1.05	0.61	1.11
Preventive visit (including immunization)	0.83	0.94	0.70
Home visit	1.26	2.02	1.00

Source: Authors.

countries, where annual budgets were used to determine unit costs, the total utilization of services was multiplied by 12 in Kazakhstan, where the study period was one month, and by 24 in Uzbekistan, where the study period was two weeks.

Combine Utilization with Unit Costs to Obtain Per Capita Cost by Population Group and Calculate Relative Coefficients

The total annual cost of PHC services for each age/sex group is calculated as follows:

$$\text{Total annual cost of group A} = \sum_{X} (\text{Relative unit cost of service X}) \times (\text{Annual total no. of service X used by group A})$$

The average per capita cost of PHC services for each age/sex group is calculated as follows:

$$\text{Per capita annual cost of PHC services for group A} = \frac{\text{Total annual cost of group A}}{\sum_{i} \text{No. population in group A enrolled in facility } i}$$

The absolute average per capita cost of PHC services for each age/sex group is converted into relative values as follows:

$$\text{Relative per capita cost of group A} = \frac{\text{Per capita annual cost of group A}}{\frac{\sum_{A} \text{Total annual cost of group A}}{\sum_{A} \sum_{i} \text{No. population in group A enrolled in facility } i}}$$

The total annual costs by loosely aggregated age/sex groups in rural Kazakhstan are shown in table 1.6.

Combine Groups to Create Age/Sex Adjustment Coefficients

The relative costs across loosely aggregated age/sex groups provide the starting point for developing the age/sex adjustment coefficients. These groups are aggregated into larger age/sex groups through a combination of science (constructing groups based on similar relative per capita costs) and art (policy considerations and the decisions about whether to fully make up for the cost differences through the payment system).

To identify groups with similar relative costs, statistical methods can be used, such as examining standard deviations if the health facility survey is based on a random sample; or a simpler method can be used, such as plotting the relative costs and visually identifying patterns. The latter method was used in Kazakhstan and Uzbekistan. Monitoring system stakeholder groups of health policy makers

TABLE 1.6 Per Capita Absolute and Relative Costs by Age/Sex Group in Rural Kazakhstan

	Male		*Female*	
Age group	*Absolute (tenge)*	*Relative*	*Absolute (tenge)*	*Relative*
0–12 months	299	5.8	221	4.2
1–4 years	44	0.8	65	1.2
5–9	30	0.6	35	0.7
10–14	40	0.8	51	1.0
15–19	36	0.7	37	0.7
20–24	17	0.3	49	0.9
25–29	22	0.4	83	1.6
30–34	25	0.5	100	1.9
35–39	19	0.4	69	1.3
40–44	32	0.5	95	1.8
45–49	24	0.4	85	1.6
50–54	20	0.4	99	1.9
55–59	24	0.5	61	1.2
60–64	59	1.1	69	1.3
65–69	42	0.8	50	1.0
70–74	114	2.2	30	0.6
75–79	74	1.4	126	2.4
80 and older	82	1.6	46	0.9
Total average	36	0.7	67	1.3
Average (male and female)			52	

Source: Authors.

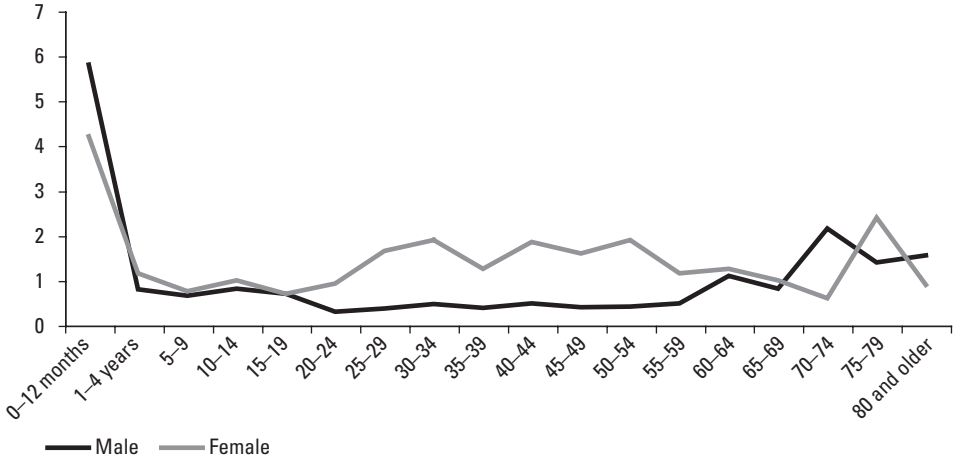
and PHC providers were assembled, who validated the results of the analysis and came to a consensus on patterns and appropriate age/sex groups based on plots of the data. The plots of relative costs by age and sex are presented in figure 1.4.

From these data, the stakeholder group in Semipalatinsk combined the age/sex groups in the following way:

- Male/female children 0–12 months
- Male/female children 1–19 years
- Male adults 20–59 years
- Female adults 20–59 years
- Male/female adults 60 years and over.

The stakeholder group then made adjustments to the groups and the weight coefficients to introduce several policy objectives. It decided that the observed cost variations did not reflect actual variation in the population's PHC needs in

FIGURE 1.4 Relative Costs of PHC Services by Age/Sex Group in Rural Kazakhstan



Source: Authors.

several instances, and that the age/sex adjustment coefficients should be used to drive a shift in some utilization patterns. For example, the coefficient for children 0–12 months was adjusted downward, to create an incentive for more efficient delivery of well-baby care in the first year of life, relying possibly less on home visits by physicians and more on nurses. In addition, the coefficient for adult men was adjusted upward to make the resources available to increase utilization by adult men, particularly for management of chronic conditions. The final set of age/sex adjustment coefficients that was adopted by the health purchaser in Kazakhstan is shown in table 1.7.

DEVELOPING AN ENROLLMENT DATABASE

A per capita payment system relies on individuals being enrolled (registered) with a single provider for a fixed period. The assignment of a fixed population to a provider is an advantage of this payment system, because PHC services can contribute most to improving the health of the communities they serve by being

TABLE 1.7 Final Age/Sex Adjustment Coefficients in Kazakhstan

	Relative average per capita resource consumption				
	Children <5	*Children 5–14*	*Women 15–49*	*Men 15–49*	*Adults>50*
Adjustment coefficient	3.0	0.8	1.3	0.8	1.2

Source: Former Semipalatinsk Mandatory Health Insurance Fund.

organized around defined populations rather than serving only those individuals who actively seek care (Ministry of Health of New Zealand 2001). The number of individuals enrolled with each provider is one of the determinants of the total amount that a provider will be paid, and so the reliability of population enrollment estimates is critical for the acceptance and credibility of the payment system. Individuals can be enrolled with providers in one of two ways: administrative assignment or open enrollment (free choice), as discussed below.

For a per capita PHC payment system to achieve its full potential for creating new incentives and driving change in the relationships between health care providers and the population, individuals should have free choice of their PHC provider. If the provider payment system allows the money to follow the choice of patients, strong economic incentives are created for providers to change their behavior and to be more responsive to patients. A survey of the population in Estonia suggests that actively choosing a primary care physician is also one of the strongest predictors of higher patient satisfaction (Kalda, Pollust, and Lember 2003). Therefore, open enrollment should be the ultimate goal wherever possible, a fact that should be communicated from the launch of the new payment system, even if the population is administratively assigned initially. In some rural areas there may be no choice in effect, because the distance between providers is too great, and because open enrollment may not provide sufficient incentives for providers to be responsive to the population. Therefore, additional quality assurance measures may be necessary. Whether open enrollment is feasible immediately, depends on the capacity of the purchaser to assemble or collect disaggregated data on individuals.

Administrative Assignment

If only aggregate population data are available, the purchaser must set the criteria for assigning the population to PHC providers. For example, the purchaser may use geographic area (village, or streets/neighborhoods in urban areas), the number of the population per physician employed by the provider (such as 1,500 population per physician), or some combination of these criteria. The criteria and assignment process should be transparent, and a process for managing questions and complaints from providers should be established.

Aggregate census data

If only aggregate census data are available, the payment system will be the simplest, with no risk adjustment coefficients, and the enrollment database can be maintained in a spreadsheet managed by the purchaser, either computerized or on paper. A sample spreadsheet is shown in table 1.8.

Data aggregated by age/sex group

If data aggregated by age/sex group are available, the payment system can include age/sex risk adjustment coefficients, limited by the categories according

TABLE 1.8 Sample Spreadsheet for Enrollment Database Using Aggregate Census Data

PHC provider name	*Location/address*	*No. of physicians*	*No. of enrollees*
PHC clinic no. 1	Village X	3	5,500
PHC clinic no. 2	Village Y	3	3,800
PHC clinic no. 3	Street A, City B	4	5,600
PHC clinic no. 4	Street C, City B	6	9,100
PHC clinic no. 5	Street D, City E	7	10,700

Source: Authors.

to which the data are aggregated. The enrollment database can be maintained in a spreadsheet managed by the purchaser, either computerized or on paper. A sample spreadsheet is shown in table 1.9.

Provider register data on individuals

If data on individuals are available from provider registers, the database can include data aggregated by age/sex group that correspond to the groups used for age/sex risk adjustment coefficients. The enrollment database can be maintained in a spreadsheet managed by the purchaser, either computerized or on paper. (A sample spreadsheet is shown in table 1.9.)

Open Enrollment

Open enrollment allows individuals to choose their PHC provider and to be enrolled with that provider for a fixed period. A system is needed to carry out the open enrollment registration process and to establish, maintain, and update the individual enrollment database after each enrollment registration period. It may be necessary to establish a database of basic information on the entire population (such as through a census) prior to the open enrollment process to accurately develop the base per capita rate. The aim of this would be to ensure that everyone who is entitled to receive PHC services covered through the purchaser is accounted for and eventually enrolled with a provider, and to provide an overall check on the issue of duplicative enrollment with more than one provider.

In many countries, however, establishing the population database may be problematic. For example, if there is significant migration or large populations with undocumented addresses, locating and documenting the entire entitled population would require extensive resources. In addition, as was seen in Kazakhstan, government agencies and financing bodies may not accept population statistics that were not generated by an official government statistical agency.

The costs and barriers to establishing a population database prior to open enrollment should be weighed against the benefit of accounting for the entire entitled population. Alternative approaches include using the open enrollment

TABLE 1.9 Sample Spreadsheet for Enrollment Database Using Data Aggregated by Age/Sex Group

PHC provider name	*Location/ address*	*No. of physicians*	*Total*	*No. of enrollees*							
				M	*F*	*M*	*F*	*M*	*F*	*M*	*F*
				<5		*5–19*		*20–55*		*>55*	
PHC clinic no. 1	Village X	3	5,500	160	179	411	380	1,681	1,750	342	597
PHC clinic no. 2	Village Y	3	3,800	123	132	225	212	1,245	1,340	234	289
PHC clinic no. 3	Street A, City B	4	5,600	172	164	356	344	1,782	1,867	402	513
PHC clinic no. 4	Street C, City B	6	9,100	267	279	503	519	2,884	3,241	643	764
PHC clinic no. 5	Street D, City E	7	10,700	412	422	714	728	3,114	3,456	886	968

Source: Authors.

process itself to establish the enrollment database; using existing population registers, such as PHC patient lists, as a starting point and verifying the registers through spot-checks; or advertising the benefits of registering for PHC benefits and encouraging the population to come forward and register. The Ministry of Health of New Zealand adopted the strategy of enrolling individuals in newly formed primary health organizations using existing patient lists of individuals who normally attended a PHC practice or clinic, with the goal of encouraging active voluntary enrollment over two years (Ministry of Health of New Zealand 2001).

Open enrollment process

The open enrollment process has three basic steps: information campaign, open enrollment registration period, and data entry and verification.

Information campaign. The information campaign is necessary to inform the population about the opportunity to choose their PHC provider (box 1.3); the mechanics of enrollment; and the regulations, including how, when, and where to enroll. The length of time before the next enrollment registration period should be established and communicated during the information campaign, as well as any process for changing PHC provider before the end of the enrollment period due to legitimate complaint.

The information campaign should also be accompanied by information on the PHC providers, including location, staff qualifications, and hours of operation, which may be distributed either by the purchaser or by the providers themselves. The first information campaign may last two to four months and involve a variety of media and events—such as radio and newspaper advertisements, posters, health fairs, and community meetings—to reach as much of the population as possible. Over time as the population becomes accustomed to the open enrollment process, the length and intensity of the information campaigns can be decreased.

Open enrollment registration period. The open enrollment registration period is the fixed time during which individuals can enroll with a PHC provider. Designated locations should be established where people can fill out enrollment forms; or, depending on the resources and infrastructure available, this may be done by mail or online. The open enrollment registration period should last about one or two weeks, depending on the size of the population and accessibil-

BOX 1.3 OPEN ENROLLMENT IN ZHEZKAZGAN, KAZAKHSTAN

In December 1997 the population of Zhezkazgan city, Kazakhstan was given the opportunity, for the first time, to choose a primary care provider. More than 75 percent of the population visited enrollment points throughout the city to enroll with the provider of their choice.

Source: ZdravPlus Program 2001.

ity of enrollment points. Special provisions should to be made to assist the elderly or disabled.

Data entry and verification. The data from the completed enrollment forms must be entered into the enrollment database on individuals. The elements of this database and the options for data entry and management are discussed in *Elements of an enrollment database on individuals* and *Data entry and management of enrollment database on individuals,* below.

Regulations

The transparency and organization of the open enrollment process are critical to its credibility. It is important for the purchaser to establish clear regulations (or policies) for the open enrollment process and communicate them to PHC providers and the population. Key areas are the following.

Length of enrollment period. Individuals and providers should know in advance for how long the enrollment decision will be binding. The enrollment period should be set so as to strike a balance between, on the one hand, offering individuals who are dissatisfied with their current provider the chance to change provider before too long, and, on the other, the need to maintain stability in the financing that individual providers receive and to create an incentive for providers to invest in the health and wellness of their enrolled populations. If the enrollment period is too short, providers will not necessarily benefit by providing more health promotion and disease prevention services.

Enrollees per provider. The purchaser may choose to establish criteria for setting a maximum or minimum number of enrollees per provider. Criteria may depend, for example, on the number of physicians employed by the provider or the population density. In Romania, a minimum enrollment of 500 is necessary to receive a contract to participate in the per capita payment system, because lower enrollment is viewed as an indicator of poor quality (Vladescu and Radulescu 2001). In Italy, a maximum of 1,500 enrollees per PHC physician is allowed (Greb, Delnoij, and Groenewegen 2006) to ensure that quality and access to services are maintained. The purchaser may also let providers themselves determine the maximum or minimum number of enrollees.

Whether the purchaser sets such limits depends on the main issues in the delivery system that are being addressed through the payment system, and thus the degree of competition and financial risk to which PHC providers will be exposed. For example, if access to PHC services is a concern, the financial risk faced by providers—if they do not enroll enough individuals or they enroll more than they can serve—can be limited through maximum enrollment regulations. But if quality and inefficiency are the main concerns, the purchaser may allow more financial risk and the survival or expansion of providers to be driven entirely by the enrollment decisions of the population. The purchaser should establish guidelines in advance on whether and how providers will be eliminated from the system if they do not attract enough enrollees (particularly in the case of public providers), on who will make the decision to eliminate them (the

purchaser or the provider), and on how access to PHC services will be protected as lower-quality providers exit the system.

Assignment to providers of unenrolled individuals. If individuals do not enroll with a PHC provider, a process must be developed to place them. This may take into consideration the distance between the individual's residence and PHC providers, the number of enrollees allowed per provider or per physician, and other criteria identified by the purchaser.

Process for changing provider before end of enrollment period. The purchaser should specify whether individuals will be permitted to change providers before the enrollment period ends, under what conditions, and the process required.

Timing of open enrollment and updating of provider per capita budgets. The purchaser should clearly specify both the timing between open enrollment and the announcement and approval of results, and the time lag between when the results of enrollment become official and when provider budgets will be updated to reflect the movement of the population, which may have to be tied to public budget cycles. The commitment of the purchaser to meeting the timeline is critical for the credibility of the results, and the timing should be planned with adequate contingency time for resolving any issues or errors in the enrollment process itself, disputes about results, or database-related technical issues.

Elements of an enrollment database on individuals

The enrollment database is the source of information on the population size and age/sex structure that will be used to calculate the base per capita rate. The database should be able to generate reports on these items and any other reports that may be needed to design or run the payment system. The information in the database should contain basic information on each individual entitled to be enrolled with a PHC provider, including name, identifying number (and the source, such as passport number, if it is not generated by the system), address, date of birth, sex, and any other information needed to operate the payment system. Unnecessary information should be excluded, particularly if it may compromise the individual's privacy. In order to track the movement of the population, each individual record may also continue the individual's enrollment history.

Data entry and management of enrollment database on individuals

The following paragraphs describe three options, which have different requirements for database software and data entry staff.

Central data entry and management. The enrollment forms collected during open enrollment are transferred to the purchaser for central data entry and management. There is only one database for individuals in the payment system, which ensures standardization of the data entry and analysis programs. The computer hardware and software capabilities, however, must be sufficient to handle such a large database. The database will need to be established in a pro-

gram such as Oracle, which is able to hold and manipulate a large number of observations. Data entry staff will need to be hired or assigned to data entry during each open enrollment registration period. Experience from several Central Asian countries suggests that each operator can enter 200–500 enrollment forms a day, which can serve as a basis for estimating resource requirements.

Provider data entry and central management of individual data. The enrollment forms collected during open enrollment are transferred to the providers in which each individual has enrolled. The financial managers or other office support staff of the PHC provider enter the data using data entry software, or standardized program specifications, supplied by the purchaser. The providers then transfer the individual data to the purchaser, where it is aggregated and managed. The computer hardware and software requirements of the purchaser are the same as in the first option, but the purchaser does not have to assign data entry staff in this case.

Provider data entry and central management of aggregate data. The enrollment forms collected during open enrollment are transferred to the providers in which each individual has enrolled. The financial managers or other office support staff of the PHC provider enter the data using data entry software, or standardized program specifications, supplied by the purchaser. The providers then transfer the aggregated data to the purchaser, where they are managed. The data must be aggregated by population groups that are used to construct any risk adjustment coefficients applied to the base per capita rate. The computer hardware and software requirements of the purchaser are less than in the first two options (a database program such as Microsoft Access or Foxpro will be sufficient), and the purchaser does not have to assign data entry staff. (See also the section, *Functions of Provider Systems,* in chapter 5.)

Specific Technical Issues

Three main technical issues may arise regarding the population enrollment database: unique identifiers, data verification, and data security.

Unique identifiers

Some type of unique identifier number is needed to distinguish records in the population database. The three main options are to:

- Use a national unique identifier number already in use for other programs or purposes
- Create a national number just for health programs
- Use some type of administratively or internally generated database number without national or health-related program relevance.

There are advantages and disadvantages to each. The first has the advantages of already being in use and tested and of allowing links or case management

across different types of programs. It has the disadvantages of, possibly, not automatically generating a number for the entire population and, possibly, raising privacy concerns. Numbers such as tax identification numbers, passport numbers, and pension or social security numbers are rarely given to the entire population, so adjustments in operating procedures would need to be made to use these numbers.

In most low- and middle-income countries, it is likely that the benefits of lower cost and ability to link programs, as seen in the first option, will override the disadvantages related to using an existing national number.

The second option offers the advantages that the program is not at the whim of arbitrary administrative and operating rules. It also ensures that the entire population is issued a unique identifier number. The disadvantages are not being able to establish links across different social programs, and the difficulty and cost of introducing and maintaining the number.

If using any kind of national unique identifier number is not feasible or the disadvantages are significant, the enrollment database can generate a number internally (the third option). This number is easy to generate, simple to use, and low cost but has the disadvantages of not being able to create links across different social programs and, possibly, not even being used for all health programs.

Data verification

Two major kinds of population database errors require monitoring by some type of data verification process. The first is human error in the data entry process. A range of standard data checks can be included to monitor these types of errors, for example, establishing possible ranges for birthdates.

The second is duplicate record entry. This can occur unintentionally, if individuals are constantly changing PHC providers and their old enrollments are not deleted in the process. It tends to happen more often when the per capita PHC payment system is maturing, because the operating rules are not yet solidified and all the providers have a tendency to enroll everyone. Duplicate record entry may also be intentional and can occur because providers are too responsive to the financial incentive to increase their enrolled population.

The level of data verification required for the database varies. If providers are responsible for data at the facility level and then submit them to the health purchaser, more extensive data verification at the latter level is needed than if the health purchaser is responsible for data entry. As with data verification for human error, standard checks for duplicate records can be programmed into the database, although no system is going to be foolproof or function 100 percent accurately. In general, the latest data entered are considered the valid record.

Data security

Data security and protecting population and patient privacy are important issues and should be prioritized in the development of a population enrollment data-

base. The type and level of security depend on the type of database. If it contains only general information that is available in other places, there are likely to be fewer issues than if it is directly linked to other health information systems or medical records. Addressing data security argues for a database program rather than just a worksheet format for the enrollment database. In a database program, the information is not readily accessible other than when it is being entered, and it is possible to set up a log file to monitor who is accessing the data.

CALCULATING EACH PROVIDER'S PER CAPITA BUDGET

When the elements of the PHC per capita payment system are constructed—the base per capita rate; population size, characteristics, and enrollment with providers; and adjustment coefficients—the per capita budget for each provider can be calculated. The formula is as follows:

$$\text{Per capita budget of facility } i = \sum_A \left[(\text{Adjustment coefficient for group A}) \times (\text{No. of enrollees in group A}) \times (\text{Base per capita rate})\right]$$

If there is a set of geographic coefficients, the formula is as follows:

$$\text{Per capita budget of facility } i = \sum_A \left[\begin{array}{l}(\text{Adjustment coefficient for group A}) \times (\text{No. of enrollees in group A}) \times \\ (\text{Base per capita rate}) \times (\text{Geographic coefficient g})\end{array}\right]$$

Adjustment coefficients serve to redistribute funds within the PHC pool, but they do not increase the amount of funds available. Therefore, if adjustment coefficients are used in the payment system and they are not completely normalized or calibrated to 1.0, the base per capita rate must be adjusted to maintain the budget neutrality of the system. The base per capita rate is calculated from the weighted average amount of funds per person available in the PHC pool, weighted by the age/sex composition of the population enrolled with each PHC provider.

$$\text{Adjusted BPCR}_R = \frac{\text{PHCP}_R}{\sum_A \sum_i \left[\left(\text{No. population}_{A,i}\right) \times \left(\text{Adjustment coefficient}_A\right)\right]}$$

where

Adjusted BPCR_R	=	adjusted base per capita rate in region R
PHCP_R	=	primary health care pool in region R
$\text{Population}_{A,i}$	=	population (number) in age/sex group A enrolled in provider i
Adjustment $\text{coefficient}_{A,}$	=	adjustment coefficient for age/sex group A

If geographic coefficients are used in the per capita payment system, they must also be used to adjust the base per capita rate. If only geographic adjustments are made, the base per capita rate is adjusted by dividing the PHC pool by the sum over PHC providers of the population enrolled with provider i multiplied by the geographic coefficient that applies to provider i:

$$\text{Adjusted BPCR}_R = \frac{\text{PHCP}_R}{\sum_i \left(\text{Population}_i\right) \times \left(\text{Geographic coefficient}_i\right)}$$

If the payment system uses both age/sex and geographic adjustors, the base rate must be adjusted as follows:

$$\text{Adjusted BPCR}_R = \frac{\text{PHCP}_R}{\sum_i \left[\sum_A \left[\left(\#\text{Population}_{A,i}\right) \times \left(\text{Adjustment coefficent}_A\right)\right] \times \text{Geographic adjustment coefficient}_i\right]}$$

An example of adjustment of the base per capita rate to maintain budget neutrality when using age/sex adjustment coefficients is shown in boxes 1.4 and 1.5. An example of adjustment of the base per capita rate to maintain budget neutrality when using both geographic and age/sex adjustment coefficients is shown in box 1.6.

DESIGNING A FINANCE AND MANAGEMENT SYSTEM

The financial incentives of a per capita payment system can bring about more responsive and efficient PHC service delivery, as providers participating in the per capita payment system attempt to attract more enrollees through higher-quality and more appropriate services; to improve the efficiency of their input and service mix in order to generate savings; and to reinvest the savings in service development to attract more enrollees. For this potential to be tapped, however, health providers need to combine their clinical functions with some features of entrepreneurship. To make the per capita payment system effective, it is critical that PHC providers not only have increased finance and management autonomy, but also that they have the capacity to operate as a business entity, rationally planning and using available resources to improve their services and attract enrollees.

This section describes the basic finance and management functions of PHC providers, as well as steps for capacity building and the development of supporting financial management and health information systems. It is not meant to provide a step-by-step guide for developing finance and management functions, as these guides are available elsewhere (see, for example, *The Health Manager's Toolkit* produced by Management Sciences for Health). It is intended, though, to

BOX 1.4 BUDGET OVERRUNS AND THE UNADJUSTED BASE PER CAPITA RATE

Suppose that the primary health care (PHC) pool is determined through a combination of bottom-up costing and top-down allocation to be $300,000 for the next year. There are three PHC providers in the payment system. The population structure is as follows:

	No. of enrollees					
PHC provider name	*Total*	*<5*	*5–19*	*Male 20–54*	*Female 20–54*	*>=55*
PHC clinic no. 1	5,500	339	791	1,681	1,750	939
PHC clinic no. 2	3,800	255	437	1,245	1,340	523
PHC clinic no. 3	5,600	336	700	1,782	1,867	915
Total	14,900	930	1,928	4,708	4,957	2,377

The age/sex adjustment coefficients are as follows:

Age/sex group	*Children <5*	*Children 5–19*	*Women 20–54*	*Men 20–54*	*Adults >=55*
Adjustment coefficient	3	0.8	1.3	0.8	1.2

The unadjusted base per capita rate is: $300,000/14,900 = $20. If the unadjusted rate is used to calculate health facility budgets, the total amount of payments the purchaser would have to make to providers is $347,906, or $47,906 greater than the amount in the PHC pool:

	Age/sex group					
PHC provider name	*<5*	*5–19*	*Female 20–54*	*Male 20–54*	*>=55*	*Total*
PHC clinic no. 1	(339) x (3) x ($20)	(791) x (0.8) x ($20)	(1,750) x (1.3) x ($20)	(1,681) x (0.8) x ($20)	(939) x (1.2) x ($20)	$127,928
PHC clinic no. 2	(255) x (3) x ($20)	(437) x (0.8) x ($20)	(1,340) x (1.3) x ($20)	(1,245) x (0.8) x ($20)	(523) x (1.2) x ($20)	$89,604
PHC clinic no. 3	(336) x (3) x ($20)	(700) x (0.8) x ($20)	(1,867) x (1.3) x ($20)	(1,782) x (0.8) x ($20)	(915) x (1.2) x ($20)	$130,374
Total	$55,800	$30,848	$128,882	$75,328	$57,048	$347,906

provide an overview of the development of finance and management capacity at the PHC level, with specific examples and illustrations taken from Uzbekistan and the Kyrgyz Republic, which have mature PHC financial management and health information systems.

Finance and Management Functions

As PHC providers take on more managerial independence and responsibility, they must perform a set of core finance and management functions: general management, financial management, information systems, and human resources.

BOX 1.5 BUDGET NEUTRALITY AND A PER CAPITA RATE ADJUSTED USING AGE/SEX ADJUSTORS

To adjust the base per capita rate to maintain budget neutrality when age/sex adjustors are used, the adjusted per capita rate is as follows:

Adjusted base per capita rate =

$$\frac{\$300{,}000}{\begin{array}{l}[(339)\times(3)+(255)\times(3)+(336)\times(3)]+[(791)\times(0.8)+(437)\times(0.8)+(700)\times(0.8)]+\\ [(1{,}750)\times(1.3)+(1{,}340)\times(1.3)+(1{,}867)\times(1.3)]+[(1{,}681)\times(0.8)+(1{,}245)\times(0.8)+(1{,}782)\times(0.8)]+\\ [(939)\times(1.2)+(523)\times(1.2)+(915)\times(1.2)]=17{,}395\end{array}}=\$17.25$$

The total payment to providers will be budget neutral:

	Age/sex group					
PHC provider name	*0–5*	*5–19*	*Female 20–54*	*Male 20–54*	*>=55*	*Total*
PHC clinic no. 1	(339) x (3) x ($17)	(791) x (0.8) x ($17)	(1,750) x (1.3) x ($17)	(1,681) x (0.8) x ($17)	(939) x (1.2) x ($17)	$110,312
PHC clinic no. 2	(255) x (3) x ($17)	(437) x (0.8) x ($17)	(1,340) x (1.3) x ($17)	(1,245) x (0.8) x ($17)	(523) x (1.2) x ($17)	$77,266
PHC clinic no. 3	(336) x (3) x ($17)	(700) x (0.8) x ($17)	(1,867) x (1.3) x ($17)	(1,782) x (0.8) x ($17)	(915) x (1.2) x ($17)	$112,422
Total	$48,116	$26,600	$111,135	$64,956	$49,193	$300,000

General management

The PHC provider must develop and implement internal systems, policies, and procedures, in order to ensure that its goals are met. It must also have a system for ensuring that it is compliant with all local laws and regulations, including taxes. Its general management function may also include a business plan, which is essentially a traditional private-sector tool that helps both identify the short-term objectives and tasks of an organization, and define, mobilize, and commit resources to the optimal fulfillment of these objectives and tasks. The business plan should emanate from a strategic plan (mission, vision, long-term goals, and of course actions) of the provider. Elements of the business plan should include projections of the size and demographic structure of the enrolled population, projected needs for specific health services, and optimal ways to address the projected health needs of that population.

Financial management

With greater financial autonomy, the PHC provider becomes responsible for planning and executing budgets, operating bank accounts, purchasing inputs, operating an accounting system, and preparing financial reports. It should have a system for analyzing its financial performance and for producing reports that

BOX 1.6 BUDGET NEUTRALITY AND A PER CAPITA RATE ADJUSTED USING BOTH GEOGRAPHIC AND AGE/SEX ADJUSTORS

Suppose the following geographic adjustment coefficients are added to the above payment system:

Geographic area	*Rural (villages)*	*Urban (cities)*
Adjustment coefficient	1.5	1.0

Suppose that PHC clinics nos. 1 and 2 are rural and PHC clinic no. 3 is urban.

To adjust the base per capita rate to maintain budget neutrality when age/sex adjustors are used, the adjusted per capita rate is as follows:

Adjusted base per capita rate=

$$\frac{\$300{,}000}{\begin{array}{l}[((339)\times(3)+(791)\times(0.8)+\ (1{,}750)\times(1.3)+(1{,}681)\times(0.8)+(939)\times(1.2))\times(1.5)]+\\ [((255)\times(3)+(437)\times(0.8)+(1{,}340)\times(1.3)+(1{,}245)\times(0.8)+(523)\times(1.2))\times(1.5)]+\\ [((336)\times(3)+(700)\times(0.8)+(1{,}867)\times(1.3)+(1{,}782)\times(0.8)+(915)\times(1.2))\times(1.0)]\\ =22{,}834\end{array}}=\$13.14$$

The total payment to providers will be budget neutral:

	Age/sex group					
PHC provider name	*0–5*	*5–19*	*Female 20–54*	*Male 20–54*	*>=55*	*Total*
PHC clinic no. 1	(339) x (3) x ($13.14) x (1.5)	(791) x (0.8) x ($13.14) x (1.5)	(1,750) x (1.3) x ($13.14) x (1.5)	(1,681) x (0.8) x ($13.14) x (1.5)	(939) x (1.2) x ($13.14) x (1.5)	$126,059
PHC clinic no. 2	(255) x (3) x ($13.14)	(437) x (0.8) x ($13.14)	(1,340) x (1.3) x ($13.14)	(1,245) x (0.8) x ($13.14)	(523) x (1.2) x ($13.14)	$88,295
PHC clinic no. 3	(336) x (3) x ($13.14)	(700) x (0.8) x ($13.14)	(1,867) x (1.3) x ($13.14)	(1,782) x (0.8) x ($13.14)	(915) x (1.2) x ($13.14)	$85,646
Total	$48,361	$26,717	$111,059	$64,860	$49,003	$300,000

can be used to improve its resource allocation and financial position. It needs a system to manage the procurement of supplies, including arranging storage, inventory, monitoring of appropriate use, and timely purchase of all clinical and non-clinical supplies.

Information systems

The provider will need to develop and operate internal information systems (computerized or paper) to monitor and manage financial and human resources and clinical/service delivery functions. Information systems may also be needed to assist in registering and reporting enrollees; tracking changes in the enrolled population due to birth, death, or migration; and meeting any other informa-

tion requirements of the per capita payment system. An important aspect of information system design is determining which subsets of data are reported to the purchaser or other health authority, and how they will be transferred. (Chapter 5 discusses health management information systems in detail.)

Human resources

Although this may be a longer-term goal in systems with publicly owned providers, a per capita payment system should be accompanied by decision rights for providers on staffing decisions. As this responsibility is transferred to providers, policies and systems are needed to support the development of staffing schedules and job descriptions, hiring/firing, maintaining personnel records, setting compensation/benefits, and managing employee benefits.

Experience from Central Asia shows that as the financial incentives of the per capita payment system mature, providers begin to advocate for more decision rights regarding their personnel and other input requirements. For example, although government control over labor supply in the health sector has been one of the most intractable barriers to reforming health systems in Central Asia, PHC providers in Uzbekistan have gained greater control over staffing decisions. The government staffing schedules now serve as maximum limits for PHC providers participating in financing reforms, and these providers now have the authority to hire (and fire) personnel, as long as they do not exceed the maximum staffing limits. The providers are still bound, however, by government labor codes and regulations on human resources management issues, including policies guiding hiring and firing and maternity leave.

Finance and Management Capacity Building

Developing the finance and management functions just listed and building capacity among PHC providers to carry out these functions effectively are key to developing PHC as a profession with a stake and say in the health system. Finance and management functions should be carried out by trained, dedicated professionals, rather than added to the clinical and leadership functions of medical personnel, who typically do not have the skills or the time for them. To build this capacity among providers, it may therefore be necessary to create a new position of finance (or practice) manager, and to develop a training program to prepare individuals for a new role as manager in a clinical setting.

New position of finance manager

To allow medical personnel to concentrate on clinical aspects of service delivery and to professionalize PHC providers as business organizations, a separation between the finance and management functions and the clinical functions is often beneficial. There is a strong justification to create a separate staff position of finance manager for the PHC providers to assist the clinical director to carry

out the new financial and general management functions. Where providers are small, it may be most cost effective to include only part-time positions or to share a position among several providers.

Finance managers in PHC providers may be a new type of position in the country and steps may be required to formalize this staff position, develop job descriptions and qualifications, and gain approval for government funds to finance this position. Practical experience from some countries has shown that there may be challenges to creating this position within public PHC providers, and a step-by-step approach may be needed to secure policy support and to overcome any legal changes.

For example, it took about five years for the rural per capita PHC reforms in Uzbekistan to resolve the issue of separation of management and clinical functions. In 2004 however, a Ministry of Health order, supported by other related ministries, delineated the status, academic and professional requirements, and role and responsibilities of PHC finance managers (Ministry of Health of Uzbekistan 2004). The order defined the status of PHC finance manager as equivalent to a deputy head of the PHC provider on financial and economic, organizational, and administrative matters. The finance manager works under the overall supervision of the clinical director of the PHC facility. In terms of academic and professional requirements, the finance manager should be a graduate from an institution of higher education or a specialized secondary school in accounting, economics, or finance, having successfully completed some advanced course in basic accounting, and financial and personnel management in health facilities, desirably with practical experience of working in the relevant field for at least three years.

Training of finance managers

Finance managers employed by a PHC provider will be required to apply aspects of the conventional finance, accounting, economic, and management concepts that are specific to nonprofit social sector organizations. Since finance and management of such organizations in general, and health management and health economics in particular, might not be an integral part of the traditional business and economics curricula in many low- or middle-income countries, some introductory training of PHC finance managers is almost certainly to be required. The content of the training programs should be country specific, depending on the exact job description of the PHC finance managers and the particular laws and regulations governing PHC financing in the country.

Introductory training programs for PHC finance managers should include brief modules on topics such as an overview of the key features of the health sector and health reform program in the country; basics of health management; health financing, including provider payment systems; strategic and business planning of PHC providers; budget formation procedures; bookkeeping and accounting systems; analysis of PHC activities and performance; financial analy-

sis; personnel management; and health information systems (box 1.7). The duration of training will largely depend on the responsibilities as well as skills and experience of the finance managers recruited, but a significant investment of time and resources to develop and carry out the training (both start-up and ongoing) should be planned.

BOX 1.7 INTRODUCTORY TRAINING FOR FINANCE MANAGERS IN UZBEKISTAN

In Uzbekistan, introductory training for primary health care (PHC) finance managers ranged from three to six weeks. Two levels of training were developed to meet the needs of new hires with differing levels of past practical experience working in health or any social sector organizations (box table): a 144-hour program for those with very little or no such experience (type 1), and a 72-hour program for those with some experience (type 2).

BOX TABLE Training Program for PHC Finance Managers

Number	*Topic title*	*Duration (academic/ clock hours) Type 1*	*Type 2*
Module 1	**Health care sector and health reforms**		
1.1	Key features of the health sector and dynamics of health system development	2	1
1.2	Basic reform program and strategies in Uzbekistan	2	1
Module 2	**Health management**		
2.1	Introduction to health management	2	1
2.2	Structure of the organizational management of PHC facilities	4	2
Module 3	**Financing and provider payment systems in health care**		
3.1	Health financing systems	4	2
3.2	Per capita financing system for PHC facilities	2	1
3.3	Compensation package for labor and manpower in the PHC sector	2	1
Module 4	**Planning of PHC activities**		
4.1	Strategic planning	4	2
4.2	Business planning	6	3
Module 5	**Budget formation in PHC facilities**		
5.1	Developing the planned expenditure estimates	8	4
5.2	Practical exercise on budget formation	4	2
Module 6	**Bookkeeping and accounting in PHC facilities**		
6.1	Objectives and content of accounting in budgetary organizations	6	3
6.2	Record-keeping for business transactions and their entry in accounting reports according to approved national procedures	4	2
6.3	Accounting of funding in budget organizations	2	1
6.4	Cash transactions	2	1
6.5	Payroll accounting	6	3
6.6	Accounting of payments for debtors and creditors	6	3

BOX 1.7 (CONTINUED)

Number	*Topic titles*	*Duration (academic/ clock hours) Type 1*	*Type 2*
6.7	Inventory of assets and liabilities	6	3
6.8	Procedures for leasing and writing off fixed assets	6	3
6.9	Financial reporting in budgetary organizations	6	3
6.10	Practical exercise on accounting in PHC facilities	8	4
Module 7	**Performance analysis of PHC facilities**		
7.1	Study and analysis of the composition and structure of enrolled/ serving population	4	2
7.2	Study and analysis of main performance indicators	4	2
7.3	Quantitative and qualitative study and analysis of clinical services and performance	4	2
Module 8	**Financial analysis of PHC facilities**		
8.1	Theoretical aspects of financial analysis	4	2
8.2	Practical exercise on financial analysis	4	2
Module 9	**Personnel management in PHC facilities**		
9.1	Introduction to personnel management	4	2
9.2	Laws and regulatory documents/normative acts on personnel	6	3
9.3	Main aspects of the personnel management process	4	2
9.4	Staff motivation: Interaction between managers and personnel	4	2
9.5	Analysis of human resources	4	2
9.6	Records keeping and management in PHC facilities		
	Filing of administrative (managerial/executive) documents	6	3
Module 10	**Basics of health statistics and informatics**		
10.1	Information systems in health care and family medicine		
	Key terminologies/definitions and indicators of health statistics	2	1
10.2	Flow of clinical documents and information in PHC facilities	2	1
	Total	**144**	**72**

Note: Approved by the Ministry of Health of Uzbekistan, Order No. 498, October 10, 2005, Attachment 2.

Undergraduate medical education curricula in most developing and transitional countries rarely include modules on health management and economics. Because it is important that the clinical directors and staff of PHC providers operating under a per capita payment system also know basic health finance and management, a brief (three- or four-day) training program should also be conducted for them (box 1.8).

While some external technical assistance could be needed initially to develop the country-specific training programs and materials and conduct the above training courses, this work ultimately needs to be institutionalized in appropriate local education institutions. In Uzbekistan, for example, the technical assis-

BOX 1.8 BASIC HEALTH MANAGEMENT FOR GENERAL PRACTITIONERS IN UZBEKISTAN

Uzbekistan introduced a 24-hour training module on basic health management in the 10-month general practitioner retraining course. This module covers: key features of the health sector, including finance and management reforms of the health facilities (three hours); basics of health management (five hours); strategic and business planning and budget formation procedures (eight hours); analysis of clinical and financial performance of health providers (four hours); and personnel management (four hours).

tance to design, develop, and run finance and management training programs included training-of-trainers courses to help develop a critical mass of local trainers-of-trainers from national medical and economic education institutions and general practitioner training centers, which now have full responsibility for these training programs.

Financial Management Information Systems

To systematize new finance and management functions of PHC providers, supporting manuals on policies and procedures as well as computerized financial management systems may be useful. In Uzbekistan for instance, practical manuals were developed to assist autonomous PHC providers in organization and management, strategic and business planning, budgeting, accounting, personnel management, health management information systems, and the relevant regulatory and policy areas.

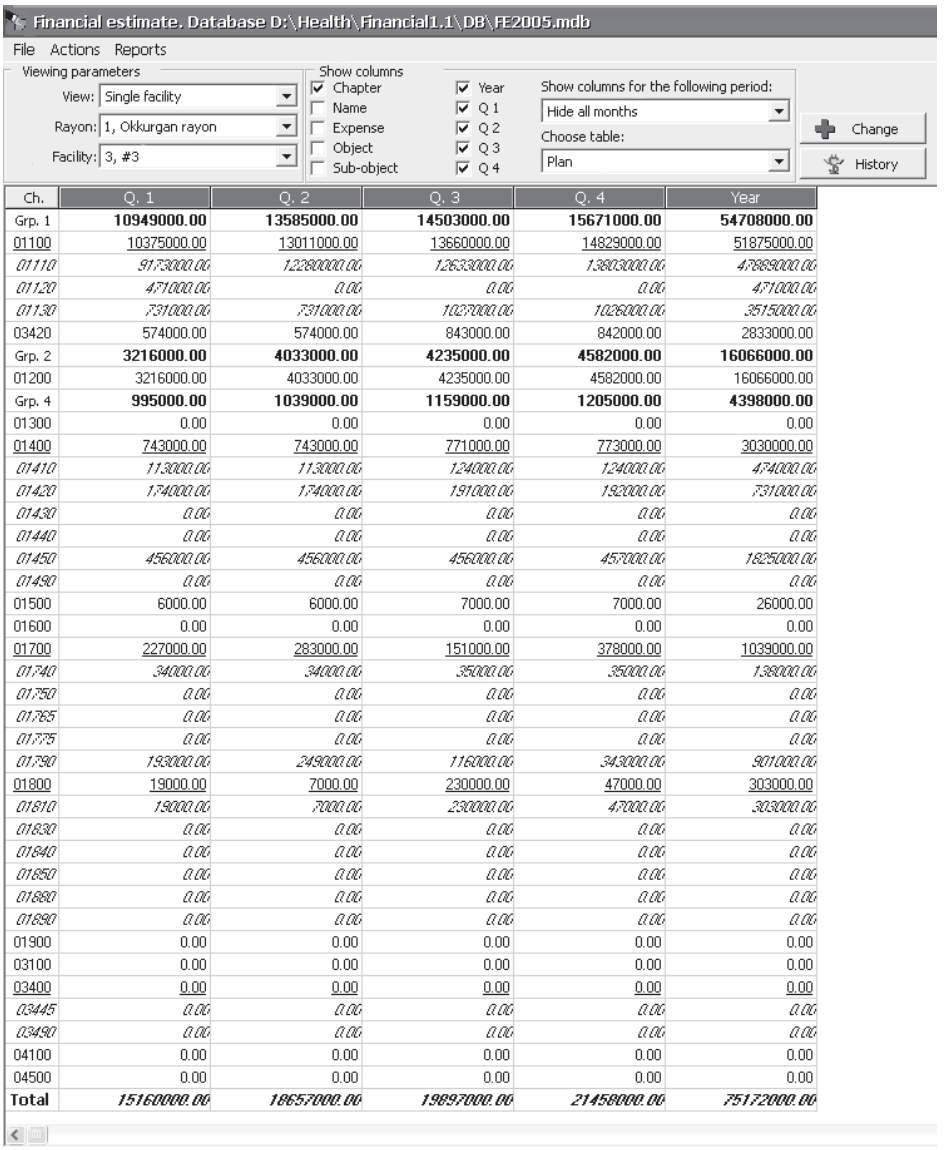
If providers have computers, simple, specialized programs may be designed to help them carry out their budgeting and accounting functions. Alternatively, a centralized financial management program may be maintained at the regional health department, which aggregates the information from paper systems submitted by providers and provides them with an analytical report. This is the approach that has been adopted in Uzbekistan.

In Uzbekistan financial management information system (FMIS) software has been developed for entry, storage, and processing of data on financial resources consumed by the PHC providers that are financed from the local government budget through a per capita payment system. The system supports data storage at the regional and district (*rayon*) levels. The main format is presented as a line item–based financial spreadsheet with information on budget and expenditures disaggregated by PHC provider. It is also possible to obtain aggregated information on individual districts, as well as on the whole region. The software enables processing of aggregated and disaggregated data on the estimates for planned expenditures, requests for financing to the regional finance department, approval and disbursement of funds, and accounting of cash and actual expenses. The FMIS software can also print payment orders, track the changes

made to any financial data, process financial requests on standard forms, and produce reports in standard formats. While the FMIS is now installed at the regional health department, as computers become available to PHC providers this software can be adapted for individual providers.

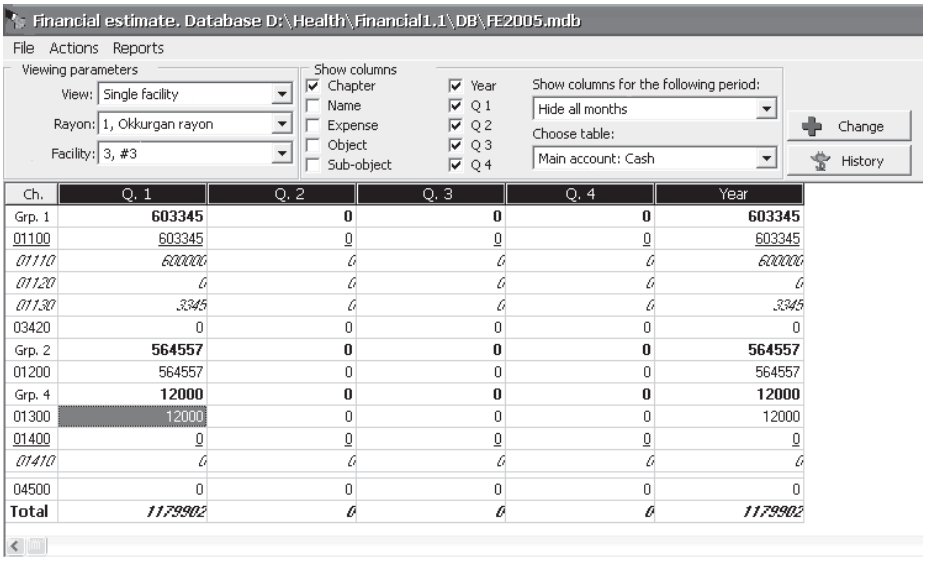
Selected screenshots from the Uzbekistan FMIS on the PHC provider budget (screenshot 1.1) and accounting transactions (screenshots 1.2 and 1.3) generated by the FMIS program are presented below.

SCREENSHOT 1.1 PHC Provider Budget



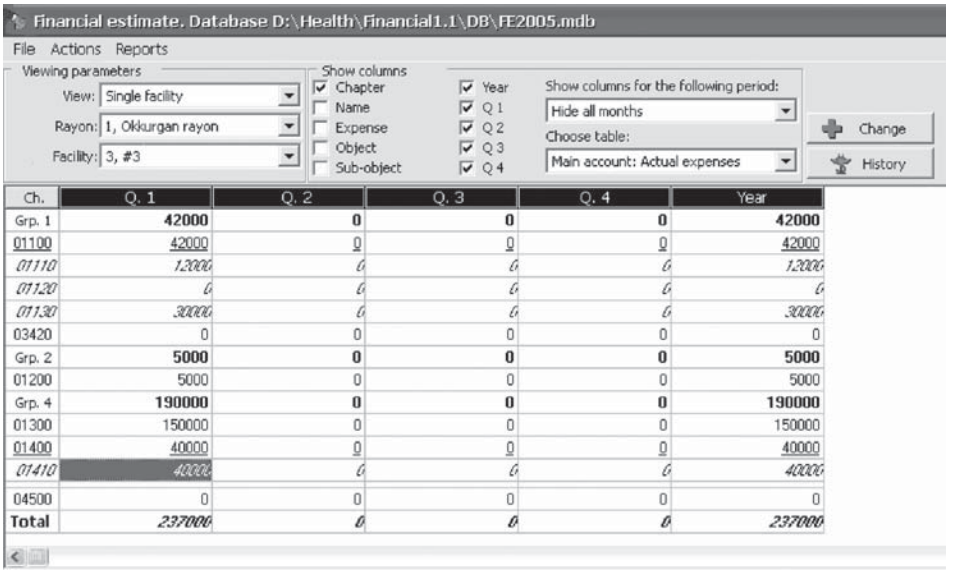
Ch.	Q. 1	Q. 2	Q. 3	Q. 4	Year
Grp. 1	**10949000.00**	**13585000.00**	**14503000.00**	**15671000.00**	**54708000.00**
01100	10375000.00	13011000.00	13660000.00	14829000.00	51875000.00
01110	*9173000.00*	*12280000.00*	*12633000.00*	*13803000.00*	*47889000.00*
01120	*471000.00*	*0.00*	*0.00*	*0.00*	*471000.00*
01130	*731000.00*	*731000.00*	*1027000.00*	*1026000.00*	*3515000.00*
03420	574000.00	574000.00	843000.00	842000.00	2833000.00
Grp. 2	**3216000.00**	**4033000.00**	**4235000.00**	**4582000.00**	**16066000.00**
01200	3216000.00	4033000.00	4235000.00	4582000.00	16066000.00
Grp. 4	**995000.00**	**1039000.00**	**1159000.00**	**1205000.00**	**4398000.00**
01300	0.00	0.00	0.00	0.00	0.00
01400	743000.00	743000.00	771000.00	773000.00	3030000.00
01410	*113000.00*	*113000.00*	*124000.00*	*124000.00*	*474000.00*
01420	*174000.00*	*174000.00*	*191000.00*	*192000.00*	*731000.00*
01430	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
01440	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
01450	*456000.00*	*456000.00*	*456000.00*	*457000.00*	*1825000.00*
01490	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
01500	6000.00	6000.00	7000.00	7000.00	26000.00
01600	0.00	0.00	0.00	0.00	0.00
01700	227000.00	283000.00	151000.00	378000.00	1039000.00
01740	*34000.00*	*34000.00*	*35000.00*	*35000.00*	*138000.00*
01750	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
01765	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
01775	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
01790	*193000.00*	*249000.00*	*116000.00*	*343000.00*	*901000.00*
01800	19000.00	7000.00	230000.00	47000.00	303000.00
01810	*19000.00*	*7000.00*	*230000.00*	*47000.00*	*303000.00*
01830	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
01840	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
01850	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
01880	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
01890	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
01900	0.00	0.00	0.00	0.00	0.00
03100	0.00	0.00	0.00	0.00	0.00
03400	0.00	0.00	0.00	0.00	0.00
03445	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
03490	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
04100	0.00	0.00	0.00	0.00	0.00
04500	0.00	0.00	0.00	0.00	0.00
Total	***15160000.00***	***18657000.00***	***19897000.00***	***21458000.00***	***75172000.00***

SCREENSHOT 1.2 PHC Provider Cash Expenses



Ch.	Q. 1	Q. 2	Q. 3	Q. 4	Year
Grp. 1	**603345**	**0**	**0**	**0**	**603345**
01100	603345	0	0	0	603345
01110	*600000*	*0*	*0*	*0*	*600000*
01120	*0*	*0*	*0*	*0*	*0*
01130	*3345*	*0*	*0*	*0*	*3345*
03420	0	0	0	0	0
Grp. 2	**564557**	**0**	**0**	**0**	**564557**
01200	564557	0	0	0	564557
Grp. 4	**12000**	**0**	**0**	**0**	**12000**
01300	12000	0	0	0	12000
01400	0	0	0	0	0
01410	*0*	*0*	*0*	*0*	*0*
04500	0	0	0	0	0
Total	***1179902***	***0***	***0***	***0***	***1179902***

SCREENSHOT 1.3 PHC Provider Actual Expenses



Ch.	Q. 1	Q. 2	Q. 3	Q. 4	Year
Grp. 1	**42000**	**0**	**0**	**0**	**42000**
01100	42000	0	0	0	42000
01110	*12000*	*0*	*0*	*0*	*12000*
01120	*0*	*0*	*0*	*0*	*0*
01130	*30000*	*0*	*0*	*0*	*30000*
03420	0	0	0	0	0
Grp. 2	**5000**	**0**	**0**	**0**	**5000**
01200	5000	0	0	0	5000
Grp. 4	**190000**	**0**	**0**	**0**	**190000**
01300	150000	0	0	0	150000
01400	40000	0	0	0	40000
01410	*40000*	*0*	*0*	*0*	*40000*
04500	0	0	0	0	0
Total	***237000***	***0***	***0***	***0***	***237000***

Once the planned PHC provider budgets, data on volume of financing, and cash and actual expense transactions have been entered, the FMIS can generate standard exit tables on detailed financial reporting.

Health Information Systems

In addition to general and financial management systems, to develop as business entities PHC providers require a health information system (HIS). (See chapter 5 for a full discussion of this topic.) Most countries have national health statistics systems, and providers' HISs need to submit information to them. In addition, PHC providers may want expanded or enhanced HISs to improve internal management. Internal (facility-level) quality improvement processes depend on HISs to generate data for analysis; for example, the PHC monitoring system discussed in the section, *Designing a Monitoring and Quality Assurance System,* below, depends on a provider HIS.

Unlike some other types of provider payment systems with a direct relationship between receiving payment and submitting billing or clinical information, an indirect relationship exists between the per capita PHC payment system and health information. While submission of population enrollment data is required to receive payment, submission of health information is not, although the health purchaser may request it. Health purchasers worldwide are, increasingly, wrestling with the problem of how to determine rates for provider payment and how to assess provider performance, as they are receiving less information from health providers under per capita payment systems. Determining what health information to require from PHC providers is a policy decision that needs to be made before the introduction of a per capita PHC payment system, and the information required may increase or decrease over time depending on the capacity of the system.

PHC HISs have three main options in an information technology sense: a completely manual system, a partially automated system compiling aggregated data, and a fully automated system compiling disaggregated per visit information.

Completely manual system

Both visit information and summary reports are prepared manually in this option. The systems and processes for collecting and recording data vary. The countries of Central Asia tended to use journals to record information manually, then manually summarize the information from them to prepare national health statistics reports.

Partially automated system

This option could use the same manual, visit-entry system as the previous system but may add an automated element to compile aggregated information and prepare summary reports and allow for some automated comparison and analysis of data. This automated element was added to the Kyrgyz Republic's health

statistics system to improve overall reporting during the step-by-step transition to a fully automated system (box 1.9).

Fully automated system

This can be directly linked to the population enrollment database. If it is, personal information does not need to be reentered on each visit. On the basis of

BOX 1.9 ISSUES AND SOLUTIONS IN A FULLY AUTOMATED SYSTEM IN THE KYRGYZ REPUBLIC

The Kyrgyz Republic started implementation of a fully automated per visit health information system (HIS) in the Issyk-Kul *oblast* (region) pilot health reform site in 1995. While having accomplished the objective of enabling newly formed family group practices to function more independently as business entities, the new approach also exposed issues in primary health care (PHC) provider-level HISs that may be found in other low- and middle-income countries. Specific issues included:

- *Infrastructure.* Perhaps the most troubling issue was insufficient infrastructure, including intermittent electricity supplies, which hampered operations of automated HISs
- *Volume.* The volume of PHC visits and laboratory and other diagnostic tests was enormous and data entry requirements tended to overwhelm staff
- *Cost per transaction.* Even given the improvements in operating efficiency and contributions to quality improvement, the extremely low budgets in PHC were generally unable to sustain extensive HISs.

The Kyrgyz Republic addressed these issues by moving forward practically and step by step, building capacity over time, trying to keep the system relatively simple, and integrating all information collection into one system structure and flow of information. Gradual improvements in information technology, decreases in transaction costs, and increases in information technology availability have the system on a path to national implementation. Today, the Kyrgyz Republic has a much improved overall HIS with hospital submission of clinical and billing information completely automated, and the transition to full automation for PHC providers is proceeding as planned.

It is possible that Central Asia (or the former Soviet Union more widely) is a unique environment related to HISs for PHC providers. The health system reforms are not building completely new systems. The former Soviet Union information infrastructure was very large, and the current reforms and improvements are increasing the efficiency and effectiveness of an asset of the old system. In addition, attempting to increase efficiency was an appropriate intervention in an environment where the health budget had collapsed but system structure and education levels remained very high.

queries or requests, the database can generate many different types of reports for many different purposes, including standard automated reports for submission to national health statistics authorities, standard internal management or performance reports, and individualized reports tied to specific quality improvement processes.

DESIGNING A MONITORING AND QUALITY ASSURANCE SYSTEM

Per capita payment for PHC potentially creates strong financial incentives for reducing the inputs to provide PHC services, which may have the positive effect of shifting services toward less expensive health promotion and disease prevention, or the negative effect of reducing the quantity and quality of necessary care. Checks and balances are needed in the system to ensure that resources are devoted to maintaining quality and access to necessary services. In countries where the organization of the medical profession is mature, professional self-regulation and clinical practice guidelines provide the mechanisms to keep pressure on quality standards.

Several approaches can be used to monitor the performance of health care providers, both externally and internally (Contencin, Falcoff, and Doumenc 2006), including clinical practice audits (review of provider records to assess performance against set objectives), peer review groups (practitioners meet to review their records and performance in a dynamic exchange), and practice visits (peers or trained assistants analyze data collected during a visit to the practice according to a structured protocol). The drawbacks are that these methods are highly resource intensive, require clinical practice to be grounded in evidence-based medicine, and rely on well-developed medical professional organizations. Many low- and middle-income countries, however, are still in the process of integrating evidence-based clinical practice into PHC and of developing a self-regulatory role for medical professional organizations.

If individuals choose their PHC provider through open enrollment, and "money follows the patient," competition between providers to attract more enrollees creates a financial incentive to be responsive to patients, which can also counter the negative incentive to reduce inputs and services. For several reasons, however, open enrollment may be an insufficient counterweight.

First, it may take time for the new PHC open enrollment system to create real pressure on providers' performance and for providers to become more responsive to their patients. Second, patients may not be perfect judges of the quality of care (Rao et al. 2006), and providers may make only those changes that are observable to them, such as those touching on staff behavior, hours of operation, or the physical space of the facility, but still reduce other inputs that affect the clinical quality of care. Finally, in some geographic areas with low population density or where it is difficult to attract providers, competition may be too weak to create effective choice. For all these reasons, the purchaser may often

have to establish a simple performance indicator-based system to monitor the effects of the financial incentives in the new per capita payment system on the quality and outcomes of PHC services.

Such systems should be distinguished from (but they may be related to) providers' own internal quality improvement activities and from licensing and accreditation activities. PHC monitoring systems may be developed and implemented by the purchaser alone; developed and implemented jointly by the purchaser and provider, as in Kazakhstan (Cashin et al. 2001); or the purchaser may set a broad framework and delegate responsibility to the providers as part of clinical governance and self-regulation, as in the United Kingdom's National Health Service (McColl et al. 2000; NHS Executive 1999). Of course, responsibility for managing the monitoring system may well be transferred as the organization of the medical profession matures and there is a shift toward self-regulation.

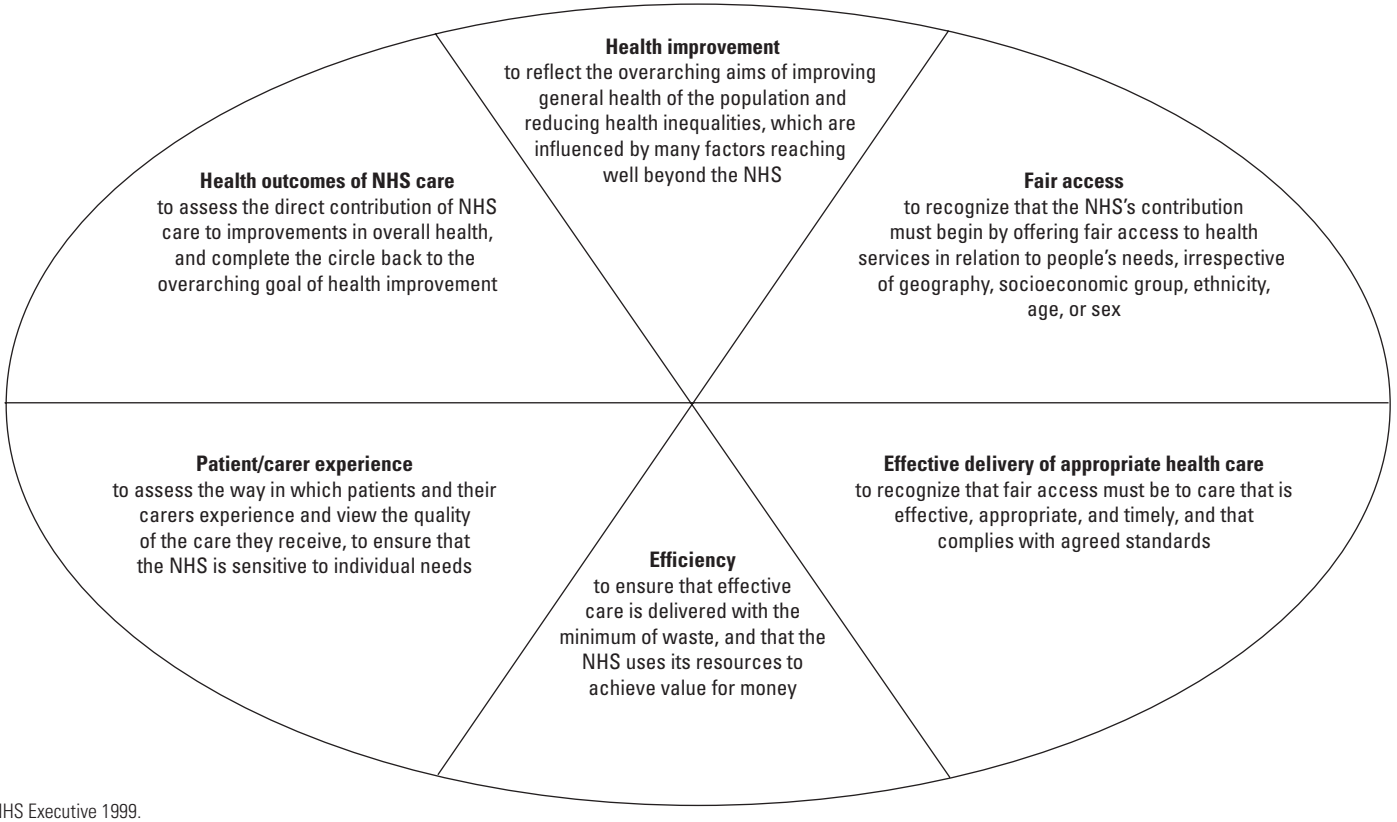
Whether the responsibility for managing the monitoring system remains with the purchaser or is delegated to providers, stakeholder involvement is important in the design and implementation of the PHC monitoring system in order to secure consensus on goals, appropriate progress indicators, and realistic expectations about performance and results. In Kazakhstan, for example, the design and implementation of the system have involved a wide range of health policy makers and providers, both within and outside the primary care sector. Encouraging participation and consensus has led a process for evolution of the monitoring system, which has stabilized into a valid and accepted system of performance assessment.

A monitoring system has four main elements: performance framework; performance indicators; data collection, and analysis and interpretation; and consequences (which should lead to change at the provider and health system levels). These are now discussed.

Performance Framework

The purchaser's monitoring and quality assurance system should be based on an appropriate performance framework, which is linked to overall health system performance and which is relevant to the current capacity of the primary care sector. In the United Kingdom, the National Health Service has established a national performance assessment framework with high-level indicators to monitor overall system performance (figure 1.5). The implementation and refinement of the framework, including lower-level indicator development and interpretation, are carried out jointly by the local health authorities and health care providers in each part of the system (Department of Health of the United Kingdom 2004; NHS Executive 1999). The 2005–2008 iteration of the framework focuses more on establishing broad principles for performance within which local provider organizations and other partner organizations can define their local needs and priorities and set local plans and performance targets (Department of Health of the United Kingdom 2004).

FIGURE 1.5 Initial National Health Service Performance Assessment Framework in the United Kingdom



Source: NHS Executive 1999.
NHS = national health service.

Performance Indicators

Indicators should satisfy several criteria to be considered good measures (Weiss 1998). They should be *valid* (that is, the indicator should measure what it is intended to measure) and *specific* (which here means that changes are *attributable* to provider performance). They should also be *sensitive* to real underlying differences in performance over time or across individual providers. For PHC, these criteria imply that the indicators should focus on a balance between measuring process (which is directly under the control of PHC providers) and outcomes (which are of ultimate interest to the purchaser but may be influenced by other factors beyond the control of PHC providers). Indicators that are oriented toward outcomes but that are also sensitive to the process of PHC service delivery tend to be the most acceptable to both the purchaser and providers. For example, hospitalization rates for conditions that should be managed at the primary care level ("primary care-sensitive conditions"), such as asthma, hypertension, and diabetes, have been found to be sensitive measures of PHC performance, embodying both process and outcomes (Caminal et al. 2004).

Indicators should also be *accessible,* that is, they should be based on data that are both readily available (or can easily be collected) and that can assure a reasonable degree of quality. They should also be *reliable,* in that repeated attempts to measure them should produce close to the same value. They should have, as well, a desired *direction* of movement.

Other points include the *timeframe* over which changes can be expected in the indicator, while the *incentives* that may be created by the indicator (or its method of interpretation) should also be considered. For example, indicators that are focused on a certain set of activities or services may create an incentive for providers to give priority to those. Furthermore, if targets are specified for certain indicators, providers may have an incentive to aim for or report the target, and the indicator loses its power as a monitoring tool.

The *number of indicators* in the monitoring system should be sufficient to give an accurate picture of provider and system performance without creating an excessive burden for the purchaser and providers. Between 10 and 25 indicators has been found to be the appropriate balance in a range of contexts (Perera et al. 2007; McColl et al. 2000; Cashin et al. 2001). More than 25 indicators can be onerous for providers and the purchaser, and timely reporting, analysis, and interpretation may be difficult to achieve in that case unless excessive resources are devoted to the system. In addition, it may be difficult to identify more than 25 indicators that are accessible and that meet the other criteria listed above (McColl et al. 2000; Cashin et al. 2001). Conversely, fewer than 10 indicators may raise concerns among providers that their performance is not subject to accurate monitoring.

It may be useful to have a relatively large number of indicators early in the development of the monitoring system; these can be streamlined over time as

some indicators prove to be more sensitive or useful than others. In the Karaganda region of Kazakhstan, for example, the rate of inappropriate ambulance calls (defined as those calls during PHC operating hours that did not result in hospitalization) was found, early in the process of primary care reform, to be quite sensitive to provider performance and to embody information about access to PHC services, quality of care, and efficiency. This allowed the monitoring system stakeholder group (comprising a wide range of representatives from the regional health department and health care providers from all levels of the system responsible for designing and implementing the monitoring system) to eliminate several other, less sensitive, indicators (Cashin et al. 2001).

The indicators themselves may well change over time as both the monitoring system and the PHC sector itself develop. New Zealand, for example, adopted a staged approach to implementing PHC performance assessment. Primary health organizations that met certain prerequisites, which included a set of eight clinical indicators together with some process and financial indicators, were invited to participate in the first phase.

Generally, as both the system and sector mature, indicators evolve to capture other aspects of PHC, such as prevention and treatment of chronic conditions (Perera et al. 2007). Sample PHC monitoring indicators that reflect a variety of stages of system and sector development are presented in table 1.10: selected PHC performance indicators that were developed for the PHC monitoring system in Karaganda, Kazakhstan; clinical indicators from the first phase of the New Zealand primary care performance assessment initiative; and a set of indicators proposed for primary care groups in the U.K. National Health Service performance assessment framework. These sample indicators, besides showing different stages of development, mark a movement toward indicators that are grounded in evidence-based PHC practice (Perera et al. 2007; McColl et al. 1998).

Data Collection, and Analysis and Interpretation

Data collection

A system of data collection and reporting for the monitoring system needs to be developed. It should be transparent and should minimize the additional burden on providers and the purchaser. The lack of complete process and outcome data in PHC is often a barrier to developing valid and credible monitoring and quality assurance systems. The collection of detailed data is too burdensome for the PHC level in most systems, and these data may not be available even in the most mature systems (Baker 2000). The collection of encounter data, for example, is resource intensive, and since it is not linked to payment in a per capita payment system, there is no financial incentive to invest in the infrastructure for data entry and analysis. The PHC monitoring system should therefore rely on indicators that are easily generated by existing provider or purchaser information systems. Data

TABLE 1.10 Sample PHC Performance Indicators

Karaganda, Kazakhstan family group practices[1]		*New Zealand primary health organizations*[2]		*United Kingdom primary care groups*	
Indicator	*Measurement*	*Indicator*	*Measurement*	*Indicator*	*Measurement*
Expenditure patterns in PHC facilities	% expenditure on salaries, utilities, medicines and supplies, and other	Age-appropriate vaccinations for 2-year-olds	No. of enrolled children who have received full set of vaccinations/No. of enrolled children in 2-year-old cohort	Access to family planning services[3]	Conception rates age <16
Structure of PHC visits	No. of preventive visits, illness visits, and other visits/Total no. of PHC visits No. of PHC visits/Total population	Influenza immunizations in the elderly	No. of enrolled persons >=65 vaccinated during last influenza campaign/No. of enrolled persons >=65 at start of last influenza campaign	Access to cancer screening services[3]	% of target population screened for breast and cervical cancer
Hospitalization rate for primary care-sensitive diagnoses: bronchial asthma hypertension iron deficiency anemia ulcer acute respiratory infection (ARI) childhood diarrheal disease (CDD)	[No. of hospital cases for asthma/ Total population] x 1,000 No. of hospital cases for asthma/ Total no. of people on asthma register [No. of hospital cases for hypertension/Total adult population] x 1,000 No. of hospital cases for hypertension/Total no. of people on hypertension register [No. of hospital cases for anemia/ Total population] x 1,000 No. of hospital cases for anemia/ Total no. of people on anemia register [No. of hospital cases for ulcer/ Total adult population] x 1,000	Cervical cancer screening coverage	No. of enrolled women 20–69 who had cervical smear in last 3 years/No. of enrolled women 20–69, adjusted for expected hysterectomy	Hospitalization rates for "avoidable admissions" [3]	Age- and sex-standardized admission rates for severe ear, nose and throat infection, kidney or urinary tract infection, heart failure
		Breast cancer screening coverage	No. of enrolled women 50–64 who had mammogram in last 2 years/No. of enrolled women 50–64	Hospitalization rates for "conditions largely managed in PHC setting" [3]	Age- and sex-standardized admission rates for asthma, diabetes, and epilepsy
		Inhaled corticosteroids prescribing	Total beclomethasone equivalent doses of inhaled corticosteroids/ Total days	Volume of prescribing of benzodiazepines, and ratio of of antidepressants to benzodiazepines[3] Composite measure of prescribing of combination and modified release products plus "drugs of limited clinical value" and inhaled corticosteroids[3] % generic prescribing[3] Notification rates for pertussis and measles[3]	

	[No. of hospital cases for ARI/ Total population under 5] x 1,000 [No. of hospital cases for CDD/ Total population under 5] x 1,000	Investigation of thyroid function	No. of thyroid stimulating hormone tests/No. of free thyroxine tests	Emergency hospital admissions for people > age 75[3] Rates of emergency psychiatric readmission[3]	
		Measurement of the acute phase response	Total no. of erythrocyte sedimentation rate tests claimed/Total No. of C-reactive protein tests claimed	Aspirin therapy for high-risk patients[4]	% of population with a diagnosis of ischemic heart disease taking aspirin
Ambulance call rate	[Total no. of ambulance calls – deliveries – trauma]/Total population x 1,000 [No. of ambulance calls where individual was hospitalized/ Total no. of ambulance calls] x 100 [No. of ambulance calls between 8am and 2pm/ Total no. of ambulance calls] x 100 [No. of ambulance calls between 8am and 2pm where individual was not hospitalized/ Total no. of ambulance calls] x 100			Detection and control of hypertension[4]	% of population who have had their blood pressure recorded in the previous year (5 years) % of population with a diagnosis of hypertension whose most recent systolic blood pressure is <160mm Hg % of population with a diagnosis of hypertension whose most recent diastolic blood pressure is <90mm Hg % of population diagnosed with ischemic heart disease, ischemic stroke, or transient ischemic attacks who have had their blood pressure recorded in the previous year % of population diagnosed with diabetes mellitus whose most recent systolic blood pressure is <160mm Hg

(*Table continues on the following page.*)

TABLE 1.10 Sample PHC Performance Indicators (continued)

Karaganda, Kazakhstan family group practices[1]		*New Zealand primary health organizations*[2]		*United Kingdom primary care groups*	
Indicator	*Measurement*	*Indicator*	*Measurement*	*Indicator*	*Measurement*
					% of population diagnosed with diabetes mellitus whose most recent diastolic blood pressure is <90mm Hg
Infant and child mortality from ARI/CDD	[No. of deaths of children under 1 year of age from ARI and CDD/No. of live births] x 1,000 [No. of deaths of children between the ages of 1 and 5 from ARI and CDD/No. of children between 1 and 5] x 1,000 [No. of deaths of children under 1 year of age from ARI and CDD]/Total no. of deaths of children under 1 year of age [No. of deaths of children between the ages of 1 and 5 from ARI and CDD]/Total no. of deaths of children between 1 and 5				
Immunization coverage	No. of children immunized according to immunization plan/Total no. of children planned			Smoking cessation advice[4]	% of population who have their smoking status recorded % of population who are current smokers who received smoking cessation advice % of population with ischemic heart disease, ischemic stroke, or transient ischemic attacks who have their smoking status recorded

			% of population with ischemic heart disease, ischemic stroke, or transient ischemic attacks who are current smokers who received smoking cessation advice
Early prenatal care	No. of women beginning prenatal care in the first 12 weeks of pregnancy/Total number of births	Use of angiotensin converting enzyme inhibitors in those with heart failure[4]	% of population with heart failure who have a prescription for angiotensin converting enzyme inhibitors
		Lipid lowering drugs for patients with established cardiovascular disease[4]	% of those with a diagnosis of ischemic heart disease who have had a cholesterol measurement
			% of those with a diagnosis of ischemic heart disease with a raised cholesterol level who are prescribed lipid lowering drugs
		Warfarin for stroke prophylaxis in non-valvular atrial fibrillation[4]	% of general practice patients with diagnosis of non-valvular atrial fibrillation who have a prescription for anticoagulants
		Influenza vaccination in those over 65 years[4]	% of population age >65 who receive annual influenza vaccination

1. Approved by Karaganda Regional Health Department as reported in Cashin et al. (2001).
2. New Zealand Ministry of Health Phase 1 clinical indicators for monitoring the performance of primary health organizations as reported in Perera et al. (2007).
3. Recommended by McColl et al. (1998).
4. United Kingdom National Health Service Executive as reported in McColl et al. (1998).

generated by non-PHC information systems, such as hospitalization rates for primary care-sensitive conditions, have the dual benefit of not placing an additional reporting burden on primary care providers and of bringing information to providers that they might not otherwise receive. In addition, stakeholders may regard data that are generated by other parts of the system as more objective and not subject to false reporting by the providers in the monitoring system.

Data analysis and interpretation

The process that is put in place for analyzing and interpreting the indicators is critical for the usefulness and credibility of the system. It should follow a transparent and structured approach that leads to objective conclusions. The direction of change that is desired for each indicator and whether it is appropriate to establish a target should be specified in advance. For example, the change in an indicator, such as a decrease in the number of hospital referrals, can be interpreted as a positive or negative change depending on the objectives of the reforms, other changes in the environment besides new health policy initiatives, and the initial value of the indicator. Benchmarking may also be used to compare individual providers either to the average performance (a proxy for the current capability of the system) or to the best performers (box 1.10).

The process of indicator analysis and interpretation should establish how frequently the performance indicators will be reviewed. Early in the roll-out of the monitoring system, the indicators should be reviewed relatively often, at least quarterly, to determine how appropriate each is, how difficult the data are to collect and analyze, and how much the values fluctuate. As the system matures, the performance indicators may be reviewed less often, possibly semiannually or annually.

In Karaganda, Kazakhstan, the PHC monitoring system stakeholder group meets semiannually to review the performance indicators. An independent

BOX 1.10 BENCHMARKING, NOT TARGETS, IN KARAGANDA, KAZAKHSTAN

The primary health care monitoring system is playing an important role in Kazakhstan in changing the way that health provider information is perceived and used. Health statistics and provider data were unreliable during Soviet times, because providers who did not meet targets established by the central Ministry of Health could be punished. There was a widespread perception that data were falsified and therefore useless for decision making. The monitoring system stakeholder group in Karaganda decided to remove all targets for indicators in the new primary health care monitoring system to eliminate any lingering association in people's minds with the punitive aspect of information.

group of analysts at the Regional Center for Medical Statistics prepares an analysis showing the distribution of values across PHC providers for each indicator, with the mean, median, and standard deviation. The indicator values for individual providers are interpreted against the average performance of all PHC providers in the system in a form of benchmarking. (The average is interpreted as reflecting the current capability of the system to provide PHC services.) Providers who perform well above or well below the average are examined in more detail to determine the reason for their performance deviation, and health policy makers take responsibility for the health system-level steps needed for providers to continue improving that average. The analysts also prepare a separate report for each facility, which shows trends for each indicator from previous quarters. The stakeholder group discusses each indicator, identifies issues and steps for action at the health system level to continue improving average performance, and identifies high- and low-performing providers for further analysis and discussion. Individual providers use the reports to develop internal quality improvement plans and organizational changes.

Consequences: Leading to Provider and System Change

The PHC monitoring and quality assurance system should of course be linked to mechanisms that encourage change to bring about continuous performance improvement among individual providers and in the PHC sector as a whole. There can be a direct link between an individual provider's performance and financial consequences, as in performance-based payment. The consequences can also be indirect, through public reporting of results either to influence consumer and patient choice or to appeal to professional pride ("reputational incentives"). For example, provider performance results could be published annually in a national publication with a wide readership, with more detailed provider performance information available on a government or purchaser's Web page. In any case, providers should use the results of the monitoring system as a source of information for focusing on internal quality-improvement efforts. There should also be a clear link between the monitoring results and system change to remove barriers and create a more enabling environment for providers to improve performance.

Performance-based payment

Performance-based payment (also known as pay-for-performance) is becoming a common strategy for purchasers around the world to link the financing of health services with quality and outcomes (Frolich et al. 2007). In particular, public and private purchasers in the United States and the National Health Service in the United Kingdom have advanced these models, but other countries are also gaining experience, such as Australia (Department of Health and Ageing of Australia 2003), the Czech Republic (Szende and Mogyorosy 2004), Haiti (Eichler, Auxila, and Pollock 2001), and Nicaragua (Jack 2003).

In the context of a per capita payment system, performance-based payment is a refinement of the payment system in which a portion of the total payment to the provider is related to the attainment of some absolute or relative level of performance (according to specified indicators in the monitoring system). In the Czech Republic PHC providers receive an age-adjusted per capita rate that is augmented by a bonus if they keep referrals to specialists and diagnostic tests below a specified limit (Szende and Mogyorosy 2004). In New Zealand primary health organizations are eligible to receive supplemental payments if they improve their performance on indicators relative to specified targets. Payments for most of the indicators are made on the basis of percentage attainment of the target (Ministry of Health of New Zealand 2007).

Public reporting

Public reporting or review of performance results (or both) is a way for purchasers to share information about performance with providers and the public. The goal of public reporting—also known as a system of report cards, provider profiles, or performance reports—is to create greater accountability of providers to the purchasers and public, and to create a more informed basis for choice (Marshall et al. 2003). Public reporting can also be used internally with purchasers and groups of providers giving feedback to providers on how their performance compares to others, which can be a motivating force for change. This has been the case in Karaganda, Kazakhstan (box 1.11 and the section, *Establishing PHC Provider Entities in Central Asia,* below).

BOX 1.11 PHC MONITORING SYSTEM IN KARAGANDA, KAZAKHSTAN

To monitor the effectiveness both of a primary health care (PHC) development program and of a new per capita payment system on PHC quality and outcomes, the Karaganda regional health department introduced a monitoring system in 2001 for the large urban center in the region (Karaganda city). It was designed and is being implemented through a participatory process by a monitoring system stakeholder group comprising a wide range of representatives from the regional health department and health care providers from all levels of the health system.

Indicators

On the basis of the following four criteria, the stakeholder group proposed a set of 15 indicators for the performance both of individual primary care providers and of the overall PHC sector:

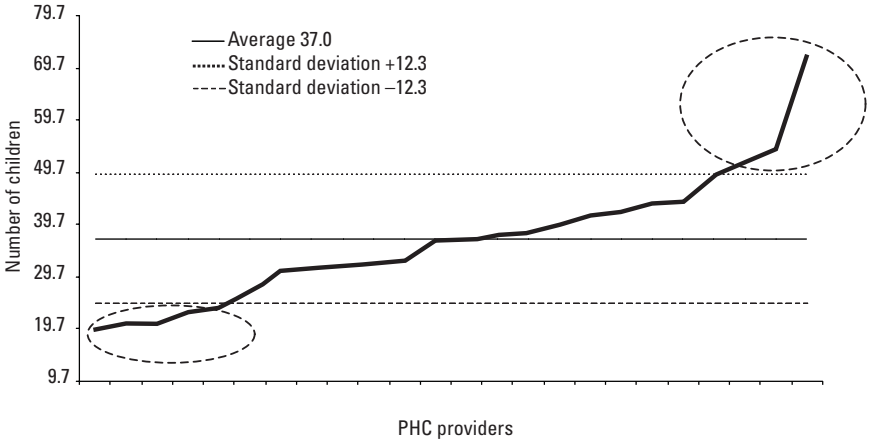
- The indicator relates to the goals of health system development in Karaganda region (improving quality, access, efficiency, and equity of health care services)

BOX 1.11 PHC MONITORING SYSTEM IN KARAGANDA, KAZAKHSTAN (CONTINUED)

- PHC providers can have a reasonable degree of influence over improving the indicator
- Data for the indicator are accessible and reliable
- The indicator can be expected to be statistically stable (each year has a significant number of observations).

The indicators are used to identify trends in primary health care, health facilities that are performing above or below the average for the city, and areas that require further analysis. The median and average values for each indicator give information about the current capabilities of primary health care under existing conditions. Health policies to improve performance focus on steps to be taken in the health system as a whole to improve the average. Health facilities that are performing well above or below the average are examined in more detail to determine the reason for the deviation.

Monitoring report for indicator "No. of children hospitalized for diarrheal disease per 1,000 children <5" by PHC provider, 2001



Source: Karaganda Regional Center for Medical Statistics 2007.

EXPANDING THE BASE PER CAPITA RATE AND PACKAGE OF SERVICES

As the operation of the per capita payment system matures it can be refined and the base per capita rate expanded. In this way, the per capita payment system can support, or even drive, an expansion in PHC clinical services' scope, which is the intersection where health care financing and health services delivery meet, because per capita PHC payment systems link directly to the package of services that the providers must offer to their enrolled populations. The per capita pay-

ment system, therefore, is a mechanism for defining and gradually increasing the scope of PHC services. Per capita payment can be set initially to fund more PHC services, and as PHC providers' clinical capacity increases, the capitated rate can be raised to pay PHC providers for additional services.

The expansion of the per capita rate through an increase in the PHC pool provides the resources to pay PHC providers for increasing their package of services. However, the clinical capacity of the providers must increase simultaneously. Concurrent investment in provider training, equipment, and the development of clinical practice guidelines may be necessary to enable PHC providers to expand their range of services. In Kazakhstan, the Kyrgyz Republic, and Uzbekistan, the scope of PHC clinical services was increased by first strengthening the core PHC services through evidence-based short courses, such as the Integrated Management of Childhood Illness from the World Health Organization (WHO), and a longer-term approach to retraining PHC providers as family physicians or general practitioners providing the full range of first-contact care to families (Borowitz et al. 1999).

The capitated rate can also be expanded to drive the integration of traditional vertical programs into PHC, such as immunization and tuberculosis diagnosis and treatment. Such integration can at the same time improve access to these services and improve cost-effectiveness. In the former Soviet health care systems, for example, sexually transmitted infections (STIs) were diagnosed and treated in a vertical service delivery structure. Pilot efforts to integrate STI diagnosis and treatment using the WHO syndromic case management approach have been successful in Kazakhstan and the Kyrgyz Republic in increasing access to effective care, improving patient satisfaction, and reducing the overall costs of STI services (Burns, Isakova, and Konovalova 2003; Reider 2000). Uzbekistan has not yet expanded the per capita rate to include the integration of STI diagnosis and treatment into PHC.

The capitated rate may also be expanded to serve as the platform for financing outpatient drugs, either directly or through an outpatient drug reimbursement scheme. The high cost of drugs may be a barrier to effective PHC, and financing priority drugs through a per capita payment system may achieve the dual goals of improving access to outpatient drug therapy and supporting further movement toward a more PHC-centered health care system. Including outpatient drug financing in a per capita payment system can strengthen PHC by:

- Supporting the shift in service delivery from hospitals to PHC (in most cases, PHC can only succeed in reducing avoidable hospitalization if effective outpatient drug therapy is accessible)
- Increasing the perceived value of PHC and the utilization of PHC services (via directing patients to PHC providers to get prescriptions for reimbursed drugs)
- Supporting the link between PHC financing and improved clinical practices (via financing drugs based on evidence-based clinical practice guidelines).

Central Asian countries have taken different approaches to incorporating drug financing into their per capita PHC payment systems. In Uzbekistan, for example, the payment system for rural providers included funding for essential drugs at the per capita rate to be purchased and dispensed by PHC providers (Government of Uzbekistan 1999). There were unanticipated legal obstacles, however, to publicly owned PHC providers procuring drugs from private pharmacies, and access to drugs did not improve much through this mechanism.

Other countries implemented drug reimbursement systems linked to the per capita PHC payment system, which is used to reimburse drugs purchased by the patients themselves through the pharmacy network. The Kyrgyz Republic, for example, has run an outpatient drug reimbursement system through its per capita PHC payment system since 2001. Kazakhstan began a drug reimbursement program to fund certain medicines for children under 1 year of age through its PHC per capita payment system in conjunction with the implementation of the Integrated Management of Childhood Illness strategy launched in 2001. The drug reimbursement program has expanded to cover drugs for particular conditions in priority populations. For example, medicines are covered for children under five to treat pneumonia, acute respiratory infection, and diarrhea, and to prevent calcium deficiency. Adults receive partial coverage for pharmaceuticals to treat asthma, pneumonia, ulcers, some cardiovascular diseases, and chronic obstructive pulmonary disease (Muratov and Waning 2006).

IMPLEMENTATION ISSUES

The way in which per capita PHC payment systems are designed, operated, and tailored to the context of a country or region strongly influences how well the new payment systems contribute to achieving health policy goals. In this section several key aspects of implementation are discussed and examples of specific strategies and experience are presented. Key issues addressed in this section include:

- Links between per capita PHC payment systems and health system strengthening, including:
  - pooling health care funds
  - streamlining the hospital sector
  - strengthening the capacity of the health purchaser
  - strengthening the clinical and management capacity of PHC providers
  - increasing the engagement and involvement of the population
- Phases of implementation in a per capita PHC payment system
- Implementation sequencing.

Legal and regulatory changes may be needed to address some of these issues, but many of these changes are beyond the control of the health sector. For example, labor laws and regulations may interfere with health sector policies to grant PHC providers autonomy over hiring and firing or setting salaries. Or Ministry of Finance funds-flow policies and procedures may restrict pooling of health care funds, reinvestment of savings from hospitals in PHC, or the ability of providers to determine allocation of resources or other financial management decisions.

These legal and regulatory changes may be made through temporary waivers in the short term, as policy dialogue and broader-based legislative reform are undertaken to achieve longer-term solutions. In some contexts the legal and regulatory challenges may be most easily addressed by altering the legal status of providers from public entities to some other type of enterprise (such as an autonomous public provider) and, possibly, privatized.

Many other important implementation issues are not addressed in this section, either because they are beyond its scope or because they tend to be highly country specific. They include: getting leadership and the support of key stakeholders, establishing the roles of and relationships between the health purchaser and providers, and linking the per capita payment system to provider payment methods at other levels of the health system and to physician payment.

Per Capita PHC Payment and Broader Health System Strengthening

Pooling health care funds

Health care funds must be pooled to some degree so that the per capita payment system can improve equity in resource allocation. Public budgets for health care are often decentralized to regional or subregional levels, and while this may seem a step toward improving resource management, it often has negative consequences for equity for two reasons. First, regions typically have very different capabilities to generate resources, particularly between urban and rural areas, and this often leads to wide disparities in health care funding. Historical budgeting patterns are often driven by the relative political and economic power of different local administrations rather than by variations in the health needs of the population, which may exacerbate these inequities.

Second, the public financing of health services is an insurance mechanism, or a way of pooling the risk of economic loss associated with health problems across groups of people. Risks are pooled to increase the predictability of the loss and to redistribute the costs of unexpected loss. A large risk pool is important both to make the expected costs of necessary health services more predictable and to be able to generate sufficient resources to cover these fluctuating costs. A small risk pool, such as a rural region, may be unable to generate sufficient resources to cover its costs, and one unexpected event, such as an infectious disease outbreak, may deplete its resources unless it receives transfers from other pools. If capitated rates are set for different funding pools, it is impossible to

cross-subsidize across different administrative or geographic areas, or across different levels of the health system, and the positive impact of the new payment system on equity will be minimal.

To pool health care funds, all state or public funds allocated to health services for the entire population of a given area are accumulated in a single budget. Health care funds should be pooled horizontally across all parts of the health care system, and vertically down all levels of local administration in a defined area. To be most effective, the geographic area for pooling health care funds should not be smaller than a large region that includes both urban and rural subregions. Pooling of health care funds should be achieved at least to the level at which equity is a concern.

Streamlining the hospital sector

In countries with an imbalance between funding for the hospital sector and for PHC services, it is critical for the sustainability of PHC development and the viability of the new payment system to streamline the hospital sector and reinvest savings into expanding the PHC per capita rate. As more of the population's health problems are managed at the primary care level, unnecessary hospitalizations will be reduced. The capacity of the hospital sector can be streamlined and upgraded for those cases that clinically need hospitalization.

Strengthening the capacity of the health purchaser

The capacity of the health purchaser must be strengthened to manage the new payment system, including the capacity required to develop and maintain purchasing contracts, to manage information and quality assurance systems, and to monitor and evaluate purchasing policies. In many low- and middle-income countries, because the function of health purchasing may be weak or nonexistent, not only will significant capacity building be needed before a new per capita PHC payment system is introduced, but the basic institutional structure and regulatory framework for health purchasing may also have to be created.

The relationship between the health purchaser and PHC providers must be clearly established (particularly between a public health purchaser and private providers). This relationship should include the development of contracts or other mechanisms that specify which services the providers agree to deliver, the terms of payment, which party has the authority to make which decisions, and what recourse is available to each party if the terms of the contract are not met. (Chapter 4 offers more detail on contracts and contracting.)

The per capita payment system creates the conditions for both public and private providers to compete for enrollees, and if the relationship between the purchaser and providers is clear, the form of ownership of the provider does not necessarily matter.

Experience from Central Asia, for example, shows that PHC may be an appropriate part of the health system in which to introduce competition between pub-

lic and private providers. The Zhezkazgan region of Kazakhstan allowed private PHC providers to compete for contracts with the public purchaser to cover an enrolled population, beginning in 1997. A successful outcome there led to a national government decree, which specifies that contracts between the public purchaser and private PHC providers are legal, and that all providers are paid by the same payment methods regardless of the form of ownership (Government of Kazakhstan 2000).

In Catalonia, Spain, a per capita payment system was introduced in the mid-1990s, which created the conditions for new nongovernmental PHC providers to compete with regional health authority providers. Evaluations of the Catalan reforms generally suggest that the competition between public and nonpublic providers has brought about greater efficiency and positive diversity in service delivery, without sacrificing quality (McCallum et al. 2006).

Strengthening the clinical and management capacity of PHC providers

To strengthen the role of PHC providers in the health care system, their clinical capabilities must allow them to take on a larger share of service delivery, and their managerial capabilities must be sufficient for more important decisions in the allocation of their resources and the way in which they serve their populations.

Clinical strengthening of PHC providers will usually be required alongside the new per capita payment system, if a shift in the focus of the health care system away from specialty care and hospitalization is a goal. A long-term strategy for the overall direction of medical education and health care delivery reform will need to accompany a short-term strategy to raise the capability of PHC immediately to keep pace with the financing reforms.

Along with clinical strengthening, the capacity of PHC providers to operate as business entities will, most likely, need to be developed. Providers must be aware of and understand the new incentives that will be created by the per capita payment system, and therefore substantial efforts may be needed to educate them about the new payment system and increase their understanding of which changes will be possible and, indeed, necessary. Investment will also be required to support providers as they develop the capacity to manage their internal resources in the new system, including training, accounting, billing, and information systems (box 1.12).

Increasing population engagement

For a per capita PHC payment system to achieve its potential for driving broader health system change, an informed and involved population is essential. Increasing population engagement in decisions on health care is important in the context of PHC development for various reasons, including: consumer choice is closely tied to the reorganization of the PHC system; informed consumers are more likely to become active consumers who hold providers accountable and thus play a role in improving the quality and efficiency of health

BOX 1.12 PROVIDER SATISFACTION

A new era of primary health care-centered system strengthening was set in motion in Central Asia when the first four family group practices were established in Karakol city, in the Issyk-Kul region of the Kyrgyz Republic in October 1994. Heavy investments were made to upgrade the clinical and managerial capacity of these practices' providers, while a per capita payment system created new incentives and gradually increased the scope of services. An early provider survey revealed that physicians were satisfied with the new financing and organization of services, because they were able to "practice medicine more broadly, and the patients were happy."

Source: ZdravReform Program 1999.

care; increased power in decisions on health care can contribute to a desire for more democratic participation in other parts of society; and the population needs to take more responsibility for its health and adopt healthier lifestyles to achieve gains from investments in PHC.

There are many ways that population engagement in PHC can be increased, all of which are highly context specific. Successful examples from Central Asia include community-based health promotion and education campaigns, the formation of village health committees, and small grants to communities to solve local health problems with PHC providers (see the section, *Per Capita PHC Payment and Disease Prevention, Health Promotion, and Community Involvement,* at the end of this chapter).

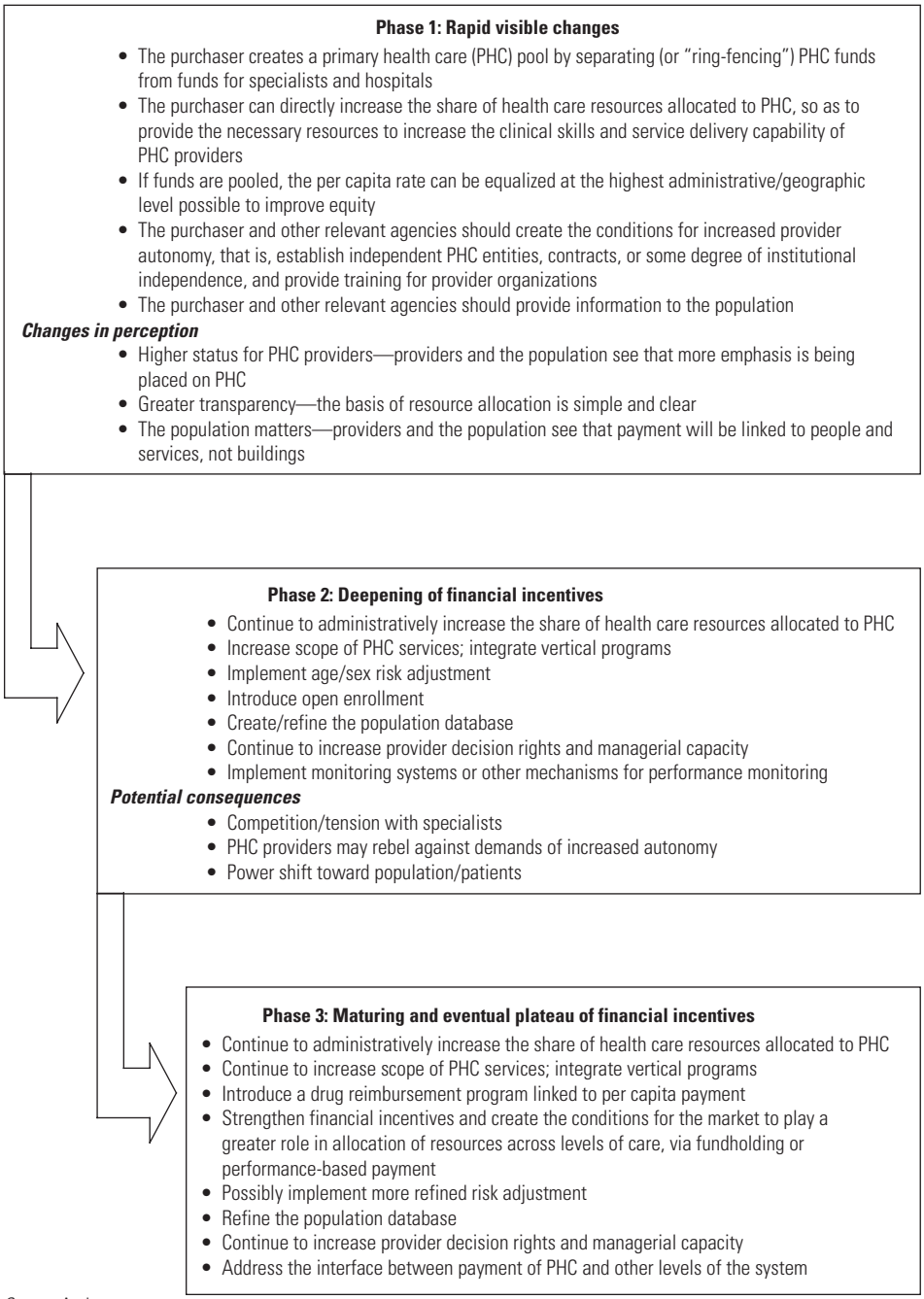
Phases of Implementation in a Per Capita PHC Payment System

The financial incentives of a per capita PHC payment system take time to mature, and the effects of the new payment system on broader health system change are likely to be felt incrementally over three broad phases (figure 1.6). These phases largely reflect different levels of maturity, and therefore the importance or effectiveness, of the incentives. These phases are illustrative and based on patterns observed in various countries implementing new payment systems. Depending on the context and the extent to which experience from other countries or regions is adapted, some steps may be skipped. For example, some countries choose to move directly to a risk-adjusted capitated rate by adapting adjustors from other countries or regions.

Phase 1: Rapid visible changes

The focus of the per capita payment system is not financial incentives, but rather using the payment system as an administrative tool to generate immediate, possibly small, but visible changes in the transparency and equity of the distribu-

FIGURE 1.6 Three Phases of Implementation for a Per Capita PHC Payment System



Source: Authors.

tion of health care resources and the allocation of available funds to PHC. In this first phase it is necessary to define PHC and the providers who are eligible to participate in the payment system. Boundaries may need to be clarified between PHC and outpatient specialty providers, and decisions should be made surrounding the participation of nongovernmental providers.

This phase sets the stage for more powerful financial incentives in the subsequent phase by taking the first steps to strengthen provider autonomy (box 1.13) and to increase population information and involvement in preparation for free choice and open enrollment (which may be part of the first or second phase, depending on the context). In phase 1, the future financial incentives and realigned relationships between the actors in the health care system are communicated by the purchaser to providers and the population, and the conditions are created for the actors to begin to change their expectations. Providers begin to understand the implications of the financial incentives and increased decision rights. There is also a change in the perceived status of providers, as both the population and providers see the new emphasis being placed on PHC, and in the relationship between the population and providers, as providers and the population see that payment will be linked to people and services, not buildings

In this phase the appropriate agency should take steps to upgrade the clinical capacity of PHC providers, with a focus on strengthening the core services currently provided at the PHC level. This may include basic clinical retraining, as well as provision of drugs, supplies, and equipment. Some of the clinical strengthening may be financed through the per capita payment system, but direct investment in training as well as capital may also be needed to lift the skills and capabilities of providers to acceptable standards for providing basic services.

Phase 2: Deepening of financial incentives

The new per capita payment system is refined and the financial incentives gain traction in this phase, enabling the payment system to drive more far-reaching changes in service delivery, the institutional structure, and population involvement. As the providers better understand the financial incentives and take on greater management responsibility, they begin to demand both greater fairness in the payment system through risk adjustment of the capitated rate, and more transparent and reliable updating of the population database, which is after all the basis for tracking enrollment and calculated per capita budgets. During this phase the scope of services may increase and vertical programs may be integrated into PHC, because more funding was allocated to the PHC sector in the previous phase. Tension with specialty care providers and hospitals may emerge. Monitoring systems of the effect of the new per capita payment system on the quality of PHC services begin to be implemented.

BOX 1.13 RESULTS OF INCREASED PROVIDER AUTONOMY IN KARAGANDA, KAZAKHSTAN

Following the introduction of per capita payment for primary health care in the Karaganda region of Kazakhstan in 2001, primary health care providers reallocated their resources internally to be more efficient and provide better services for their populations. Spending on drugs increased by 80 percent, while spending on utilities decreased by 18 percent.

Source: Karaganda Regional Center for Medical Statistics 2007.

Phase 3: Maturing and eventual plateau of financial incentives

Restructuring along all four axes (figure 1.1 earlier in the chapter) of the health system matures in this phase. The financial incentives of the per capita payment system by themselves have limited reach and will plateau in this phase unless they are taken to the next level through fundholding (purchasing referral services through the per capita rate) or performance-based payment. The per capita rate may continue to expand, including addition of an outpatient drug benefit and reimbursement system to further increase the scope of services. In this phase the interface between payment for PHC services and other providers closely linked along the continuum of care, including ambulance services, will need to be addressed. Some forms of integrated payment between PHC and specialty providers/hospitals, such as fundholding or shared bonuses, may be explored to drive better integration and continuity of care, as well as a strengthening of the incentives to continue moving service delivery to PHC.

Implementation Sequencing

Health system changes are complex and take place only gradually and incrementally. Experience shows that the timing and sequencing of some of these changes matter. There is no absolutely right or wrong approach, as implementation is heavily dependent on its particular environment. However, it is useful to have (or develop) some type of framework for deciding the sequencing. A possible framework entails categorizing implementation sequencing into decisions that:

- would create problems and should never be made
- are debatable and have to be decided within the current timeframe and context
- should clearly be done together but are difficult to carry out at the same time.

Based on the Central Asian health reform implementation processes, the following paragraphs describe an example of each decision.

An example of the first is extensive investment in service delivery improvement for one or several providers without decisions having been finalized on the overall institutional structure, including which specific restructuring will be carried out. The idea of improving service delivery at a health provider that is later restructured or rationalized obviously makes no sense. In Central Asia, for example, the initial urban PHC structure entailed separate polyclinics (outpatient clinics run by specialists and subspecialists) for adult general medicine, pediatrics, and reproductive health services, all with weak PHC services, and heavy reliance on specialized services. If the intent is to strengthen PHC, it is important to establish an entity where PHC can develop and to establish that entity before beginning significant service delivery improvement.

An example of the second decision is the timing of open enrollment, which in Central Asia was seen as a dilemma. On the one hand, it was possible that the population receiving a new right to choose their PHC provider and enroll in the provider of their choice could drive an awakening by PHC providers and service delivery improvements. On the other, if nothing had yet changed at the PHC provider and the population did not see improvements in service delivery, people could be discouraged and lose interest both in the health reforms and in exercising their new rights. In Central Asia it was decided that bridging the disconnection between the health system and the population, which was inherent in the old system, would drive service delivery improvement and was worth that risk.

An example of the third is the connection between health financing and service delivery. Health financing reform usually involves national commitment and systems (small-scale pilots are hard to do and it is not the nature of financial management specialists to desire or even tolerate divergence from their overall systems and rules). For its part, service delivery reform can be initiated rapidly, especially if it is carried out by individual health providers. It is hard to decide on the implementation sequencing that appropriately links these two critical elements. It is doubtful that perfect solutions will be found. But, if reformers in health financing understand that health financing is necessary but not sufficient, and if their counterparts in service delivery understand that without changes in financing and financial incentives no improvement is sustainable, it is likely that reformers on both sides will be able to support appropriate sequencing that links their respective areas.

THE LINK BETWEEN PHC PER CAPITA PAYMENT AND THE HEALTH SYSTEM AXES: EXPERIENCE FROM FOUR CENTRAL ASIAN REPUBLICS

In this section, the experience of the Central Asian republics of Kazakhstan, the Kyrgyz Republic, Tajikistan, and Uzbekistan in implementing new per capita PHC payment systems is presented to demonstrate how these new payment systems facilitated linkages between the four health system axes described in figure 1.1 (financing, service delivery, institutional structure, and the role of the popu-

lation). Each example illustrates a specific aspect of these linkages. New payment systems were introduced in these countries as part of comprehensive health sector reforms, which were initiated in the context of broader economic liberalization following independence from the former Soviet Union in the early 1990s.

At that time, the countries faced similar crises in their health care systems, which were brought about by a combination of economic collapse following the breakup of the Soviet Union and the burden of inherited health care systems. Per capita PHC payment was initiated to some degree in all the countries to set in motion a fundamental change in priorities in the health sector, particularly to redirect resources from the unsustainable hospital sector to more cost-effective PHC. The introduction of per capita PHC payment systems also initiated, in all the countries, a radical shift in the roles and responsibilities of the government, health purchasers, and the population toward a more responsive system.

The following examples describe the role that PHC financing reform played in the broader health reform process in each country as it clarified and strengthened the linkages across the health system. They also illustrate how policy decisions and technical design issues can be addressed, as well as the compromises that are often necessary to operate a new PHC payment system in the context of the political, economic, and social realities in low- and middle-income countries. The examples highlight the fact that the new PHC payment system is not a goal by itself, and unless it is accompanied by a range of other reforms—broad commitment to greater equity, more efficient resource use throughout the system, upgraded clinical capacity and management autonomy of providers, and increased rights and responsibilities for patients—it will be insufficient, alone, to bring about significant change.

Health Policy Context

At the time of independence, the health care systems of all the former Soviet republics were in crisis, a result of the combination of economic collapse, unsustainable massive health infrastructure, outdated organization of service delivery and clinical practices, and a lack of responsiveness of the system to the countries' real epidemiological and social situations. Infectious diseases were reemerging at the same time that mortality was sharply increasing from chronic diseases, particularly cardiovascular disease. Many of the former Soviet republics experienced an unprecedented decline in life expectancy (WHO 2001).

The obvious locus in the health care system for addressing this crisis was PHC. Its role in the system, however, had been eroding for decades. Under the Soviet Union's "Semashko" health system model, access to primary care was theoretically a high priority, and as a result there was—and is—an extensive network of PHC providers in the countries of Central Asia that covers the entire population, even in the most remote rural areas. However, the clinical capabilities and the status of primary care in the system deteriorated over time, because in reality PHC providers were subordinated in every way to specialty care providers. A

combination of the physical design and structure of the health care delivery system, centrally regulated clinical protocols, methods of financing, and the way in which financing flowed through the system worked together to fragment the primary care system and to favor specialty care (Borowitz et al. 1999).

The primary care delivery system was structured and managed in such a way as to inhibit PHC providers from taking a broad interest in the health of their patients, which deprived them of a clearly defined role in the health care system. Primary care was provided through a wide array of health care institutions, including adult and children's polyclinics, women's consultation centers for reproductive health services, and outpatient dispensaries for diseases managed through vertical programs, such as tuberculosis, STIs, and oncology. Individuals were assigned to primary care physicians based on geographic catchment areas; nor was there any choice of provider, with the result that providers were not accountable to their populations. Training of primary care physicians, by Western standards, was inadequate, and thus conditions that should have been treated in the primary care sector were treated in the hospital or by specialists at polyclinics.

The resources that were directed to PHC were managed by hospitals and polyclinics, with the result that services were biased toward specialists. Funds were disbursed according to budget line items, further limiting the flexibility and autonomy of providers. The head physicians of the polyclinics and central *rayon* hospitals controlled the resources and made all the managerial decisions on primary care. PHC providers were simply paid a salary and controlled no resources. They had virtually no say in staffing decisions, in establishing service priorities, or in modifying clinical protocols. With few supplies and medicines, little say over internal decisions, and limited accountability to the population, PHC providers evolved into disinterested "dispatchers" in the system, referring even simple cases to specialists and hospitals.

In the mid-1990s the limited resources for health care and the health crisis made the strengthening of PHC the only viable route to health system improvement. All the countries of Central Asia embarked on a fundamental reorientation of their health systems to address the historical degradation of PHC. The comprehensive PHC strengthening agenda included at least some degree of restructuring of the PHC delivery system to create the conditions necessary for other aspects of health reform, such as introducing modern clinical protocols, implementing new provider payment methods, improving service delivery and clinical skills, and increasing population involvement and choice.

The restructuring of PHC was followed by the introduction of per capita PHC payment to address the inequities of historical budgeting patterns; to facilitate the shift of resources from the hospital sector to PHC; and to set in motion a cycle of strengthening PHC, and in the process reducing unnecessary hospital services and thus freeing additional resources to continue strengthening PHC. The goal was to embed the role of PHC as the foundation of the health system pyramid as the level providing accessible and affordable first-contact care to address the majority of health problems in these Central Asian countries.

The following sections present six examples from the Central Asian republics of Kazakhstan, the Kyrgyz Republic, Tajikistan, and Uzbekistan that demonstrate how the implementation of per capita PHC payment has been instrumental in helping establish new roles and relationships across the four axes of the health system: financing, service delivery, institutional structure, and the role of the population.

Link between institutional structure, financing, and service delivery

- Establishing PHC provider entities in Central Asia
- Overcoming system barriers to new financial incentives in Kazakhstan (Karaganda example)

Link between financing and service delivery

- Quality improvement in the context of a per capita payment system in three Central Asian countries
- Additional drug package in the Kyrgyz Republic

Link between financing and the population

- Per capita PHC payment and equity in Tajikistan
- Per capita PHC payment and disease prevention, health promotion, and community involvement

Establishing PHC Provider Entities in Central Asia

Institutional structure is one of the axes of the per capita PHC payment system impact shown in figure 1.1 above. In strengthening PHC, a critical factor is the overall physical and legal structure of providers. If an appropriate structure for a specific environment does not exist, it is hard to continually improve service delivery, because the weaknesses or barriers in the overall structure constantly hamper any service delivery improvement processes. In addition, a close relationship exists between per capita PHC payment (or any provider payment system) and PHC structure, as payment for health services to the population is generally made to the PHC provider in the institutional, legal, or business entity sense. Finally, implicitly or explicitly underlying PHC structure policy or business decisions is the issue of the relationship between PHC practitioners and specialists, an important factor in all environments worldwide.

This first example documents the relationship between per capita PHC payment and reform of the PHC structure in Central Asia. Although the nature of the structure and changes to it vary widely across countries, the need to consider structure in the PHC strengthening process is a constant element. While overall, the environment of the former Soviet republics is unique among low- and mid-

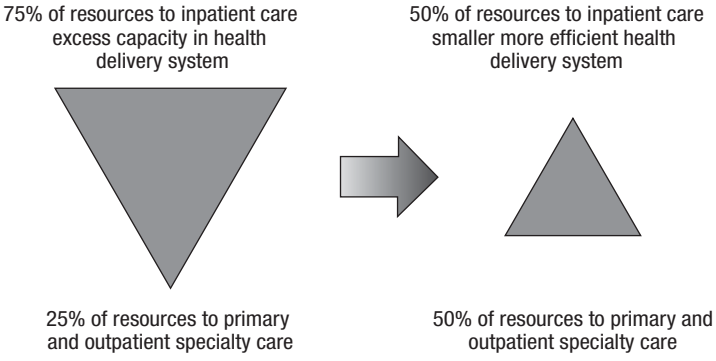
dle-income countries, it has some similarities in PHC structure issues to other developing or transition countries, especially in terms of the need to create a new PHC sector. The environment is different in that the new PHC providers are created by removing or decentralizing them from a huge, overspecialized health system and funding them by rationalizing the inefficient hospital sector and reinvesting at least a portion of the savings in PHC.

In Central Asia one of the most profound inefficiencies in the health care system was the imbalance between the hospital and PHC sectors. Hospitals consumed more than 70 percent of the health care budget. The health delivery system inherited from the former Soviet Union can be likened to an inverted pyramid (figure 1.7). The hospital sector at the top of the pyramid was overdeveloped and the PHC sector, which should serve as the broad base of the pyramid, was underdeveloped, underfinanced, and underused. The conceptual health reform framework and implementation strategies for inverting the pyramid and reducing its size are also shown in the figure.

A more detailed portrayal of the former Soviet Union health delivery system structure is shown in figure 1.8. Visually, it is clear that the system is large, fragmented, and overspecialized. PHC was provided by specialists (internists, pediatricians, and obstetricians/gynecologists), who were attached to large polyclinics serving only adults, women, or children. An oversupply of physicians contributed to PHC practitioners having a very small and narrow scope of services and largely serving as indifferent dispatchers to specialists. Fulfilling many of the principles of PHC such as comprehensive, continuous care was difficult or impossible in this health system with PHC buried inside. In addition, given that the health budget had largely collapsed, the enormous excess capacity was no longer sustainable and greater efficiency was necessary.

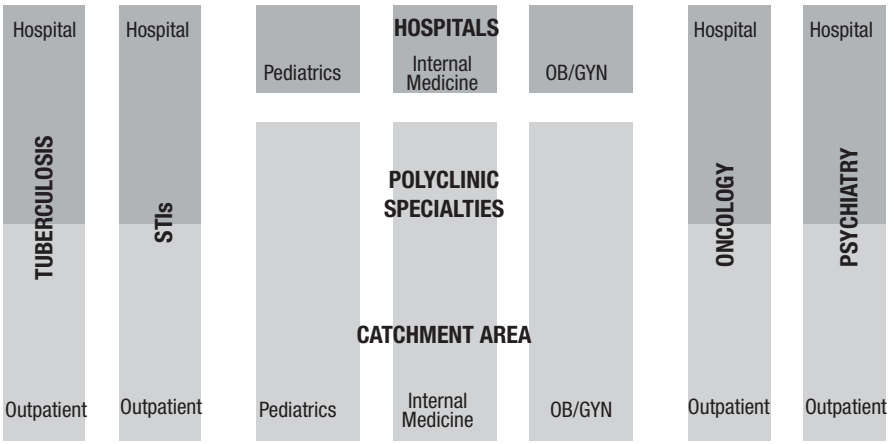
The governments of Central Asia decided that the solution to these systemic problems required complete restructuring of the PHC sector. PHC practitioners

FIGURE 1.7 Inverting the Pyramid: Health Reform in Central Asia



Source: Authors.

FIGURE 1.8 Structure of the Health Delivery System in the Former Soviet Union



Source: Authors.

were pulled out from the health system and a new structure was established, generally through creating business entities that could provide PHC with the autonomy it needed to develop. The form of ownership was not considered significant, and Central Asia has examples of both public and private entities in the new PHC structure.

The per capita PHC payment system was a major driver in the PHC restructuring process. It paid a predetermined amount for comprehensive PHC services, thereby encouraging integration of services and the development of a structure able to provide these services. It also allowed the broad separation and realignment of functions discussed throughout this chapter.

The payment system worked through two approaches: with broader health financing reform, it pooled PHC financing to improve both equity and efficiency; with institutional structure reform, it decentralized management to improve efficiency, access, and quality of health services. If both financing and management had been centralized or decentralized, the reform intervention would not have been as successful. The balance created through this separation and realignment of functions enabled PHC provider entities to begin working well.

The PHC restructuring process varied across the former Soviet republics. A major difference was whether the new providers were "legally independent" entities. The options included legally independent providers; providers as affiliates or lines of business under either a hospital or a polyclinic; and mixed polyclinics (reorganized from specialized polyclinics) with both PHC practitioners and specialists serving all categories of the population.

Uzbekistan consolidated rural PHC providers into new legally independent entities known as rural physician points. Finance managers were hired for them, and they began to function as business entities. For several years the country has been in the process of rolling out this PHC structure model nationwide. It has proven to be more difficult to accomplish restructuring of PHC in urban areas.

In the Kyrgyz Republic the pilot *oblast* restructured PHC into independent PHC providers called family group practices. The national roll-out consisted of such practices established as separate business affiliates under a legal entity called a family medicine center, because the administrative costs of independent legal entities were unaffordable for both the health purchaser and health provider in the difficult economic situation. The population enrolls only in family group practices, which are paid the per capita PHC payment while family medicine centers perform general and financial management functions, as well as provide specialty care. This compromise (made in order to achieve national roll-out) succeeded in handling management functions and establishing a new PHC sector nationwide, but it did not address the critical problem of the relationship between PHC practitioners and specialists, an issue still being addressed.

In Tajikistan, health reforms are still in their early stages. In a severely resource-constrained environment, a policy decision has been made to maintain rural PHC providers as affiliates under central district hospitals; a new management structure and process have been set up to help ensure both that per capita payment goes to PHC, and that PHC providers have greater visibility and autonomy.

Consistent with the sophisticated and fluid environment in Kazakhstan, all three models of PHC restructuring are seen.

In summary, even though PHC structures vary significantly in Central Asia, per capita PHC payment is a constant theme, resulting in PHC entities generally being paid in the same way with the same financial incentives. The implementation strategy and process are consistent with the implementation phases described in the section, *Implementation issues,* above, where in phase 1 a restructured PHC provider with enhanced service delivery capabilities is paid a capitated rate based on an enrolled population—creating a powerful synergy between the axes of the conceptual framework and driving change.

In phase 2, the financial incentives of the new provider payment systems operating throughout the health delivery system start to gain traction and drive health provider behavior. Two changes take place in the structure. First, horizontal integration across different types of PHC and outpatient specialty providers occurs (integration of adult general medicine, pediatric, and reproductive health providers), and second, rationalization and restructuring of hospitals begins, including closure, merger, and downsizing.

In the Kyrgyz Republic the Mandatory Health Insurance Fund (MHIF) carried out nationwide health financing reforms, including pooling budget and payroll tax funds, and implemented new provider payment systems for both hospitals

and PHC providers. Combined with facility- and region-level planning, changes in financial incentives resulted in a significant reduction in excess capacity in the health system and in efficiency increases. For example, in the first stage of national implementation in 2000 in Issyk-Kul *oblast* the number of health sector buildings was reduced by 30 percent, health worker salaries rose by 20 percent, and expenditures on direct patient care increased from 12 percent to 26 percent. In essence, the costs of maintaining excess physical capacity were lowered and the savings reinvested in direct patient care. The share of state health funds spent on PHC increased from 24 percent in 2001 to 36 percent in 2005.

The rationalization and restructuring of the hospital sector also drove change in PHC in phase 2—expansion of the scope of services in PHC and initiation of gradual integration of services previously provided in inefficient vertical infectious disease systems into PHC. Refinements and additions to the per capita PHC payment system, such as the introduction of an outpatient drug benefit reimbursement system, have been directly connected to both quality improvement and expansion of the scope of services in PHC. The basic per capita PHC payment system, as well as policy dialogue and initial stages of introduction of refinements such as performance-based payment, helped trigger intense discussion on integration of vertical infectious disease systems into the integrated health delivery system in general and PHC in particular. In the Kyrgyz Republic treatment of STIs started to be integrated into PHC providers. Throughout Central Asia, the follow-up phase of the directly observed treatment for tuberculosis began to be integrated into PHC while the intensive phase remained inpatient.

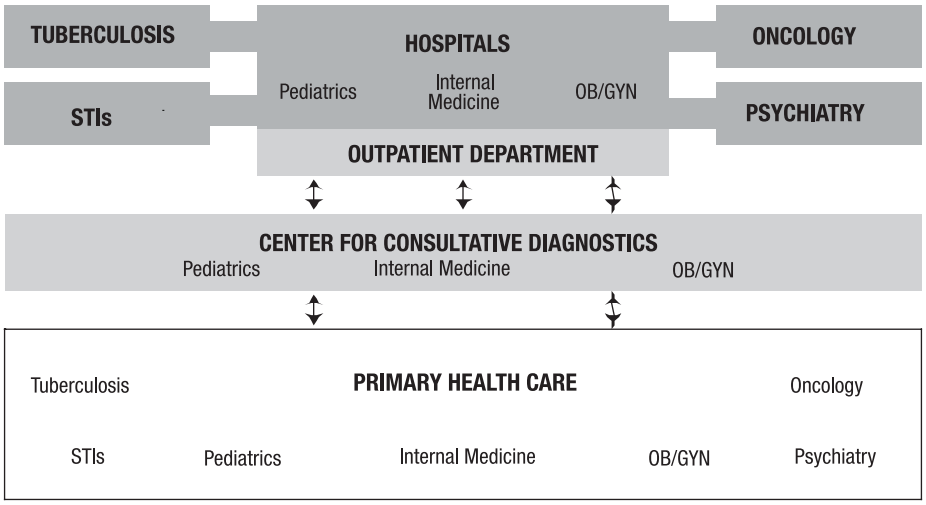
As the per capita PHC payment systems in Central Asia mature further, the boundaries between levels of the service delivery system will increasingly be defined by the interaction of the different provider payment systems and appropriate clinical practice guidelines. The per capita payment system served as the initial seed that makes possible the ultimate goal of a seamless delivery system (figure 1.9), which is centered on the PHC sector, minimizes unnecessary hospitalization and outpatient specialty services, and is driven by the population's needs and satisfaction.

Overcoming System Barriers to New Financial Incentives in Kazakhstan

Overview

The Karaganda region (*oblast*) of Kazakhstan has been at the forefront of comprehensive PHC-centered reforms in the country since 1996. The region, which has a population of 1.4 million, has been a leader in developing, testing, and refining health financing and service delivery innovations, many of which are now codified in national health policy legislation (Government of Kazakhstan 2000) and are being adapted for use throughout Central Asia. For example, Karaganda developed and launched one of the first case-based hospital payment systems in Central Asia, using one of the first hospital discharge databases established in 1998, which now has more than 2 million hospital cases recorded.

FIGURE 1.9 The Ultimate Goal: A Seamless PHC-Centered Health Delivery System



Source: Authors.

Karaganda was also one of the earliest regional health departments in the former Soviet republics, beginning in 1998, to initiate comprehensive restructuring of the PHC sector and subsequently to implement a per capita PHC payment system. In 2001 it established a PHC monitoring system, which has allowed it to analyze the results of its PHC strengthening activities, to refine its policies, and to share lessons with other Central Asian countries.

The Karaganda region adopted a comprehensive approach to PHC strengthening, which has achieved impressive results even in the face of a constantly changing policy environment and ongoing barriers to full provider autonomy and to open enrollment for the population. Its experience demonstrates that even when the financial incentives of the payment system are blunted by barriers in the system and by implementation challenges, per capita payment can set in motion a dynamic of change. Improvements in PHC provider performance have been stimulated by higher priority and visibility given to providers; by the incentives of a per capita payment system; and by a valid and credible monitoring system that is operated through an open, participatory, and nonpunitive process.

Restructuring the PHC sector and clinical upgrading

Karaganda embarked on PHC restructuring in the late 1990s, establishing more than 50 new independent PHC practices in urban areas and 123 family medicine centers in rural areas. In addition 18 private PHC providers opened in urban

areas and were awarded government contracts to provide free services to the population alongside public providers. The restructuring of the sector created a platform to shift resources to PHC, to begin a large-scale initiative for upgrading the clinical skills of PHC providers, and to introduce the new per capita payment system. The regional health department invested heavily in upgrading clinical skills. Extensive training programs in evidence-based practices were carried out over several years. For example, clinical guidelines were developed for the Integrated Management of Childhood Illness, and more than 400 of the region's PHC clinicians received training in this (Karaganda Regional Health Department 2004).

Shifting resources to PHC

In the Karaganda region all budgets for cities and subregions are consolidated into one regional health budget, giving regional pooling. A portion of this regional budget is set aside for directly funded activities, such as public health and physician retraining. Three pools are also established from the regional budget through a top-down percentage allocation: hospital, outpatient specialty care, and PHC. The per capita rate paid to PHC providers is calculated by dividing the total PHC pool by the population, with adjustments for age and sex according to the national risk adjustment coefficients specified in national legislation (Government of Kazakhstan 2000).

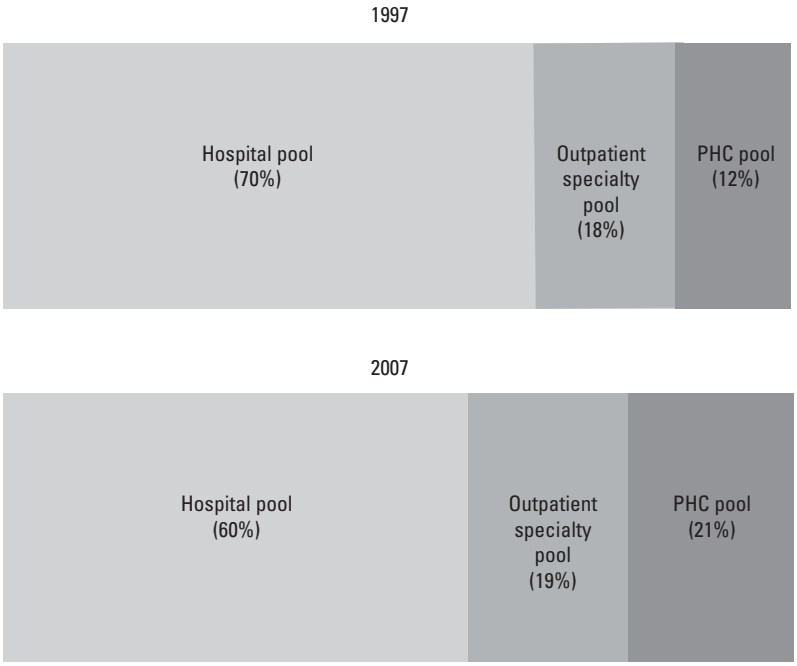
The percentage allocation to each pool is a policy variable that is amended each year, and as shown in figure 1.10, the allocation to PHC increased from 12 percent to 21 percent in the decade after the PHC reform program was initiated (Karaganda Regional Center for Medical Statistics 2007). The allocation of the total health budget to PHC in Karaganda has also increased relative to other services, and in absolute terms. The annual per capita rate grew by about 40 percent in real terms (from about $7 to $10) between 2006 and 2007 alone (Karaganda Regional Center for Medical Statistics 2007).

Incomplete financial incentives

The per capita PHC payment system was designed in Karaganda to support an overall strengthening of PHC. The region has been successful in shifting resources from hospitals to PHC, as part of a process to move toward a more cost-effective allocation within the health sector and to implement a per capita payment system. This payment system has improved equity and created new financial incentives for PHC providers to be more responsive to their populations and to increase services aimed at health promotion, disease prevention, and chronic disease management.

The new payment system has, however, come up against both implementation challenges and rigidities in the public sector financing environment that have limited the ability of the financial incentives to bring about significant change in PHC performance. The treasury system in Kazakhstan has posed some

FIGURE 1.10 Evolution of the PHC Pool in Karaganda Region, Kazakhstan



Source: Karaganda Regional Center for Medical Statistics 2007.

barriers to true autonomy for the mostly publicly owned PHC providers. The PHC providers now receive per capita budgets, but they are disbursed according to strict line items, severely limiting the providers' flexibility to redirect expenditures to new services or to update clinical practices and service delivery approaches. Providers in some parts of the region have also experienced intrusions into their management autonomy through repeated top-down restructuring, which has resulted in ad hoc consolidations and reorganization of PHC providers. This lack of organizational consistency and say in their affiliations has been an additional demotivating force for providers, limiting both staff loyalty and cultural change.

The PHC reforms have also faced implementation challenges. Plans for introducing population choice and open enrollment to strengthen the financial incentives of the per capita payment system have met various obstacles. Attempts to establish a population database have been frustrated by constant population migration and unofficial residency. Significant financial and human resources were invested in an initial open enrollment campaign, but the results were contentious because of discrepancies between the enrollment database and official census data. Consequently, the open enrollment results have not yet

been accepted officially as the basis for provider payment. The population is still administratively assigned to PHC providers in most of the region, with the exception of Zhezkazgan city, where open enrollment has been used since 1997.

Overcoming system barriers

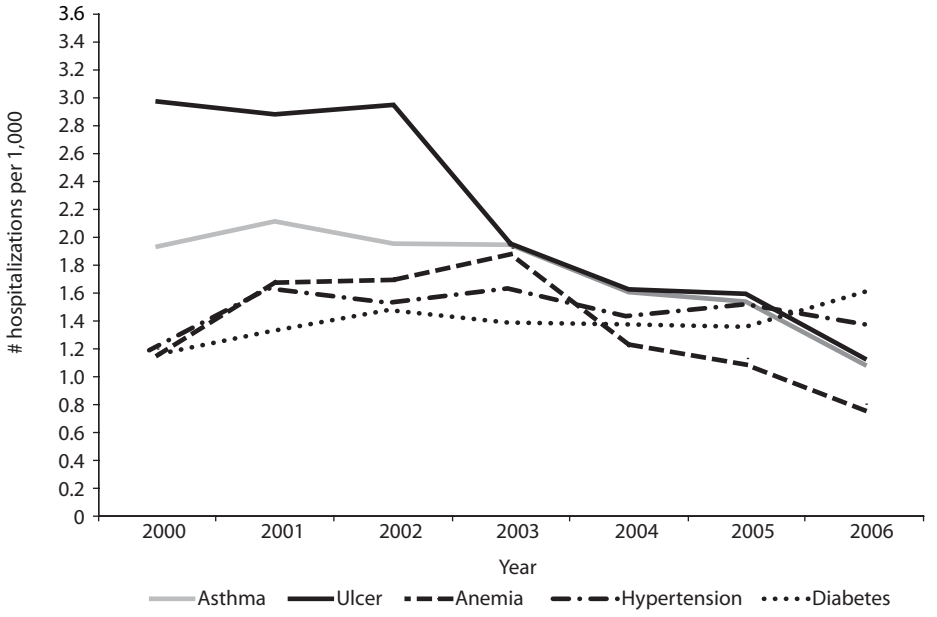
Although the new financial incentives have not reached their full potential, the PHC reforms have set in motion a new dynamic that has motivated PHC providers to improve their performance. The regional health department has worked with providers to improve their clinical practices and to move toward the goal of a strong PHC sector that can manage most of the population's health problems. The PHC monitoring system has created a source of motivation through its open process and the opportunity it offers to discuss the remaining barriers in the system. Providers and policy makers now have a sense of mutual responsibility for improving the performance of PHC.

The monitoring system also created a form of competition among providers, who have become interested in gauging their performance relative to others and publicly demonstrating their ability to enhance their services. For example, soon after the monitoring system was set up, the share of PHC visits for preventive services was a focus of the monitoring system stakeholder group as an indicator both that could be influenced by providers and that would be related to improved health outcomes over time. At the end of the monitoring system's first year, the average share of preventive visits across PHC providers was 24.8 percent, with the lowest at 16.8 percent. In 2004 the average had increased to 30.3 percent, with the lowest at 21.4 percent; there was also less variation across providers, with the standard deviation decreasing from 7.4 to 5.6. The improvements in PHC service delivery were not only observed in process indicators reported by the providers themselves, but also in outcome indicators that were recorded in other parts of the system. For example, the hospitalization rate for the PHC-sensitive conditions of asthma, ulcer, and anemia declined almost consistently between 2001 and 2006 (figure 1.11).

The monitoring system also exposed some areas where the performance of providers did not significantly improve. For example, in the case of hospitalization for the PHC-sensitive conditions of hypertension and diabetes, the number of hospital admissions per 100 population for patients under the care of a PHC physician declined, but the overall rates stayed the same or even increased (figure 1.11).[1] The stakeholder group concluded that stronger financial incentives were needed to stimulate outreach into the community to identify individuals with hypertension and diabetes and to bring them into the PHC system. It also identified the high cost of drugs to treat these chronic conditions as a barrier to improvement.

These experiences have fed into a national policy dialogue that is leading to the next steps of per capita PHC payment reform, including an outpatient drug reimbursement program and refinement of the payment system to include performance-based payment to strengthen the financial incentives for outreach

FIGURE 1.11 Rate of Hospitalization for PHC-Sensitive Conditions in Karaganda, 2000–06



Source: Authors.

and health promotion in communities, possibly focusing on priority conditions such as hypertension and diabetes.

Lessons learned

The Karaganda experience highlights some important lessons for the implementation of per capita PHC payment (and see box 1.14). First, the new payment system is not a goal in itself and, even when it is involves a shift in resources to PHC, it must be accompanied by a comprehensive approach to improve PHC performance. Barriers in the system to increased provider autonomy and to organizational stability will limit the effect of the financial incentives on the motivation and ability of providers to make the changes necessary to serve their populations better. Furthermore, engaging the population and promoting its active involvement in PHC system change through free choice and open enrollment can pose significant implementation challenges, but these moves are an important force for change and should not be abandoned.

Second, even in the face of system rigidities and implementation challenges, a new per capita payment system can set in motion a new dynamic. Individual providers can become motivated to upgrade their clinical practices and more actively pursue performance improvement. If health authorities support these providers to continue developing, documenting, and disseminating best prac-

BOX 1.14 KARAGANDA ACHIEVEMENTS

The monitoring system in Karaganda revealed the performance of individual providers who have overcome system barriers and made improvements in how they serve their populations, as reflected in better outcomes.

The health policy makers and providers of Karaganda continue to work within the system to improve individual provider performance, and to bring their experience to higher levels of the system in order to continue to demand a more enabling environment for full implementation of per capita PHC payment and continuous PHC service delivery improvements. The Karaganda regional health authority is currently using analyses from the monitoring system to advocate for continuing system change, moving the per capita payment system to the next level through performance-based payment and outpatient drug reimbursement, and working to dismantle rigidities to allow PHC providers to fully exploit the opportunities and incentives of the new per capita PHC payment system.

tices, the health system will continue moving toward its goals, even while the more intractable system barriers are gradually dismantled.

Finally, the Karaganda experience shows that a valid and well-accepted PHC monitoring system is important, to track the progress of change both among individual providers and in the system as a whole. The monitoring system in Karaganda, for example, exposed areas where system barriers or incomplete financial incentives prevented providers from achieving the full potential benefit of improved clinical practices and creative service delivery innovations, such as in hypertension and diabetes management. This information is necessary for policy makers to continue to update reform measures and to remove barriers to improved performance.

Quality Improvement in the Context of a Per Capita Payment System in Three Central Asian Countries

When linked with other interventions and guided through the phases of implementation discussed in the section, *Implementation Issues,* above and as seen in earlier examples, a per capita PHC payment system can make a significant contribution to strengthening PHC. Central Asia is gradually building a body of evidence showing that simultaneously carrying out health financing reform and improving service delivery boosts outcomes. Among other benefits, per capita PHC payment systems have enabled PHC providers to begin using new knowledge and skills; facilitated introduction of new clinical practice guidelines by helping ensure that there is no negative impact on funding from changes in clinical practice; and contributed to quality improvement techniques by granting autonomy and providing tools (such as the PHC monitoring system). This short example describes both the results of PHC quality improvement programs

(carried out in concert with per capita PHC payment systems) in Kazakhstan and Uzbekistan, and initial experience in integrating infectious disease services (previously treated in vertical systems) into PHC in the Kyrgyz Republic.

Kazakhstan

In Karaganda, Kazakhstan, a new hypertension clinical practice guideline was developed by staff at evidence-based medicine centers and the Republican Cardiology Institute, which was taken up by six pilot PHC providers using quality improvement techniques. The health purchaser used per capita PHC payment and a quality assurance system, while the Kazakhstan Association of Family Practitioners gave to PHC providers bottom-up technical assistance and operational support to use the new guidelines. The providers were accountable for implementation and for monitoring results.

The monitoring system stakeholder group decided that the treatment of identified cases of hypertension was relatively good, and that the focus should be on improving screening and case identification. This decision was supported by results from the monitoring system, which showed a decrease in hospitalization for hypertension among patients under the care of a PHC provider, but a slight increase in overall hospitalization rates for hypertension (see the subsection, *Overcoming System Barriers to New Financial Incentives in Kazakhstan,* above). Between 2005 and 2006, the share of patients screened rose from 70 percent to 81 percent, and the incidence of new cases in pilot sites increased from 163 per 100,000 to 879 per 100,000, an increase of 439 percent.

Uzbekistan

In Ferghana, Uzbekistan, quality improvement projects on hypertension, the Integrated Management of Childhood Illness, and anemia have been launched and linked to new per capita PHC payment systems since 2000. These projects started in a few rural PHC providers and have subsequently been rolled out to almost all of Ferghana *oblast* covering over 2 million people. A marked bottom-up quality improvement process has contributed service delivery substance. For example, in two of the more than 100 PHC providers implementing quality improvement processes, the proportion of patients with arterial hypertension who had their blood pressure under control after three months of treatment grew from 43 percent in 2003 to 94 percent in 2006.

The Kyrgyz Republic

Infectious diseases in the Kyrgyz Republic, which were previously treated in vertical systems, are being integrated into PHC. One result of the post-independence economic and social upheaval in the country was a steady rise in the rates of STIs. These rates appeared to stabilize in the late 1990s, but have remained unacceptably high. Furthermore, many STI experts are concerned that official rates underestimate the true values, noting that a growing proportion of STI patients

are no longer seeking treatment from the dermato-venereology system (official statistics are based on numbers of patients seen there), making monitoring difficult.

Under the Soviet system, all STI prevention, detection, and treatment services were provided by a special vertical system, encompassing dermato-venereology dispensaries and special freestanding dermato-venereological hospitals. Patients suspected of having an STI received all their care within this system.

Informal surveys indicate that in recent years many patients have begun seeking care from private clinics or are treating themselves according to the advice of pharmacists or friends. This could explain the apparent stabilization in STI rates. Actual rates may still be rising.

Recognizing the problem, the Ministry of Health authorized two pilot projects in 2002 to assess the feasibility of primary care physicians providing prevention and treatment services for the most common STI syndromes. Newly formed family group practices (FGPs) provide a range of services in a single facility close to where people live. FGP doctors have received short retraining courses as family doctors and are bringing some previously vertical services, such as child health care, reproductive health, and certain tuberculosis services, into their practices.

The two pilot projects sought to assess the potential for FGPs to integrate basic STI prevention and treatment services into their practices. This approach could both increase access to STI services and decrease costs. If successful, it should also reduce the spread of STIs and decrease the incidence of their most serious complications, namely decreased female and male fertility, ectopic pregnancy, and death. Moreover, because infection with another STI has been repeatedly shown to increase the spread of the human immunodeficiency virus, this strategy could also reduce the spread of this life-threatening infection.

An evaluation of the pilot projects was conducted six months after they were initiated (Burns, Isakova, and Konovalova 2003). The general results were that patient satisfaction with STI care was high, and a simple cost analysis indicated that STI treatment in FGPs was cost-effective for both the health system and the patient. FGP doctors believed that they should be compensated for this increase in their scope of services. While the difficult economic situation in the Kyrgyz Republic and the low health budget make additional compensation for PHC providers difficult in the short term, the per capita PHC payment system provides a mechanism to quickly encompass this additional service by adding an adjustment or supplement to the base per capita rate for PHC providers providing this vital individual and public health service.

Additional Drug Package in the Kyrgyz Republic

To continue its strengthening and expansion of the per capita PHC payment system, the Mandatory Health Insurance Fund of the Kyrgyz Republic added an outpatient drug reimbursement program in 2001, the Additional Drug Package

(ADP). The goals were to increase access to PHC treatment and case management, promote evidence-based treatment of priority conditions, and contribute to the overall restructuring and reform of the health care system by shifting resources and service delivery from hospitals to the more cost-effective PHC setting. By 2003, 80 percent of the population was eligible for drug benefits through the ADP.

To integrate drug reimbursement into the per capita payment system, the MHIF increased the PHC pool to include partial funding for priority medicines in the per capita rate. Each year the MHIF determines the share of the PHC pool to allocate to the ADP. The PHC providers receive their per capita rate with a portion designated and set aside for drug reimbursement for their enrolled population, which they allocate according to need and on the basis of prescription forms distributed by the MHIF. Because the resources are insufficient to fully cover all necessary drugs, the ADP fully or partially covers 52 medicines (30–100 percent coverage of a reference price set by the MHIF) prescribed at the PHC level. The list of subsidized medicines was chosen on the basis of the national essential medicines list and national clinical practice guidelines. The drugs covered also have a focus on treating primary care-sensitive conditions, that is, those conditions that should be treated at the PHC level to reduce avoidable hospitalization and create savings to further increase the benefits of the ADP.

The MHIF contracts with private pharmacies to provide the ADP medicines. The pharmacies must accept the MHIF conditions, including the reference price and copayment amount. Individuals receive a prescription from their PHC provider based on the diagnosis and clinical practice guidelines; they then choose their pharmacy, receive the prescription, and make the copayment. The pharmacy invoices the MHIF for prescriptions filled at the reference prices. Although not all pharmacies in the Kyrgyz Republic have an ADP contract with the MHIF, there are a significant number of participants, particularly in urban areas.

The ADP emphasizes patient responsibility through the copayment, as well as choice by allowing individuals to purchase covered medicines from any participating pharmacy and to choose the drug within the prescribed class of medicine. It also encourages generic medicines, because the subsidy is a percentage of the reference price of the dispensed medicine. If patients choose a higher-priced brand-name drug, they pay a higher copayment. So the choice of the patient is preserved by allowing generic substitution, but the MHIF aims to encourage an overall shift to less expensive drugs, so that overall access to necessary medicines can rise further.

The ADP reimbursement system is completely computerized, with electronic information that links pharmacies, physicians, and patients. Information is available on diagnoses, medicines prescribed, medicines dispensed, billing by pharmacies, and payment by the MHIF. These data allow monitoring and evaluation of the ADP and refinement of the program. For example, initial analyses of the ADP database indicate an increase in the adherence of PHC physicians to

clinical guidelines; more prescribing and dispensing of lower-priced generic drugs; and a reduction in the share of prescribed drugs administered through injection—the last a source of inefficiency and poor quality in PHC drug utilization (Kadyrova and Kutzin 2002). The hospital case database of the MHIF also shows that the hospitalization rates for some PHC-sensitive conditions covered through the ADP fell significantly and rapidly after the program started. Figure 1.12 shows admission data for selected PHC-sensitive conditions for three hospitals in 2000 and 2001.

The drug reimbursement program in the Kyrgyz Republic shows the potential of a per capita PHC payment system, as it is refined and matures, to serve as a platform for highly complex policy initiatives with effects on the health care system extending well beyond financial incentives. The ADP is still being refined and will benefit from technical improvements, but it has already touched the following areas: efficiency through rational drug use, by triggering increased generic use and reductions in injections; clinical practice, by driving greater adherence to clinical guidelines among PHC providers; service delivery, by sparking immediate reductions in hospitalization rates for various PHC-sensitive conditions; and patient rights and responsibilities, by emphasizing choice but attaching consequences to a higher-priced choice.

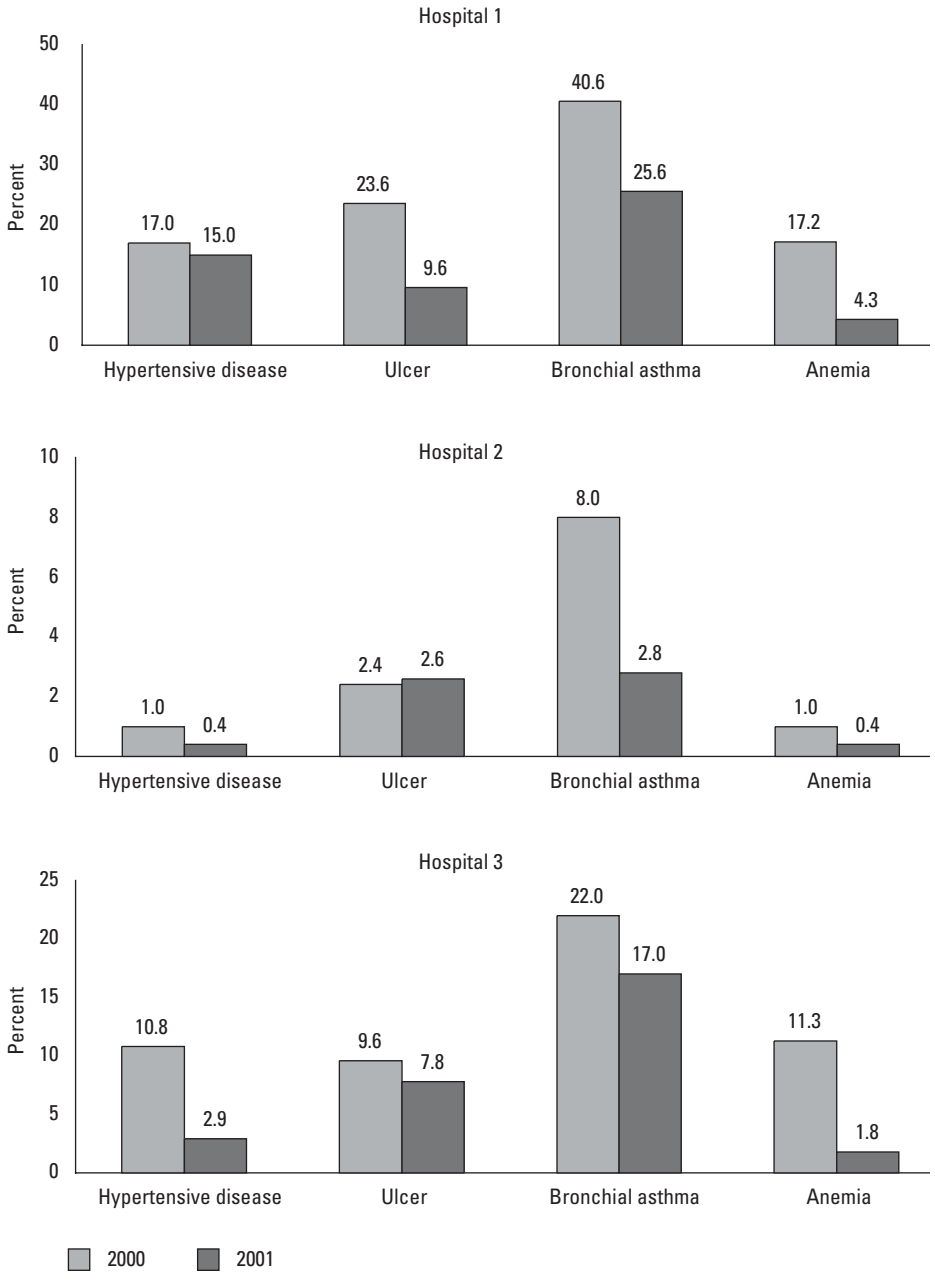
Per Capita PHC Payment and Equity in Tajikistan

A per capita payment system for PHC is being developed for several rural regions of Tajikistan. This example is based on a simulation analysis that was completed in 2007 as part of the development of the new payment system. The simulation shows that a new per capita payment system can begin to address historical inequities in health resource allocation, but the new payment system will have only a limited impact on overall equity unless funds are pooled at higher geographic levels than the current decentralized and fragmented levels. This example illustrates the initial improvements in equity that a per capita PHC payment system can bring, but it also illustrates their limits if the politically more difficult decisions about pooling of funds and interregional transfers are not made.

Even within rural regions, there is wide disparity in allocation of PHC funding across providers in Tajikistan. In one illustrative region, for example, the allocation of PHC resources based on historical budgeting patterns ranged from about twice the average in three PHC facilities to about half the average in the most underfunded PHC facility in the region (figure 1.13). These disparities are not explained by different demographic or morbidity patterns or the size of the population served. The per capita payment system currently being developed in Tajikistan can address this historical inequity by equalizing the per capita amount of PHC funds available to each person in the region.

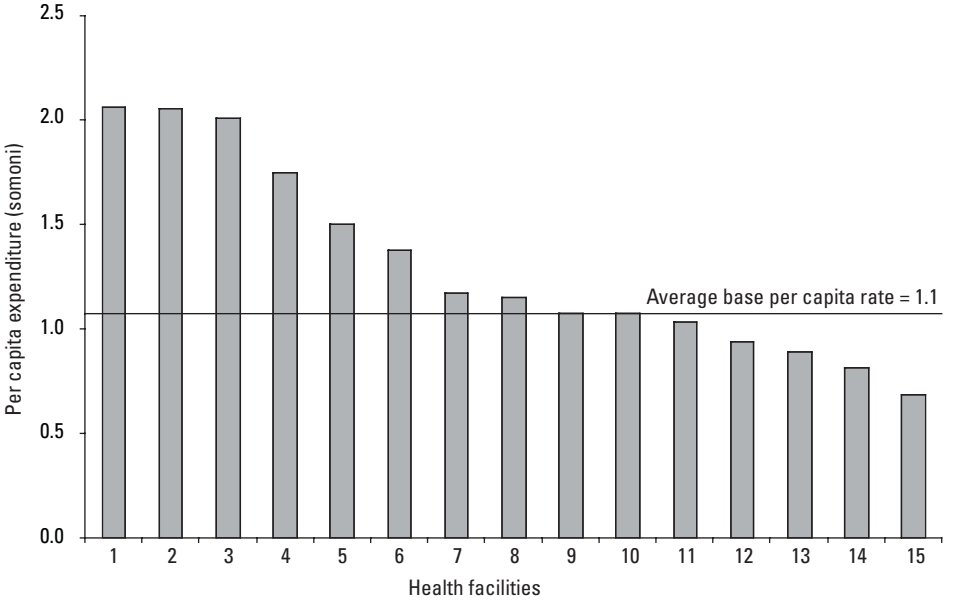
The improvement in equity will be accompanied by an increase in the PHC pool in those regions introducing a new per capita system. In our illustrative region, for example, the PHC pool would be increased from 31.4 percent to

FIGURE 1.12 Change in Share of Cases Hospitalized for Selected PHC-Sensitive Conditions in Three Hospitals, Kyrgyz Republic, 2000 and 2001



Source: Mandatory Health Insurance Fund.

FIGURE 1.13 Allocation of PHC Resources in an Illustrative Region of Tajikistan before Introduction of a Per Capita Payment System



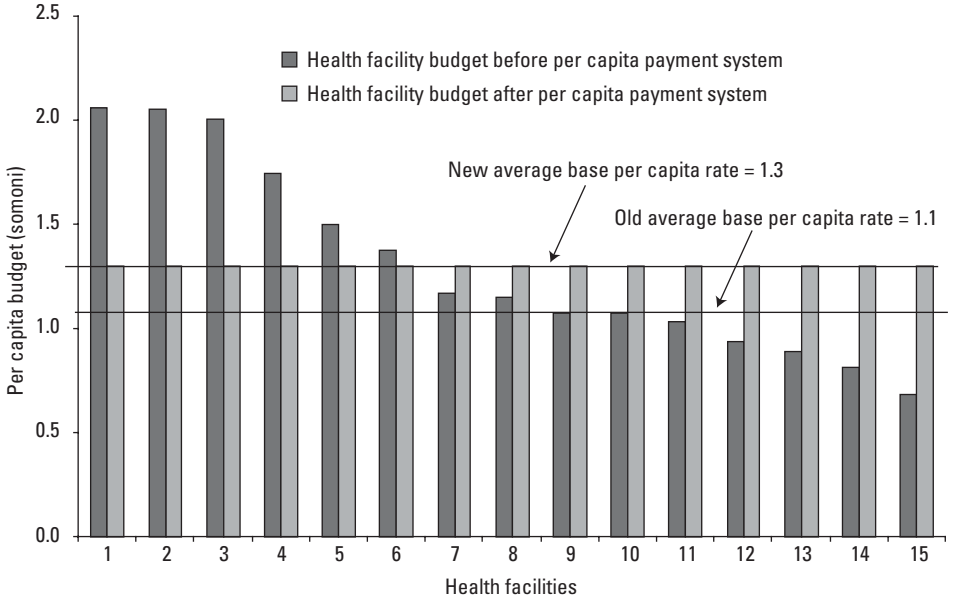
Sources: ZdravPlus Program, Tajikistan Ministry of Health, and local health budget analysis, 2007.
Somoni = The currency of Tajikistan.

35.6 percent of total health care funds. The additional resources would make it possible to achieve greater equity with less impact on the total budgets of individual providers who previously benefited from the inequitable distribution of funding.

Figure 1.14 shows the increase in total resources for PHC and the redistribution through a per capita payment system that could be achieved in this region. The lower of the two horizontal bars shows each facility's per capita financing before the introduction of a new payment system, and the higher one shows the facility's per capita financing after it was introduced, with an increase in the PHC pool in the region. With the increase in resources, only four PHC providers face a decrease in their budgets. Health facilities 7, 8, 9, and 10 would have had reduced budgets but now benefit from increased funding. The gradual adjustment and reallocation of resources is currently being worked out in Tajikistan.

The new per capita PHC payment system in Tajikistan may bring about improvements in the equity of PHC resource allocation within some rural regions, but the full equity impact that is possible through such a payment system will not be achieved, because health care funds are still being pooled at a relatively low geographic level. The potential transfers between rich and poor regions, and between urban and rural areas, will not be realized.

FIGURE 1.14 Allocation of PHC Resources across Providers after Introduction of a Per Capita Payment System and Increase in PHC Pool



Sources: ZdravPlus Program, Tajikistan Ministry of Health, and local health budget analysis, 2007.

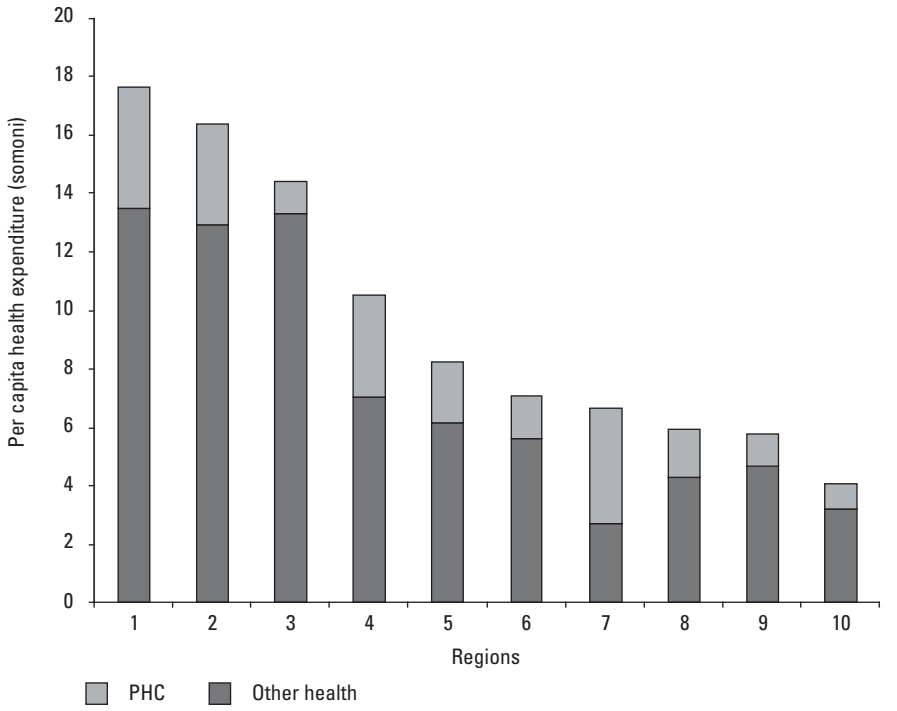
Figure 1.15 shows the huge variation in per capita PHC expenditures across 10 of Tajikistan's regions in 2007: the highest spending was twice the average and four times the lowest-spending region. There was also a wide variation in the allocation of total health care resources to the PHC pool, ranging from 33.5 percent to a low of 7.8 percent, with an average of 26.7 percent.

If the government decided to pool funds for PHC at the national level and set the PHC pool at the national average of 27 percent, using these 10 regions as a sample, the base per capita rate would be 2.3 somoni. Without any further age/sex or geographic adjustment to the payment system, all the PHC providers in our illustrative region would benefit (figure 1.16).

Per Capita PHC Payment and Disease Prevention, Health Promotion, and Community Involvement

A per capita PHC payment system has financial incentives to increase and improve the provision of PHC preventive services, and it is clear from the Central Asian experience that changing the provider payment system alters the perception and behavior of PHC providers and how they relate to the population. Under the new system, PHC providers function more independently, and their payment is directly connected to attracting and then serving an enrolled popu-

FIGURE 1.15 Allocation of Health Care Resources across Regions in Tajikistan, 2007

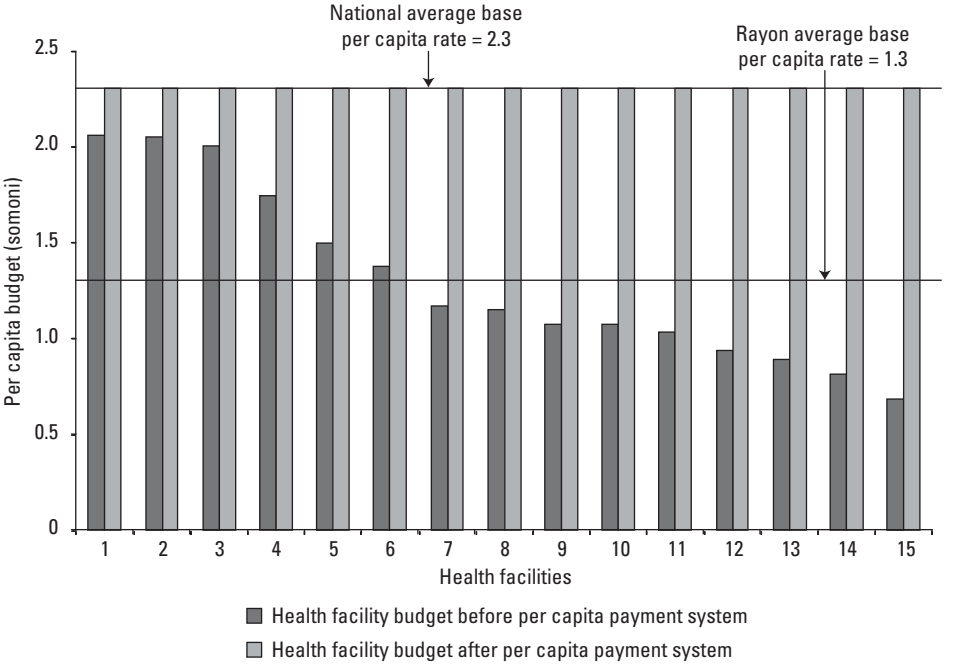


Sources: ZdravPlus Program, Tajikistan Ministry of Health, and local health budget analysis, 2007.

lation. This direct relationship between payment and meeting the needs of their enrolled population has changed the way PHC providers see and value the people they serve, and therefore the nature of the relationship between PHC providers and the populations and communities they serve has also changed. The per capita payment system also places additional responsibility on the population, as services shift to disease prevention and health promotion, which rely on an informed population actively involved in seeking and complying with wellness services.

In Central Asia efforts of PHC providers to increase the information available to the population and the population's engagement have included community-based health promotion and health education activities in all the countries implementing PHC payment reforms (Kazakhstan, the Kyrgyz Republic, Tajikistan, and Uzbekistan), as well as Turkmenistan, where PHC payment reforms have not yet been initiated. This effort has been a constant element in the region, even though the extent of collapse of the old health system, the degree of overall health reform and health system improvement, and the structure of PHC vary significantly. In many cases, PHC providers are becoming community health resource centers with educational materials for patients and visitors. The

FIGURE 1.16 Allocation of PHC Resources across Providers after Introduction of a Per Capita Payment System and National Pooling of Funds



Sources: ZdravPlus Program, Tajikistan Ministry of Health, and local health budget analysis, 2007.

scope of work of nurses, for example, is being expanded to encompass health promotion, and all health professionals are improving their interpersonal communication skills.

Other factors have also contributed to this shift in focus, including a separation of PHC and outpatient specialty services, greater health sector awareness of the benefits of health promotion, and a stronger desire among the population for health education materials and a willingness to act on them. In Central Asia a bonus has been the further strengthening and enhancement of this relationship through the establishment and development of community-based organizations that organize and mobilize the community to increase citizens' involvement in their own health. In Uzbekistan, the existing social or community structures, called *mahallas,* have launched health-related activities by setting up new *mahalla* health initiative groups. The groups' main goal is to foster greater involvement of the community in health promotion activities and to develop joint health promotion activities by PHC providers and the groups themselves.

A lesson learned from Central Asia is that the content of community engagement and education matters—people organize more effectively when they care

about the issue. People care about health, and in countries where it is difficult for people to organize or information is not readily available, strengthening the relationship between PHC providers and individuals or community-based organizations can enhance the participation of the population and the role of people not only in their own health, but also in the health system and in their communities.

NOTE

1. A hospitalization rate of at least 1/10,000 is considered a "risky condition" (Caminal et al. 2004). Hospitalization rates for the conditions monitored in Karaganda remain above 7/10,000.

REFERENCES

Ajwani, S., T. Blakely, B. Robson, M. Tobias, and M. Bonnie. 2003. "Decades of Disparity: Ethnic Mortality Trends in New Zealand 1980–1999." Public Health Intelligence Unit, Occasional Bulletin No. 16, Ministry of Health, Wellington, New Zealand.

Atun, R. 2004. "Advisory Support to Primary Health Care Evaluation Model: Estonia PHC Evaluation Project." World Health Organization Regional Office for Europe, Copenhagen.

Atun, R., N. Menabde, K. Saluvere, M. Jesse, and J. Habicht. 2006. "Introducing a Complex Health Innovation: Primary Health Care Reforms in Estonia (multimethods evaluation)." *Health Policy* 79: 79–91.

Baker, R. 2000. "Managing Quality in Primary Health Care: The Need for Valid Information about Performance." *Quality in Health Care* 9(2): 83.

Borowitz M., S. O'Dougherty, C. Cashin, G. Hafner, J. Samidjiyski, C. VanDevelde, and M. McEuen. 1999. "The Kazakhstan Country Program." USAID-funded ZdravReform Program, Abt Associates Inc., Almaty, Kazakhstan.

Burns, D., A. Isakova, and N. Konovalova. 2003. "Integrating STI Services into Primary Health Care in the Kyrgyz Republic: Implications of Pilot Projects for a National Program." ZdravPlus Program, Bishkek, Kyrgyz Republic.

Caminal, J., B. Starfield, E. Sanchez, C. Casanova, and M. Morales. 2004. "The Role of Primary Care in Preventing Ambulatory Care Sensitive Conditions." *The European Journal of Health Economics* 14 (3): 246–251.

Cashin, C., M. Borowitz, and O. Zues. 2002. "The Gender Gap in Primary Health Care Resource Utilization in Central Asia." *Health Policy and Planning* 17(3): 264–272.

Cashin, C., O. Zues, N. Khe, and A. Nurbaev. 2001. "A Monitoring System for the Primary Health Care Sector in Karaganda, Kazakhstan: Progress Report." ZdravPlus Program, Almaty, Kazakhstan.

Clark, M. 2002. "Health Sector Reform in Costa Rica: Reinforcing a Public System." Paper prepared at the Woodrow Wilson Center Workshops on the Politics of Education and Health Reforms, April 18–19, Washington, DC.

Contencin, P., H. Falcoff, and M. Doumenc. 2006. "Review of Performance Assessment and Improvement in Ambulatory Medical Care." *Health Policy* 77: 64–75.

Department of Health and Ageing of Australia. 2003. *Annual Report 2002–2003*. Canberra, Australia.

Department of Health of the United Kingdom. 2004. "National Standards, Local Action: Health and Social Care Standards and Planning Framework 2005/06–2007/08." London.

Eichler, R., P. Auxila, and J. Pollock. 2001. "Performance-based Payment to Improve the Impact of Health Services: Evidence from Haiti." *World Bank Online Journal.* rru.worldbank.org/documents/publicpolicyjournal/236Eichl-080201.pdf.

Fowles, J., J. Weiner, D. Knutson, E. Fowler, A. Tucker, and M. Ireland. 1996. "Taking Health Status into Account when Setting Capitation Rates." *Journal of the American Medical Association* 276: 1316–1321.

Frolich, A., J. Talavera, P. Broadhead, and R. Dudley 2007. "A Behavioral Model of Clinician Response to Incentives to Improve Quality." *Health Policy* 80: 179–193.

Gauri, V., J. Cercone, and R. Briceno. 2004. "Separating Financing from Provision: Evidence from 10 years of Partnership with Health Cooperatives in Costa Rica." *Health Policy and Planning* 19(5): 292–301.

Government of Kazakhstan. 2000. Government Order No. 806: "On the Approval of Reimbursement Rules for Medical Care." Astana, Kazakhstan.

Government of Uzbekistan. 1999. Government Order No. 100: "On the Implementation of Primary Health Care Reforms in Ferghana Oblast." Tashkent, Uzbekistan.

Greb, S., D. Delnoij, and P. Groenewegen. 2006. "Managing Primary Care Behavior through Payment Systems and Financial Incentives." In *Primary Care in the Driver's Seat? Organizational Reform in European Primary Care,* ed. R. Saltman, A. Rico, and W. Boerma, 184–200. Berkshire, United Kingdom: Open University Press.

Hefford, M. 2005. "Reducing Health Disparities through Primary Care Reform: The New Zealand Experiment." *Health Policy* 72: 9–23.

Hornbrook, M., and M. Goodman. 1996. "Chronic Disease, Functional Health Status, and Demographics: A Multi-Dimensional Approach to Risk Adjustment." *Health Services Research* 31: 283–307.

Jack, W. 2003. "Contracting for Health Services: An Evaluation of Recent Reforms in Nicaragua." *Health Policy and Planning* 18 (2): 195–204.

Jakab, M., A. Preker, A. Harding, and L. Hawkins. 2002. "The Introduction of Market Forces in the Public Hospital Sector: From New Public Sector Management to Organizational Reform." Health, Nutrition and Population Discussion Paper. World Bank, Washington, DC.

Kadyrova, N., and J. Kutzin. 2002. "Purchasing Case Study—Kyrgyzstan." Report produced for the European Observatory on Health Systems and Policies.

Kalda, R., K. Pollust, and M. Lember. 2003. "Patient Satisfaction with Care Is Associated with Personal Choice of Physician." *Health Policy* 64 (1): 55–62.

Karaganda Regional Center for Medical Statistics. 2007. "Principles of Financing and Organizing Primary Health Care in Karaganda Oblast." March. Karaganda City, Kazakhstan.

Karaganda Regional Health Department. 2004. "Report on the Implementation of Integrated Management of Childhood Illness." Karaganda City, Kazakhstan.

Kozak, L., M. Hall, and M. Owings. 2001. "Trends in Avoidable Hospitalizations, 1980–1998." *Health Affairs* 20 (2): 225–232.

Lee, C., and D. Rogal. 1997. "Risk Adjustment in the Health Insurance Market." The Robert Wood Johnson Foundation Special Report, Alpha Center, Washington, DC.

Management Sciences for Health. n.d. *The Health Manager's Toolkit.* http://erc.msh.org/toolkit/.

Marshall, M., P. Shekelle, H. Davis, and P. Smith. 2003. "Public Reporting on Quality in the United States and the United Kingdom." *Health Affairs* 22 (3): 134–148.

McCallum, A., M. Brommels, R. Robinson, S. Bergman, and T. Palu. 2006. "The Impact of Primary Care Purchasing in Europe: A Comparative Case Study of Primary Care Reform." In *Primary Care in the Driver's Seat? Organizational Reform in European Primary Care,* ed. R. Saltman, A. Rico, and W. Boerma, 105–128. Berkshire, England: Open University Press.

McColl, A., P. Roderick, J. Gabbay, H. Smith, and M. Moore. 1998. "Performance Indicators for Primary Care Groups: An Evidence-based Approach." *British Medical Journal* 317: 1354–1360.

McColl, A., P. Roderick, H. Smith, E. Wilkinson, M. Moore, M. Exworthy, and J. Gabbay. 2000. "Clinical Governance in Primary Care Groups: The Feasibility of Deriving Evidence-based Performance Indicators." *Quality in Health Care* 9: 90–97.

Ministry of Health of New Zealand. 2001. *The Primary Health Care Strategy.* Wellington, New Zealand.

———. 2007. moh.nsf/indexmh/phcs-funding-performance.

Ministry of Health of Uzbekistan. 2004. Ministry of Health Order No. 535, Attachment No. 5, December 6.

———. 2005a. Ministerial Order No. 484: "In Support of the Cabinet of Ministers Resolution on Continuing the Implementation of Financing and Management Reforms of Health Facilities in Uzbekistan." Attachment 1: Guidelines for the Calculation of Per Capita Financing of PHC Facilities with Consideration of Age/Sex Adjustment Coefficients. Tashkent, Uzbekistan.

———. 2005b. Ministerial Order No. 498, Attachment No. 2, October 10.

Muratov, S., and B. Waning. 2006. "Kazakhstan Outpatient Drug Benefit." ZdravPlus Discussion Paper, ZdravPlus Program, Almaty, Kazakhstan.

NHS (National Health Service) Executive. 1999. *The NHS Performance Assessment Framework*. London: Department of Health.

Perera, R., T. Dowell, P. Crampton, and R. Kearns. 2007. "Panning for Gold: An Evidence-based Tool for Assessment of Performance Indicators in Primary Health Care." *Health Policy* 80: 314–327.

Rao, M., A. Clarke, C. Sanderson, and R. Hammersley. 2006. "Patients' Own Assessments of Quality of Primary Care Compared with Objective Records Based Measures of Technical Quality of Care: Cross Sectional Study." *British Medical Journal* 333 (7557): 19. Epub June 22.

Reider, G. 2000. "Report on the Project: Integration of STI Prevention and Care into Family Group Practices' Services in Zhezkazgan." ZdravPlus Program, Almaty, Kazakhstan.

Shaw, P. 2004. "New Trends in Public Sector Management in Health: Applications in Developed and Developing Countries." Health, Nutrition and Population Discussion Paper, World Bank, Washington, DC.

Szende, A., and Z. Mogyorosy. 2004. "Health Care Provider Payment Mechanisms in the New EU Members of Central Europe and the Baltic States." *European Journal of Health Economics* 5: 259–262.

van Vliet, R., and L. Lamers. 1998. "The High Cost of Death: Should Health Plans Get Higher Payments when Members Die?" *Medical Care* 36: 1451–1460.

Vargas, V., and J. Wasem. 2006. "Risk Adjustment and Primary Health Care in Chile." *Croatian Medical Journal* 47: 459–468.

Vladescu, C., and S. Radulescu. 2001. "Primary Health Services: Output-based Contracting to Lift Performance in Romania." Public Policy for the Private Sector. Issue 239. The World Bank Group Private Sector and Infrastructure Network.

Weiss, C. 1998. *Evaluation*. Upper Saddle River, N.J.: Prentice Hall.

Weissman, J. S., C. Gatsonis, and A. M. Epstein. 1992. "Rates of Avoidable Hospitalization by Insurance Status in Massachusetts and Maryland." *JAMA* 268 (17): 2388–2394.

WHO (World Health Organization). 2001. Basic Health Indicators Database.

WHO Regional Office for Europe. 1995. "Manas National Conference on Broad Policy Options. Manas Health Programme of the Kyrgyz Republic." Bishkek, Kyrgyz Republic.

ZdravPlus Program. 2001. "A Monitoring System for the Primary Health Care Sector in Karaganda City." Almaty, Kazakhstan.

———. 2007. "Tajikistan Ministry of Health and Local Budget Analysis." Almaty, Kazakhstan.

ZdravReform Program. 1999. "First Phase of the Issyk-Kul Oblast Demonstration Site: Building the Health Reform Foundation in Kyrgyzstan." Almaty, Kazakhstan.

———. 2000. "Health Reform Initiatives in Central Asia: ZdravReform Program Final Report." Almaty, Kazakhstan

CHAPTER 2

Case-Based Hospital Payment Systems

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OVERVIEW OF CASE-BASED HOSPITAL PAYMENT SYSTEMS

The chapter is based on a synthesis of international evidence and experience related to the design and implementation[1] of case-based hospital payment systems. It summarizes lessons learned and consolidates specific technical recommendations. Many of the examples and illustrations are drawn from the experience of the Central Asian republics of Kazakhstan and the Kyrgyz Republic, where the authors have direct experience implementing health care financing reform. These countries have been using case-based hospital payment systems since the mid-1990s and have completed several iterations of development and refinement of these systems. Because they inherited many of the same challenges faced by health care systems in other low- and middle-income countries throughout the world, their experience implementing case-based hospital payment systems is relevant for many other countries. The chapter also provides case studies from Kazakhstan and the Kyrgyz Republic.

Defining the Health Policy Context

A case-based hospital payment system (that is, the whole set of rules, policies, and supporting management and information systems) should be designed in the context of broader health policy goals, the current capacity of the system, and the desired or expected changes in the system. The payment system will likely stimulate changes in hospital care that also will be felt in other parts of the health care system. For example, if the new payment system creates incentives for shorter hospital stays, outpatient or community care must be ready to provide a greater degree of follow-up care. Therefore, planning of the new case-based hospital payment system should include an analysis of the expected impacts and potential unintended impacts not only within the hospital sector, but also on other parts of the health care system and community. The following questions should be addressed before a case-based hospital payment method (that is, the formula for allocating money) is selected and the new system is designed:

- What is the system, organizational, and policy context of health care services?
- What are the goals of the case-based hospital payment system?
- What conditions must be met and what steps are required to ensure that the goals will be achieved?
- What changes can be expected in the hospital sector and other parts of the health care system and community after the new hospital payment system is introduced?

The above questions are now discussed in greater detail.

Several methods for paying hospitals are used widely throughout the world, all of which have a variety of strengths and weaknesses, both in theory and in practice. There is no clear consensus about which hospital payment method is most successful in bringing about desired results for the health care system, while minimizing the unintended consequences. Some payment systems may be more appropriate for certain environments or countries at certain times; the payment system that is most appropriate may change over time in any given setting; and often it is most effective to use more than one payment method in combination. In recent years, however, many countries have followed the United States (U.S.) Medicare system (which provides health services for the elderly) and have moved toward some variation of case-based payment, which reimburses to all hospitals in the payment system a predetermined fixed rate for each treated hospital case. Before choosing a case-based hospital payment system, it is necessary to assess the systemic, organizational, and policy context of health care services to determine the most appropriate payment method. (The subsections that follow discuss how to do this.)

Goals of a case-based hospital payment system for low- and middle-income countries

The goals of the new hospital payment system should be clarified before the system is chosen and designed. These goals should be consistent with the broader goals related to the health financing and delivery system. Case-based hospital payment was introduced in the U.S. Medicare system with the primary goal of promoting cost containment in the hospital sector. In most low- and middle-income settings where per capita health expenditures are generally too low, however, goals related to improving management and resource use, to shifting expenditures to more cost-effective services, or to improving the equity of health financing are likely to be more pressing. Goals to be supported by a case-based hospital payment system may include, for example, one or more of the following:

- Reorient the health system planners and providers to begin thinking in terms of providing health services to the population rather than creating or maintaining infrastructure (buildings)

- Create incentives for hospitals to supply higher-quality services using fewer or lower-cost inputs
- Introduce competition for providers and choice for patients to increase the responsiveness of the health system to patients and the population
- Allow payment by government health purchasers to private health facilities
- Drive restructuring of the health delivery system
- Reprofile or close inefficient hospitals and departments
- Improve the efficiency of resource allocation across hospitals, and between the hospital sector and other levels of care
- Improve the equity of health financing across, for example, hospitals, geographic areas, or population groups
- Generate information for better management of the health sector
- Increase provider management autonomy (in effect, decentralization of hospital management).

In the Kyrgyz Republic, for example, introducing a case-based hospital payment system was one element in a broader health financing policy that had the goal of shifting resources to the primary health care sector, streamlining the oversized hospital sector (particularly in urban areas), using resources more efficiently in the hospital sector, increasing the autonomy of hospitals to allocate their own resources, and increasing the responsiveness of the health system to patients and to the population.

Conditions for implementation

In order for a case-based hospital payment system to reach any of the goals outlined above, certain conditions should exist. The new payment system will create new incentives for providers, and therefore the most important conditions relate to determining the strength of the incentives that are desired and making it possible for providers to respond to them. Conditions may include, for example:

- *Health purchaser capacity.* This must be developed to manage the new payment system, including capacity to develop and implement purchasing contracts, manage information systems and quality assurance systems, and monitor and evaluate purchasing policies. In many low- and middle-income countries, because the function of health purchasing may be weak or nonexistent, not only will significant capacity building be needed before a new hospital payment system is introduced, but the basic institutional structure and regulatory framework for health purchasing may need to be created.
- *Pooling of health care funds.* To some degree, this must be established in order for the payment rate per case to be set as an average across a group of hospi-

tals (a critical aspect of case-based payment), and for payment to actually follow hospital cases. If, for example, health financing is decentralized, and health funds are generated and disbursed at the administrative level (such as a region or city) with no pooling across administrative units, it is difficult to establish a consistent set of payment rates for hospital cases, and there is no opportunity for competition or reallocating funds across administrative units based on the number of treated cases. If the administrative (or geographic) area or group of hospitals for which health care funds are pooled is too small, the case-based hospital payment system approaches hospital-specific payment, and the incentives for efficiency are limited.

- *Relationship between the health purchaser and providers (hospitals).* This must be clear, particularly between public health purchasers and private providers, including the development of contracts or other mechanisms that specify which services the providers agree to deliver and what prices the purchaser agrees to pay; which party has the authority to make which decisions; and what recourse is available to each party if the terms of the contract are not met. (See chapter 4 for further discussion of contracts.)
- *Conditions in place for appropriate degree of competition and financial risk.* Hospitals will be exposed to these new ideas under the new payment system. For example, if one of the goals is to drive the restructuring of the delivery system, it may be decided that hospitals should be exposed to more competition and greater financial risk, with the result that the new payment system leads to downsizing and closure of inefficient hospitals. Some steps may be required to determine the circumstances in which department or hospital closures will be permitted and how those decisions will be made, as well as how access to hospital care will be protected as inefficient providers exit the system.
- *Provider awareness and understanding of new incentives.* The new payment system will create new incentives, and substantial efforts may be needed to educate providers about the system so that they understand which changes will be possible (or necessary to carry out well) in the new system. Providers must be aware of the possibilities for the reprofiling of services and shifting the focus of care to the outpatient level so as to benefit from outpatient care payment methods as well.
- *Decision rights (autonomy).* Providers must be granted a measure of decision rights with respect to reorganizing service delivery and managing their inputs in order to respond to the new incentives. Providers should have increasing autonomy to make the following decisions:[2]
  - *Staffing*—hiring and firing, remuneration, fringe benefits
  - *Other inputs*—quantity and type of drugs, supplies, and other inputs
  - *Physical assets*—disposing of existing capital stock, including buildings and equipment, or acquiring new capital, such as equipment

  - *Organizational structure*—management structure and processes, contracting out services, etc.
  - *Output mix*—types of services provided
  - *Use of surplus revenues*—how surplus revenues generated from efficiency gains are used.
- *Provider capacity to manage internal resources*. Providers must have such capacity for the new payment system, including that required for accounting, billing, and information systems
- *Appropriate capacity and financing mechanisms*. These must be created in other parts of the health care system to enable those parts to take on a larger share of service delivery as incentives for hospitals to decrease lengths of stay and make other changes in their services.

Different agencies may have authority to grant autonomy in these areas. To create the necessary conditions, legal and regulatory changes may be needed, many of which are outside the control of the health sector. For example, labor laws and regulations may interfere with health sector policies to grant hospitals autonomy over hiring and firing staff or setting salaries. Or Ministry of Finance funds-flow policies and procedures may restrict pooling of health care funds, reinvestment of savings, ability of providers to determine allocation of resources, or other financial management decisions. These legal and regulatory changes may be made through temporary waivers in the short term, as policy dialogue and broader-based legislative reform are undertaken to achieve longer-term solutions. In some contexts, the legal and regulatory challenges may be most easily addressed by changing the legal status of hospitals from public entities to some other type of enterprise and, possibly, privatizing them.

Anticipating intended and unintended consequences of the new system

If the main conditions are met and the payment system is properly designed, case-based hospital payment rewards results, and it can be expected that health care providers will examine the way in which they structure, organize, and deliver care; motivate and supervise staff; and use resources (Eichler, Auxila, and Pollock 2001). Profound changes in the way that services are delivered are possible. As providers adjust to the system, however, they will adapt their behavior to further their own self-interests under the new system, which may also lead to some unintended consequences.

The changes that are brought about by the new payment system, both intended and unintended, will be determined by the way in which the system is designed and the context within which it operates. Table 2.1 shows some possible intended and unintended consequences of a case-based hospital payment system, as well as features that may be incorporated into the design of the system to mitigate the negative effects of unintended consequences. Unintended

consequences are not always negative, but whether negative or positive, they should be recognized and incorporated into a health policy framework.

Components of a Case-Based Hospital Payment System

In a case-based hospital payment system, the health purchaser pays all hospitals in the system a fixed payment rate for each treated case that falls into one of a set of defined categories of cases. Payment rates for treated cases can be defined as one of the global average cost for all hospital cases, the average cost per case in each hospital department, or the average cost per case in the category of the patient's diagnosis. The fixed payment rates are set for a group of hospitals, rather than for a single hospital, because implementing a new payment system for a single hospital will not achieve any of the new payment system's goals. Any underlying differences in costs across hospitals need to be addressed by the process of case grouping, or other adjustments across groups of cases or groups of hospitals, rather than by establishment of hospital-specific payment rates. How a treated case is defined and the degree to which cases are differentiated to reflect different costs of treatment determine both the incentives that will be created by the payment system and the complexity of the information and billing system that is required to support the payment system.

TABLE 2.1 Possible Consequences of a Case-Based Hospital Payment System

Possible intended consequences	*Possible unintended consequences*	*Design features to reduce unintended consequences*
Shorter hospital stays	Increase in hospital admissions Increase in readmissions	Instruments for the purchaser to monitor and control volume and quality of care
More efficient use of hospital inputs	Excessive reduction in intensity of care and poor quality Increase in use of outpatient and community care for follow-up	Adequate capacity to increase outpatient and community care for follow-up
More efficient and effective mix of hospital services	Avoidance of high resource-intensity (severe) cases or cases with a low payment rate	Cross-subsidization across case payment rates to favor priority diagnoses and services
Higher-quality hospital data	"Gaming" of the system (interpreting the rules to their own advantage) through upcoding (systematically recording diagnoses that are reimbursed at higher rates than the actual diagnoses)	Instrument for the purchaser to monitor coding patterns and identify upcoding trends
Closure of hospital beds, departments, and facilities	Inadequate access to hospital services in some geographic areas	A combination of planning and payment incentives to achieve the desired size and location of hospital infrastructure

Source: Authors.

The objective of a case-based hospital payment system is to reimburse hospitals the average expected cost in an average-performing hospital to treat a case in a given category. The actual costs of treating individual cases exceed the payment rate in some cases and fall below it in others, which is the feature of the payment system that creates incentives to make hospital management more efficient. If a hospital within a system is paid its actual cost for each case, it has no reward, and therefore no incentive, to improve its efficiency in treating cases. If, however, it is paid an average cost per case, it has an incentive to change its cost structure so that it can treat more cases at a cost below the average cost and therefore generate a surplus for itself, which it can invest in improving the quality of its services and thus attract more patients and generate more revenue. In this way, paying hospitals the average cost for treating a type of case stimulates competition.

Case-based payment systems have at least two components: an administration system (information and billing) for hospitals to report their cases and be reimbursed by the purchaser; and the set of parameters for calculating the payment rates for each type of case. These payment systems, when they use diagnosis-based case groups, also require an information system that computerizes the recording of cases by the hospitals and the grouping of cases into payment categories for the purchaser. The parameters for calculating the payment rate per case include at least a base rate, or global average cost per case, and case group weights to differentiate cases with different resource intensities. The most general formula for computing payment rates in a case-based hospital payment system is shown in equation (2.1):

$$\text{Payment per case}_i = BR \times CGW_i \tag{2.1}$$

where

$\text{Payment per case}_i$ = price paid by purchaser for cases in case group *i*
BR = base rate, or global average cost per case
CGW_i = case group weight for case group *i*

Case group weights reflect the average cost per case in a given case group relative to the global average cost per case. For example, a case group weight of 1.2 for case group X indicates that cases in case group X use on average 20 percent more resources to diagnose and treat than the average case in the payment system. In the simplest case-based payment systems that pay hospitals one global average cost per treated case, the case group weights (CGW_i) are all set to 1.

Adjustment parameters, such as region-specific or hospital-type adjustment coefficients, may also be added to the basic per case formula to determine the final payment rate for a particular case in a particular hospital (box 2.1). For example, a coefficient may be added to uniformly increase the payment rate to teaching hospitals or hospitals serving a disproportionate share of poor and socially vulnerable patients, or to reflect regional variations in the cost of hospital inputs, such as labor. In addition, coefficients for payment for unusually

BOX 2.1 POSSIBLE ADJUSTMENT COEFFICIENTS TO THE PAYMENT PER CASE FORMULA

Coefficients that apply to groups of cases:

- Case group weights
- Outliers
- Transfers
- Incomplete cases.

Coefficients that apply to groups of hospitals:

- Geography
- Teaching hospitals
- Population served (such as the poor and socially vulnerable).

expensive cases (outliers), for transfers, and for incomplete cases, for example, can be applied to the basic formula to adjust for cost variations beyond the control of providers, to reduce financial uncertainty, to avoid duplication of payments, and to promote equitable allocation of financing across services.

A case-based hospital payment system that differentiates cases according to the diagnosis requires a tool to scale the level of complexity—or more precisely, the resource consumption—of each case relative to the others. This tool is called the clinical grouping of cases, which uses a set of criteria and a process for allocating hospital cases into clinical groups that have similar clinical characteristics and resource intensities. Case group weights are then computed for these clinical groups by calculating the cost of diagnosing and treating cases in each group relative to the average cost per case.

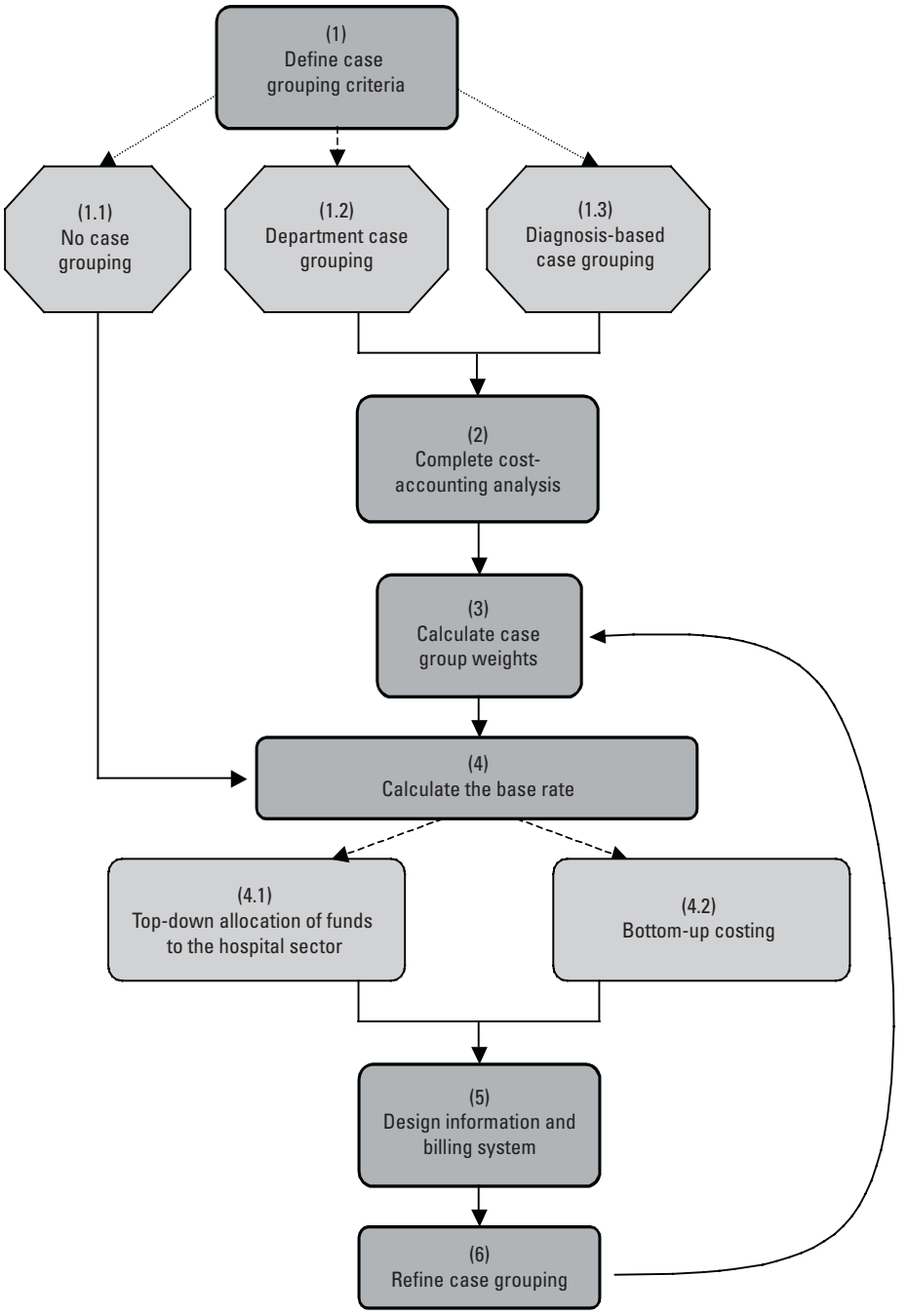
Steps in Developing a Case-Based Payment System

Figure 2.1 shows the steps in developing a case-based hospital payment system:

- defining case grouping criteria
- completing cost-accounting analysis
- calculating case group weights
- calculating the base rate
- designing the information and billing system
- refining case grouping.

These steps are described in detail in the remainder of this chapter. Although the steps are depicted in figure 2.1 as a sequential process, the development and implementation of a case-based hospital payment system are an ongoing iterative process of collecting and analyzing data, developing payment parameters and other components of the system, implementing the system, collecting more

FIGURE 2.1 Steps in Developing a Case-Based Hospital Payment System



Source: Authors.

data through the process of implementation, monitoring system behavior, and refining the system.

In addition, several of the steps may well be carried out simultaneously. For example, while case grouping criteria are being developed, some cost analysis should be initiated to get an idea of variation in resource intensity across cases to inform the definition of the groups. The average cost per case within each group is recalculated after the groups are defined and refined as more data become available during operation of the payment system. Also, the development of the information and billing system can start simultaneously with the design of the payment system.

DEFINING CASE GROUPING CRITERIA

The case groups in a case-based hospital payment system group cases that have similar clinical characteristics and similar resource requirements for diagnosing and treating cases, so that these cases can be reimbursed at different rates. The simplest system, which reimburses hospitals the average cost per case for all hospital cases, does not put cases into case groups. The next level is to group cases by the department (aggregate clinical specialty) to which the case was admitted or from which it was discharged. The most sophisticated level is grouping cases according to diagnosis and major procedures. The level of complexity is determined by the amount of detail of available cost and clinical data that are needed to compute the cost per case for each group of cases.

Data Requirements

Defining case grouping criteria and then calculating case group weights require estimates of the cost per case for a group of cases. One way that estimates of the cost per case within a department or specialty group are obtained is by using the step-down cost-accounting method discussed in detail in the section, *Cost-Accounting Analysis*. The cost per case may be based on the average cost per bed-day in the department where a given type of case is treated, and the average length of stay for that type of case. If no data are available on costs and lengths of stay during the initial stages of developing the payment system, even at the department level, the payment system cannot group hospital cases immediately, and a simple average cost per case may be used while the necessary data are being generated by the new payment system. It is also possible, however, to do a special survey of costs and average length of stay of cases in each department to develop initial estimates to begin a department case grouping system.

If some data are available on department costs and lengths of stay for some groups of cases, then a department case grouping system may be implemented immediately, or some hybrid of department and diagnosis-based case grouping (box 2.2).

BOX 2.2 INITIAL CASE GROUPS AND WEIGHTS IN THE KYRGYZ REPUBLIC

The case groups for the hospital payment system in the Kyrgyz Republic were developed in three phases, an initial phase and two refinements, as the type and amount of available data improved. A hybrid approach was used initially, because, while detailed data on average length of stay were available for some cases at the start, only department cost and clinical data were available for most of them. The initial case grouping system was based on hospital cost accounting and data available from the national health statistics system. These data enabled the hybrid approach to be developed, with 28 case groups. These groups were split further into cases with and without a stay in the intensive care unit, giving a total of 56 groups. Hepatitis, for example, was a separate diagnosis-based case group, because the statistics system separated data related to this diagnosis, while all cases treated in the internal medicine department were treated as one case group, because the statistics system did not record disaggregated information on those.

0	Unclassified	1.0000	15	Ear, nose, and throat without surgery	0.7834
1	Surgery	1.0585	16	Ophthalmology with surgery	1.1847
2	Diarrheal infections in children (001–009)	0.8498	17	Ophthalmology without surgery	1.0209
3	Diarrheal infections in adults (001–009)	0.6674	18	Hypertension (401–404)	0.8802
4	Hepatitis (A & B) in children (070)	1.2455	19	Cardiovascular diseases	1.0706
5	Hepatitis (A & B) in adults (070)	1.6301	20	Other cardiology	1.0307
6	Other infections in children	1.3278	21	Neurology	1.0991
7	Other infections in adults	1.1287	22	Pediatric cases	1.0700
8	Internal diseases	1.1111	23	Intensive care	1.7611
9	Fractures in children (820–829)	1.1216	24	Delivery	0.7218
10	Fractures in adults (820–829)	1.3218	25	Gynecology	0.6917
11	Other injuries in adults and children	0.9307	26	Neonatal problems	2.3235
12	Urology with surgery	0.9544	27	Complication of pregnancy	0.8349
13	Urology without surgery	0.8236	28	Daybed cases	0.9000
14	Ear, nose, and throat with surgery	0.8987			

Actual implementation of the initial case grouping with an accompanying information system allowed the collection of much better data, including individual diagnosis and length of stay. During the first refinement, individual data on 40,000 cases were used to construct a new case grouping system with the number of groups increasing to 54 groups (108 groups with and without a stay in the intensive care unit). The second refinement was performed once the information system contained data on approximately 1 million cases, which resulted in a more stable case grouping system based entirely on diagnosis with 139 case groups (Samyshkin and Lisitsin 1998a and b; Samyshkin 1999).

TABLE 2.2 Data Requirements for Case Grouping

Type of case grouping	*Data requirements*	*Data sources*
No case grouping	Average cost per hospital case	Historical hospital budgets; statistical data; other hospital expenditure and utilization data
Department case grouping	Department average cost per bed-day; department lengths of stay	Hospital budgets and cost-accounting analysis; statistical data; other hospital expenditure and utilization data
Diagnosis-based case grouping	Department average cost per bed-day; individual diagnosis, length of stay, and other characteristics of the case	Hospital budgets and cost-accounting analysis; statistical data; individual data on age, sex; ICD-9 or ICD-10 code for primary diagnosis; length of stay, surgery, and other characteristics of the case (such as intensive care)

Source: Authors.

Cost per bed-day at department level as well as individual clinical data are necessary to design and run a system with complete diagnosis-based case grouping. The individual clinical data required include the age and sex of the patient, the International Classification of Diseases (ICD-9 or ICD-10) code for the primary diagnosis, length of stay, and other details of the case, such as whether there was surgery and whether the patient spent time in intensive care, which may be associated with the cost of treatment. (See table 2.2.)

It is unlikely that complete cost data and individual clinical data are available when the case-based payment system is being designed. When the payment system is launched, at whatever level of detail that is possible initially, the data systems necessary to develop case grouping criteria and case group weights are put in place. As the payment system is implemented and as more data become available, it becomes possible to develop or refine case groups and case weights.

Types of Case Grouping

No case grouping

The simplest case-based hospital payment system does not group cases, but pays for all hospital cases at the same rate (the base rate).

$$\text{Payment per case} = BR \tag{2.2}$$

This type of payment system is an option if no disaggregated data are available on the clinical characteristics or costs of individual hospital cases. The advantage of using no case grouping initially is that it is administratively simple, and that it introduces the idea of case-based payment while the data are being collected for more sophisticated systems. A system with no case grouping should only be a starting point, however, and should not be operated for more than a year, because reimbursing all hospital cases at the same rate creates a strong

incentive for hospitals to increase admissions for low-cost cases and avoid costly cases. In Kazakhstan, for example, the Mandatory Health Insurance Fund (MHIF) introduced a case-based hospital payment system with no case grouping in 1996. Experience showed that after only one year, there was a sharp increase in the number of treated cases, particularly of less severe cases that were "recruited" from outpatient polyclinics attached to hospitals (Katsaga 2000). To counteract this response of providers, health insurance funds in several regions of the country where new information systems were set up as part of the new hospital payment system, such as Karaganda and Zhezkazgan, very quickly moved to introduce some form of case grouping.

Another option when no disaggregated clinical data are available is to run a case-based system on paper only, without actually changing the payment to hospitals, during the time that data are being collected to design a more sophisticated system (see the section, *Implementation Issues*, below).

Department grouping

The next level of complexity is to group cases by the department to (or from) which the case was admitted (or discharged). Departments in a hospital are often dedicated to a broad clinical specialty, therefore grouping by department can also be called specialty grouping. In a system with department grouping, all cases discharged from the same department (or specialty group) are paid the same rate.

$$\text{Payment per case}_d = \text{BR} \times \text{CGW}_d \tag{2.3}$$

where

$\text{Payment per case}_d$ = price paid by purchaser for cases discharged from department *d*
BR = base rate, or global average cost per case
CGW_d = case group weight for department *d*

Department grouping can be introduced even when only highly aggregated department data are available. If data on average length of stay are available by department, cost-accounting data can be collected to calculate average cost per case and department case group weights. A set of departments must be defined that is comparable across all hospitals in the payment system, and then the average cost per case is calculated for each department. Case group weights are calculated from the cost in each department relative to the overall average cost per case (see the section, *Calculating Case Group Weights*, below).

Diagnosis-based case grouping

The most sophisticated payment systems group cases by diagnosis, procedure/surgery, or case management approach. This approach consists of a case classification system, which groups patients into mutually exclusive

(nonoverlapping) categories defined by their type of diagnosis. These categories, which may also be known as diagnosis-related groups (DRGs), comprise a group of diagnoses that are both clinically cohesive and similar in the intensity of resources required to diagnose and treat a case, or to complete a phase of case management. Each category is given a relative weight based on its cost compared to the average cost for all cases. Payment to a hospital for a case is calculated as the base rate multiplied by the weight for the category to which the patient is assigned.

(2.4) $$\text{Payment per case}_d = \text{BR} \times \text{CGW}_i$$

where

$\text{Payment per case}_i$ = price paid by purchaser for cases in diagnosis-based case group *i*
BR = base rate, or global average cost per case
CGW_i = case group weight for diagnosis-based case group *i*

Criteria for Diagnosis-Based Case Groups

Case groups should be defined so that they are medically and economically homogeneous (Grimaldi and Micheletti 1982). In this way the definition will make sense to both clinical professionals and financing specialists. In addition, the average cost per case within a case group should be statistically stable in repeated samples. There are therefore three main criteria that underlie the formation of diagnosis-based case groups: clinical homogeneity, economic homogeneity, and statistical representativeness.

Clinical homogeneity

Cases that are grouped into one diagnosis-based case group should be similar by anatomical system and belong to one group of diseases. Clinical coherence is important for the case classification system to be logical from a medical standpoint and to be understood and accepted by providers.

> A medically meaningful classification (scheme) stimulates expectations as to the natural history of the disease, the appropriate ways to manage the case, the prognosis, the likelihood of complications of specific kinds, and the risk of death. Determination of medical meaningfulness is therefore a subjective process, best accomplished by consensus of clinicians from the defined population (Wood, Ament, and Kobrinksi 1981).

The Australian National Diagnosis Groups classification, for example, uses three criteria to establish clinical homogeneity: grouping of body systems; separation of medical and surgical cases; and a hierarchy of procedures, medical problems, and other factors that differentiate processes of care.

Economic homogeneity

Each diagnosis in a diagnosis-based case group should have a similar resource intensity and cost for the range of diagnostic and treatment services needed to completely diagnose and treat the case (or complete a phase of case management). Costs are distributed within each group of course, but the distribution should be relatively tight. The resource intensity is estimated initially using the average length of stay and the average cost per bed-day in the department in which the case is typically treated, without costing out each service individually.

Statistical representativeness

Each diagnosis-based case group should contain enough hospital cases to produce stable aggregate estimates of cost per case in repeated samples.

Steps for Developing Diagnosis-Based Case Groups

The process of developing mutually exclusive diagnosis-based case groups that meet the above three criteria can begin when individual data are available on the diagnosis, department, and length of stay for each hospital case, as well as the cost per bed-day in each department in each hospital. Ideally these clinical data are available for each case treated in each hospital to be included in the payment system, but diagnosis-based case groups can also be constructed using limited data on a subset of hospital cases. Before case groups are developed, it should be decided how surgical cases are to be weighted in the payment system. There are three options.

- *Option 1*. A surgical case can be treated as a variation of the primary diagnosis, with a single "surgical multiplier weight" multiplied by the case group weight of the primary diagnosis to determine the final case group weight of each case. The amount that surgery alters the case group weight, either upward or downward, of the primary diagnosis does not vary by case group.
- *Option 2*. Surgical cases can be treated as a completely separate group of cases with weights determined by the complexity of the surgical procedure. The primary diagnosis does not determine the case group weight for surgical cases.
- *Option 3*. A surgical case can be treated as a variation of the primary diagnosis, with surgical multiplier weights that vary by diagnosis.

In options 1 and 2, case groups and case group weights are developed separately for medical and surgical cases; in option 3, one set is developed. Options 1 and 2 are typical approaches when case data are limited, but option 3 yields the most precise estimates of variation in resource intensity related to surgical procedures. Option 1 was adopted initially in Karaganda, Kazakhstan, but surgical codes consistent with option 2 were developed there over time. A hybrid of

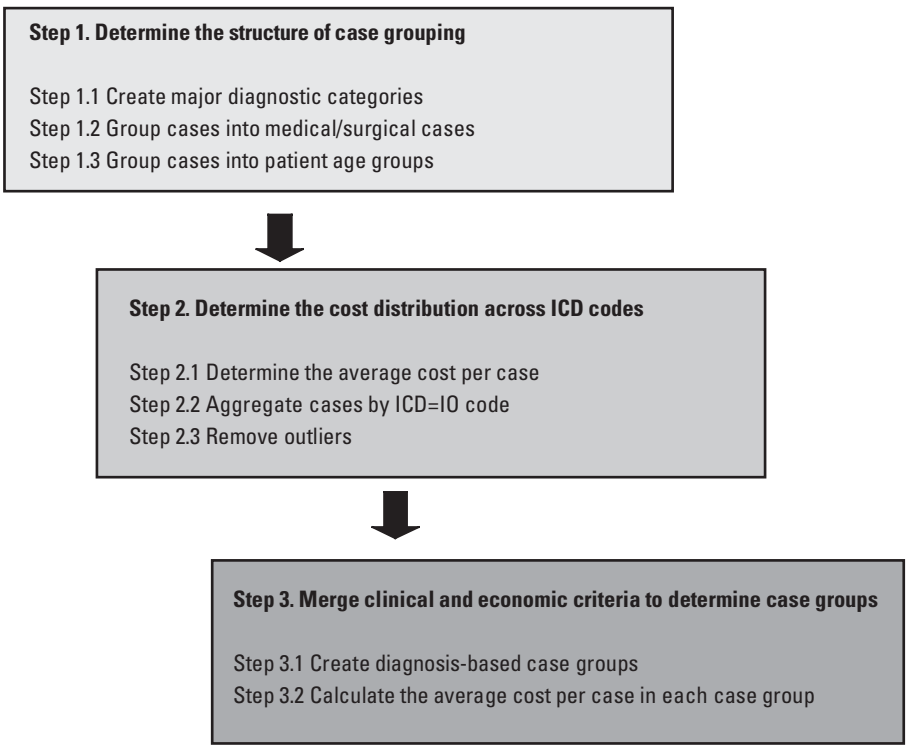
options 2 and 3 was adopted in the Kyrgyz Republic. Option 3 was used in the definition of DRGs in the U.S. Medicare program.

After the option for weighting surgical cases has been selected, come three steps for developing diagnosis-based case groups (figure 2.2). (These vary slightly depending on which of the three options was chosen.) Step 1 establishes a set of nonoverlapping groups of hospital cases that are clinically homogeneous. In step 2, the economic homogeneity criterion is applied to condense the groups into a smaller set of groups that have similar resource intensities, without sacrificing clinical homogeneity. In step 3, the clinical and economic criteria are merged to define the final set of case groups.

Step 1. Determine the structure of case grouping

Step 1.1: Create major diagnostic categories (MDCs). In this step the approximately 4,000 ICD-9 or 14,000 ICD-10 codes are grouped into a smaller number of broad groups—MDCs—based solely on clinical criteria. MDCs are developed taking into account the clinical homogeneity criterion, with the objective that each diagnosis-based case group completely falls into one of the MDCs. The MDCs may be formed according to the anatomical systems (nervous system, digestive

FIGURE 2.2 Steps for Developing Diagnosis-Based Case Groups



system) or disease etiology (infectious or parasitic diseases). The MDCs should conform to the ICD classes of diseases, and each should be related to a particular medical specialty, with some minor exceptions.

The U.S. Medicare DRG system has 26 MDCs, and the Australian system has 23 MDCs (box 2.3), but fewer groups may be necessary in the early stages of a new system. For example, a pilot case-based hospital payment system of the Republic of Korea's national health insurance program started with five MDCs in the first year, expanding to nine by the third (Lee and Lee 2007; Kwon 2003).

Step 1.2: Group cases into medical/surgical cases. The process for determining the structure of case grouping under the three surgical grouping options is shown in figure 2.3. In surgical grouping options 1 and 2, cases are divided into medical

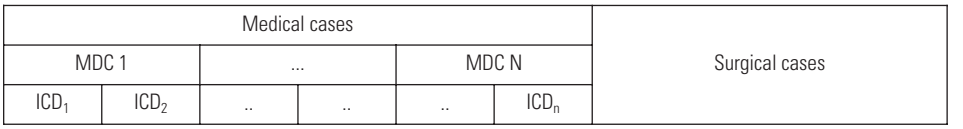
BOX 2.3 MAJOR DIAGNOSTIC CATEGORIES IN THE AUSTRALIAN REFINED DIAGNOSIS-RELATED GROUPS CLASSIFICATION

MDC 1	Diseases and disorders of the nervous system
MDC 2	Diseases and disorders of the eye
MDC 3	Diseases and disorders of the ear, nose, mouth, and throat
MDC 4	Diseases and disorders of the respiratory system
MDC 5	Diseases and disorders of the circulatory system
MDC 6	Diseases and disorders of the digestive system
MDC 7	Diseases and disorders of the hepatobiliary system and pancreas
MDC 8	Diseases and disorders of the musculoskeletal system and connective tissue
MDC 9	Diseases and disorders of the skin, subcutaneous tissue, and breast
MDC 10	Endocrine, nutritional, and metabolic disorders
MDC 11	Diseases and disorders of the kidney and urinary tract
MDC 12	Diseases and disorders of the male reproductive system
MDC 13	Diseases and disorders of the female reproductive system
MDC 14	Pregnancy, childbirth, and the puerperium
MDC 15	Newborns and other neonates
MDC 16	Diseases and disorders of the blood and blood forming organs and immunological disorders
MDC 17	Neoplastic disorders
MDC 18	Infectious and parasitic diseases
MDC 19	Mental diseases and disorders
MDC 20	Alcohol/drug use and alcohol/drug induced organic mental disorders
MDC 21	Injuries, poisonings, and toxic effects of drugs
MDC 22	Burns
MDC 23	Factors influencing health status and other contacts with health services

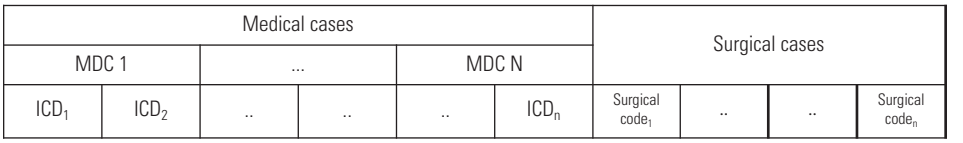
Source: Department of Health and Ageing, Government of Australia 2008.

FIGURE 2.3 Grouping Cases into Medical/Surgical Cases in Three Surgical Grouping Options (Step 1.2)

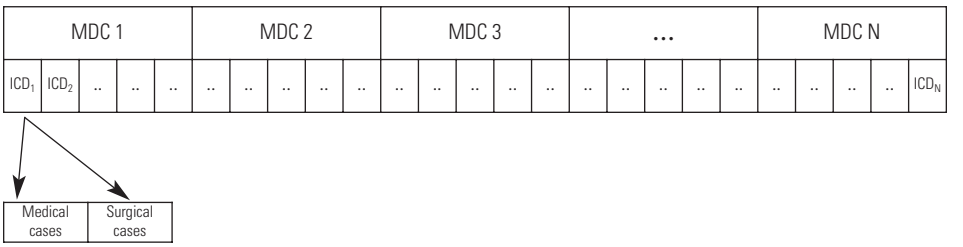
Option 1:



Option 2:



Option 3:



and surgical cases. A case is considered surgical if there is a significant surgical operation after admission; otherwise it is considered medical.[3] Medical cases are then grouped by the ICD code of the principal diagnosis and assigned to one of the MDCs. Surgical cases should be grouped by surgical code or procedure code if these codes are available (option 2). If surgical codes are unavailable, these codes can be developed, or a single code can be used initially for all cases with a surgical procedure (option 1). In Kazakhstan, the Karaganda Health Insurance Fund conducted a special study of 162,000 surgical cases to develop six groups of surgical complexity independent of the diagnosis. In option 3, all cases are grouped by the ICD code of the principal diagnosis and assigned to one of the MDCs. Cases are then divided into medical and surgical cases within each ICD code.

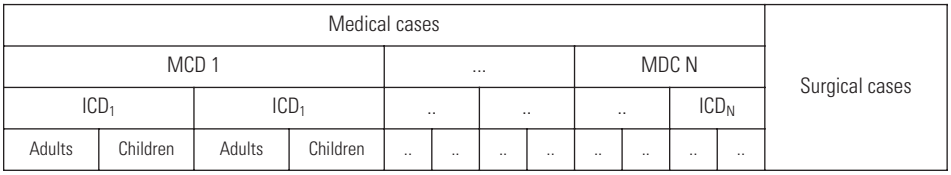
Step 1.3: Divide cases into patient age groups. Cases are divided according to the age of the patient if patient age influences the disease management and cost per case (figure 2.4). Patients may be divided into two large age groups: adult (aged 15 and over, for example) and pediatric (aged under 15).

Step 2. Determine the cost distribution across ICD codes

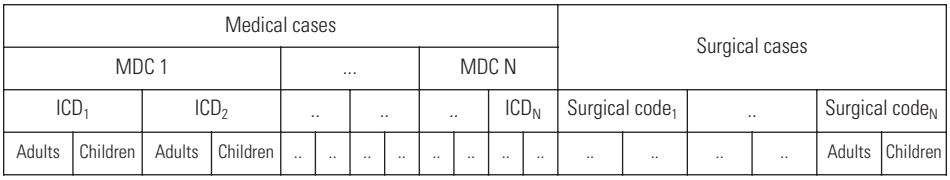
Step 2.1: Determine the average cost per case. The cost per case for each case in the hospital case database is computed by multiplying the length of stay for that

FIGURE 2.4 Grouping Cases According to the Age of the Patient in Three Surgical Grouping Options (Step 1.3)

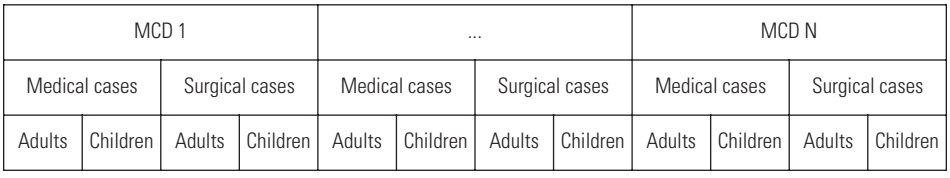
Option 1:



Option 2:



Option 3:



case by the cost per bed-day in the department from which the case was discharged (see box 2.4, the first in a series of boxes presenting a practical example of how to build a case-based hospital payment system). This can be done by simply adding two columns to the hospital case database (which is described in detail in the section, *Designing an Information and Billing System*, below)—one column for the cost per bed-day in the department and one column that multiplies the length of stay by the cost per bed-day.

Step 2.2: Aggregate cases by ICD-10 code. Each case in the complete hospital database is then aggregated or organized by ICD-10 code. The primary goal of ICD-9 and ICD-10 was not of course to support the design and implementation of a payment system, but rather to perform comparative analysis of morbidity and mortality. Still, these classifications can be useful for payment systems, but their level of detail is not needed. Given the number of ICD-9 and ICD-10 codes, it is likely that there will be many ICD codes for which there are few or no cases recorded in the hospital case database. The cost per case of ICD codes for which there are no recorded cases should be set at 0. If cases are grouped by surgical code, the cost per case in each surgical code should also be computed.

BOX 2.4 SERIAL EXAMPLE: CALCULATING AVERAGE COST PER CASE

In this serial example given in some of the boxes this chapter, we start with individual clinical data that are available from two hospitals, A and B. Hospital A treated five cases in ICD-9 code no. 410 (acute myocardial infarction), three of which were treated in the internal medicine department and two in the cardiology department. The cost-accounting analysis showed that the full cost per bed-day in the internal medicine department in hospital A is $7, and in the cardiology department $10. Hospital B treated seven cases in ICD-9 code no. 410, two in the internal medicine department and five in the cardiology department. The cost-accounting analysis showed that the cost per bed-day in the internal medicine department in hospital B is $6 and in the cardiology department $8. The cost per individual case in ICD-9 code no. 410 is computed by multiplying the cost per bed-day of the department of discharge by the length of stay for each case.

ICD-9 code no. 410: Acute myocardial infarction

Hospital	*Case*	*Department from which case was discharged (D)*	*Length of stay (days)*	*Cost per bed-day in department D ($)*	*Cost per case ($)*
Hospital A	1	Internal medicine	7	7	49
	2	Internal medicine	9	7	63
	3	Internal medicine	12	7	84
	4	Cardiology	15	10	150
	5	Cardiology	13	10	130
Hospital B	1	Internal medicine	7	6	42
	2	Internal medicine	8	6	48
	3	Cardiology	32	8	256
	4	Cardiology	15	8	120
	5	Cardiology	13	8	104
	6	Cardiology	12	8	96
	7	Cardiology	17	8	136
Average cost per acute myocardial infarction case					106.50

Step 2.3: Remove outliers. When the average cost per case is calculated for each main ICD code for which cases were treated, all cases with a cost more than two standard deviations above or below the average (outliers) should be discarded. The average cost per case in each ICD should be recomputed excluding the outliers (box 2.5). Outlier cases, or cases with an atypically long or atypically short length of stay for a particular case group, are discarded to keep the cost distribution within a case group tight and compute a more precise average. Eventually, however, the issue of payment for outlier cases must be addressed by the payment and quality assurance systems as they are refined (see the section, *Implementation Issues*, below).

BOX 2.5 SERIAL EXAMPLE: REMOVING OUTLIERS

The average cost per case for ICD-9 code no. 410 (acute myocardial infarction) cases as computed in box 2.4 was $106.50, with a standard deviation of 59.74. Two times the standard deviation is equal to 119.48. So, to compute the final average cost per case for acute myocardial infarction cases, we will only include those cases below $225.98 (between $106.50 + 119.48 and $106.50 - 119.48). Therefore, case no. 3 from hospital B is discarded from the calculation. The average cost per case for acute myocardial infarction cases is recomputed as follows:

ICD-9 code no. 410: Acute myocardial infarction

Hospital	*Case*	*Department from which case was discharged (D)*	*Length of stay (days)*	*Cost per bed-day in department D ($)*	*Cost per case ($)*
Hospital A	1	Internal medicine	7	7	49
	2	Internal medicine	9	7	63
	3	Internal medicine	12	7	84
	4	Cardiology	15	10	150
	5	Cardiology	13	10	130
Hospital B	1	Internal medicine	7	6	42
	2	Internal medicine	8	6	48
	~~3~~	~~Cardiology~~	~~32~~	~~8~~	~~256~~
	4	Cardiology	15	8	120
	5	Cardiology	13	8	104
	6	Cardiology	12	8	96
	7	Cardiology	17	8	136
Average cost per acute myocardial infarction case					92.91

The new average cost per case is $92.91, with a standard deviation of 38.56. Two times the standard deviation is equal to 77.12. So, in computing the final average cost per case for acute myocardial infarction cases, we will only include those cases between $15.79 and $170.03 (between $92.91 + 77.12 and $92.91 - 77.12). The cost per case for all the cases in the database now falls into the acceptable range.

Step 3. Merge clinical and economic criteria to determine case groups

Step 3.1: Create diagnosis-based case groups. In this step, the clinical homogeneity and economic homogeneity criteria are merged, to group ICD codes within each MDC that are clinically coherent and have similar costs per case. All cases within each MDC should be examined together (adults and children, and medical and surgical under option 3) to determine if there are real cost differences across these classifications. In the Kyrgyz Republic, for example, adult hepatitis cases were kept in a separate group from children's hepatitis cases, whereas adult

ophthalmology cases were combined with children's. Ophthalmology cases with and without surgery, however, were kept in separate case groups.

Creating diagnosis-based case groups is a part of a process that is both art and science. Some grouping tasks can be completed using statistical analysis, while others rely on expert judgment; many rely on a combination of the two. The economic criterion, for example, is applied empirically, and involves iterations of combining ICD codes into groups, running a cost analysis on the group to determine the cost distribution, and recombining ICD codes to improve the distribution. Although there are no clear guidelines about what the cost distribution should look like within each case group, optimally it should approach a relatively tight, normal distribution.

One measure of the homogeneity of costs within a group is the coefficient of variation.[4] This measures the variation, or standard deviation, in costs among a group of patients as a percentage of the average cost for that group. Groups of ICD codes can be recombined until the coefficient of variation in each group is sufficiently small to characterize the group as homogeneous. Again, "sufficiently small" lacks a clear definition, and a tolerable coefficient of variation must be determined by the designers of the payment system. It is expected that there will be a relatively wide distribution of costs in the early stages of the system, which will become narrower over time as the case groups are refined.[5] Improvement of the system is inherent in implementation of the new payment system, as implementation generates the data that make refinement possible.

In contrast the clinical homogeneity criterion is applied more subjectively, and there are no clear guidelines for ensuring clinical coherence at this stage other than the final groups should make sense to local clinical specialists.

Step 3.2: Calculate the average cost per case in each case group. When the final set of case groups is determined, the average cost per case should be calculated. Outliers of two standard deviations more or less than the average should be discarded, and the final average cost per case should be calculated for each group without the outliers. It is also important to look at the actual distribution of cases in each group after the cases are split between normal and outliers, because the percentage of cases in the outlier group may be significant, and payment rules for the outliers may need to be established (see the section, *Implementation Issues*, below).

Number of Case Groups

There is a trade-off between a large number of case groups with a small number of cases in each, and vice versa. If the number of groups is large, the cost variation across cases within each group is small, but the cost estimates may not be statistically stable, and the system may be administratively burdensome. In addition, the greater the number of groups, the closer the payment system comes to fee-for-service, and the efficiency incentives may decrease. In contrast, if the number of case groups is small, the groups have little homogeneity, and legitimate differences in costs between cases are not captured.

The initial case classification system should contain relatively few diagnosis-based case groups, because patient-level data are likely to be limited (box 2.6), and a large number of case groups with a few cases in each will not produce statistically stable cost estimates. As discussed earlier, when a case-based hospital payment system was piloted in Issyk-Kul *oblast* (region) in the Kyrgyz Republic

BOX 2.6 DEVELOPING CASE GROUPS AND WEIGHTS WITH LIMITED DATA IN THE KYRGYZ REPUBLIC

Experience demonstrates that implementing even a basic case-based hospital payment system can set in motion the process of collecting the necessary data for ongoing refinements of the payment system, and that these refinements are often demanded by the providers themselves. In the initial stages in the Kyrgyz Republic, for example, only very limited data were available to develop case groups and case group weights. Individual patient clinical data were unavailable. The data that were available included cost-accounting estimates of the cost per case in each department, average length of stay for cases in each department, and average length of stay for some groups of diagnoses in each department. In the cardiology department, for example, the statistical report submitted by hospitals to the Ministry of Health included average length of stay for three groups of diagnoses: hypertension in adults and children (ICD-9 code nos. 401–404); cardiovascular diseases in adults and children (ICD-9 code nos. 430–438); and all other cardiology cases.

These groups of diagnoses were used as the first case groups in the major diagnostic category "Diseases and disorders of the circulatory system." Using department cost-accounting data and the partially disaggregated average length of stay data, the following case group weights were computed:

Case group	*Case group weight*
Hypertension in adults and children	0.88
Cardiovascular diseases in adults and children	1.07
All other cardiology cases	1.03

The providers began to understand the payment system and complained that it was unfair to combine cases that had very different treatment costs or that made no sense to group together from a clinical standpoint. For example, they agreed that acute myocardial infarction was much costlier to treat than other cases in the same case group, "Cardiovascular diseases in adults and children." As the payment system was in operation for longer and data became available from the information and billing system, the Mandatory Health Insurance Fund could recalculate the cost per case and case weights for individual diagnoses by multiplying the average length of stay for cases in each ICD-9 group by the cost per case in the cardiology department.

As a result of the new analysis, acute myocardial infarction was separated as an individual case group, with a case group weight of 1.53, or about 50 percent more than when these cases were in the more aggregated case group.

in 1997, an initial list of 28 diagnosis-based case groups was defined, which was refined and expanded over several years as more hospital case data became available. The case groups were refined and expanded to 54 groups and then to 139. The national health insurance program in the Republic of Korea had only 25 diagnosis-based case groups in 2000, three years into implementation (Kwon 2003), and when Israel's national health insurance system introduced a case-based hospital payment system in 1990, only 15 case groups were used (Shmueli, Intrator, and Israeli 2002). Over time, as the volume of data available and administrative capacity of the system increase, it is possible to refine and expand the number of case groupings. For example, the U.S. Medicare DRG system currently has more than 500 groups.

COMPLETING COST-ACCOUNTING ANALYSIS

As discussed in the section, *Defining Case Grouping Criteria*, above, the creation of case groups for hospital payment requires that cases grouped into each category be both clinically coherent and of similar cost or resource intensity. A cost-accounting process is used to determine the unit cost per case, which together with expert clinical opinion is then used to assign each diagnosis code to a case group.

The purpose of this section is to describe an illustrative cost-accounting process, as used to determine the cost per case and develop the case groups for the national case-based hospital payment systems in Kazakhstan and the Kyrgyz Republic. The process was adapted from the Medicare Cost Reports used in the United States to determine costs for the federal Medicare program. A wide variety of potential cost-accounting processes are available (Young 2003; Finkler and Ward 1999; Sheppard et al. 1998), and there is no absolutely right or wrong method. This process was selected for Central Asia for its simplicity and fit with the hospital organizational structure in the Kyrgyz Republic. (Chapter 3 deals more generally with hospital global budgets.)

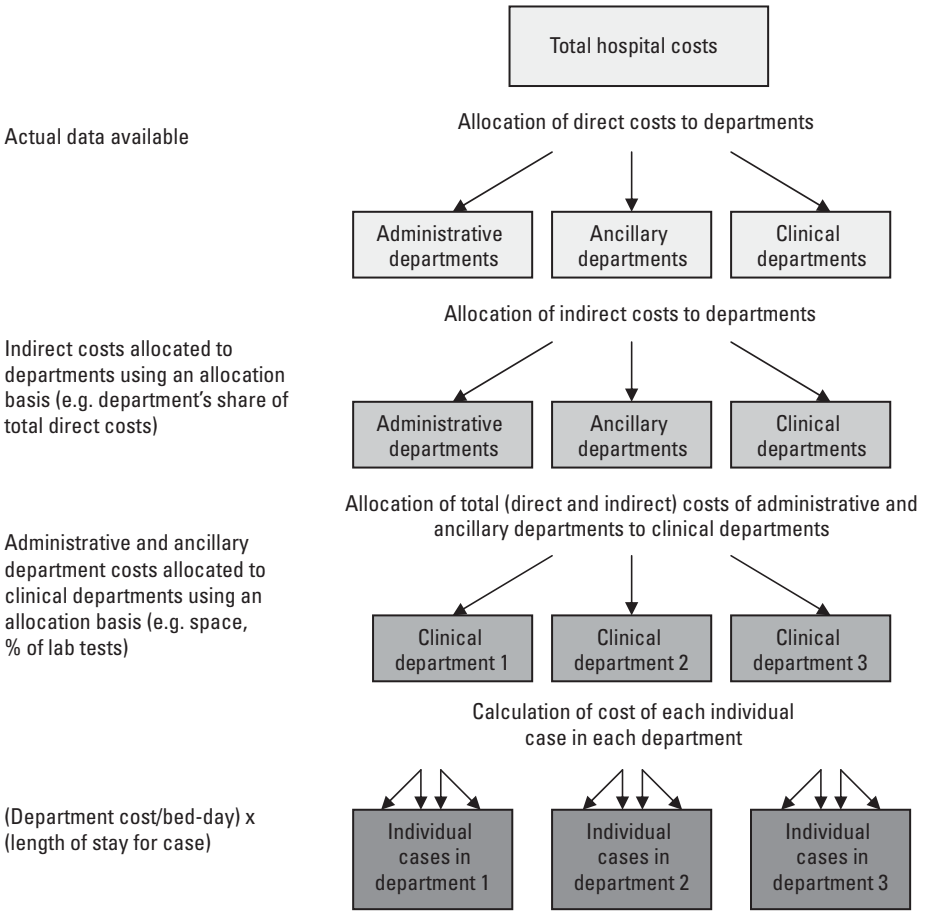
An underlying principle of a case-based hospital payment system is worth repeating: hospitals are reimbursed not for maintaining infrastructure or building capacity but for providing services to individual patients. Unlike outpatient services where defining a discrete unit of service may be difficult, in inpatient services the general consensus is that the appropriate final unit of output is a treated case or discharged patient (at least for acute care). The cost-accounting process for hospitals, therefore, is intended to allocate all the hospital's costs to the final unit of output and to determine the cost per case for a discharged patient.

It is, though, often difficult to determine the cost per individual hospital case, because costs tend to be collected and aggregated by organizational units of the hospital (often hospital departments). Furthermore, hospital clinical departments, for example, cardiology, generally produce the output of a discharged patient, but administrative departments such as accounting and paraclinical, or

ancillary departments such as laboratory, also contribute to the services and costs involved. Because the case-based hospital payment system pays hospitals on the basis of a treated case, the objective of the cost-accounting exercise is to allocate the full costs, direct and indirect, from administrative and ancillary departments to clinical departments in order to estimate the full unit cost. (See also the section, *An Overview of Costing*, in chapter 3.)

The simple cost-accounting process described here (figure 2.5) accepts the assumption that the department is the lowest unit at which costs can be reliably and consistently determined (often referred to as a cost center). Hospital budget data showing the allocation of direct costs across departments are usually fairly accurate. The cost-accounting process determines the average total cost per case by estimating the total costs for each department through allocating indirect

FIGURE 2.5 Overview of a Simple Cost-Accounting Process



Source: Authors.

costs to the departments. The total (direct and indirect) costs of the administrative and ancillary departments are then allocated to the clinical departments from which cases are discharged. The total cost of each individual case within each department is then calculated by multiplying the cost per department bed-day by the length of stay for each individual case.

The example used to illustrate a cost-accounting process is Issyk-Kul Hospital in the Issyk-Kul region of the Kyrgyz Republic. The cost-accounting analysis in this hospital, which was completed in 1995, was used to develop the initial case-based hospital payment system for the country, and was the first cost-accounting analysis ever done in the health sector in Central Asia. The currency is the Kyrgyz som, and the exchange rate at that time was approximately 10 som to the U.S. dollar. The average cost per bed-day in the hospital was som 26, or $2.60, and the average cost per case was som 383, or $38.30. The cost per bed-day ranged from som 17 in the neurology department to som 210 in the intensive care department, and the cost per case ranged from som 292 in the otolaryngology department to som 2,004 in the intensive care department. The detailed steps in the cost-accounting process used in Issyk-Kul Hospital are outlined below.

Step 1. Standardize hospital departments

The list of departments for all hospitals for which cost-accounting data are collected needs to be standardized (to the degree possible—see box 2.7) in order to ensure consistency. Even if data are only being collected from a few hospitals, in effect, the data are being collected to be representative of an entire hospital system. Hospital departments are separated into three categories:

- *Administrative departments*—those that provide support services to other departments, such as accounting services
- *Ancillary departments*—those that provide clinical services but do not discharge patients, such as laboratory and radiology services
- *Clinical departments*—those that discharge patients, such as the cardiology department.

BOX 2.7 STANDARDIZING HOSPITAL DEPARTMENTS: ADAPTING TO CONTEXT

The classification of the emergency department in Issyk-Kul Hospital is an example of adapting the classification of departments to the local environment. During the time that the cost-accounting analysis was being performed in the Kyrgyz Republic, patients seen in the emergency department could not be discharged from that department and first had to be admitted to a clinical department. As the definition of a clinical department is a department that discharges patients, the emergency department was classified as an ancillary department.

A standardized list of departments in each category should be developed and applied to all the hospitals in the payment system, even if not all the hospitals have all the departments on the list. In this step it is important to ensure that the scope includes only inpatient costs. For example, some hospitals may have an outpatient department included in their total budget. These costs should be removed, as the case-based payment system is intended only for inpatient care, and outpatient care should be reimbursed using a different payment system.

Box 2.8 and the cost-accounting worksheet for Issyk-Kul Hospital in table 2.3 show the hospital department structure for the entire Issyk-Kul region. Even though Issyk-Kul Hospital is the largest hospital in the region, it does not include many of the departments or provide many types of services. Hospitals in the former Soviet Union, including the Kyrgyz Republic, were very specialized (pediatric services were provided at the pediatric hospital, delivery and gynecology services at the maternity hospital, and so forth). This specialization, contributing to excess capacity and fixed costs, was one of the major problems in the health delivery system. The incentives of the new hospital payment system were intended to encourage mergers and create multiprofile (or general) hospitals.

Step 2. Determine direct costs for each hospital department

Direct costs are costs that can be directly attributed to each department. Examples include salaries, social taxes, medicines and supplies, and food. In Issyk-Kul Hospital, direct costs for each department were available from department-level line-item budgets. In table 2.4, the "Direct cost" column shows the direct costs for all departments in Issyk-Kul Hospital listed in the rows.

BOX 2.8 STANDARDIZED HOSPITAL DEPARTMENTS IN ISSYK-KUL HOSPITAL, KYRGYZ REPUBLIC

Department category	*Department*	
Administrative	Administration	Accounting
	Laundry	Kitchen
	Security	Transport
Ancillary	Blood transfusion	Dental
	Diagnostic	Laboratory
	Operating theater	Pathology
	Pharmacy	Physiotherapy
	X-ray	
Clinical	Cardiology	Gynecology
	Internal medicine	Infectious diseases
	Intensive care	Maternity
	Mental health	Neonatal
	Neurology	Oncology
	Ophthalmology	Otolaryngology
	Pediatrics	Substance abuse
	Surgery	Trauma
	Tuberculosis	Urology

TABLE 2.3 Illustrative Line-Item Budget by Department for Issyk-Kul Hospital, Kyrgyz Republic

	CH1	CH2	CH3_TOTAL	CH4	CH9	CH10	CH12	CH14	CH16	CH18	TOT_STAFF	DOCS	NURSES	SURGERIES	X_RAYS	LABS	BAC_LABS	PHYSIOTHER	ENDOSCOPY	ULTRA_SND	EKG	BEDDAYS	DISCHARGES	DEATH
Administration	25776	8893									10.5	4.5	5		0	0	0	0	0	0	0			
Accounting	37800	13041									12.5				0	0	0	0	0	0	0			
Security	12096	4173									8				0	0	0	0	0	0	0	0	0	
Laundry	23832	8222									17.5				0	0	0	0	0	0	0		0	
Kitchen	21384	7377									19.5	0.5	2		0	0	0	0	0	0	0	0	0	
Transport	51924	17913									17.5				0	0	0	0	0	0	0	0	0	
Laboratories	139824	48239									47.75	13.5	25.8		0	139978	19068	0	0	0	0	0	0	
Pharmacy	25116	8665									11		5		0	0	0	0	0	0	0	0	0	
X-Ray	32052	11052									11	3	6.5		4529	0	0	0	0	0	0	0	0	
Endoscopy and Diagnostic	30094	10382									12	5	5		0	0	0	0	2295	1810	2714	0	0	
Physiotherapy	68292	23560									28	2.75	18.3		0	0	0	154953	0	0	0	0	0	
Pathology	29079	10032									11	3.5	4.5		0	0	0	0	0	0	0	0	0	
Dental	8077	2786									3	1	1		0	0	0	0	0	0	0	0	0	0
Blood transfusion	68900	25500				95500					39	9	16	0	0	0	0	0	0	0	0	0	0	0
Operating Theater	80268	27692									31.25	6.5	13.3	0	0	0	0	0	0	0	0	0	0	0
Emergency	85212	29398									30.5	8.5	16	0	2144	0	0	0	0	0	0	0	0	0
Admission	52428	18088									24	5	6	0	99	0	0	0	0	0	52	0	0	0
Surgery	71437	24645			75411	55270	10170	3866			40	3.5	19.5	1221	99	13490	1059	10486	418	378	242	21156	1620	16
Traumatology	104176	24645			80248	46424	10170	3866			53	8.75	25	468	1465	12847	785	23667	48	39	50	18981	1304	5
Urology	50754	17510			57969	24555.7	7627	2900			28	2.75	14	148	234	11793	5231	22948	87	351	150	15564	1115	0
Otolaryngology	61000	21000			54248	13587.7	5085	1933			25.5	3	11	546	55	5721	866	15264	18	26	32	14364	1216	0
Ophthalmology	38468	13271			36103	13554.8	5085	1933			21	2.5	9.5	220	33	2984	602	11368	9	0	16	9555	550	0
Therapy (Internal Medicine)	78590	27113			78371	33084.5	10170	3866			45	4.25	19.8	0	144	19943	6119	24856	636	263	64	20990	1125	3
Cardiology	87067	30038			77789	36632.2	10170	3866			47	5.5	26	0	30	18356	391	22619	482	195	1610	20767	1154	16
Neurology	34028	11740			42138	13448.1	5085	1933			17	1.5	7	0	34	4455	169	23745	51	46	148	11661	606	1
Infectious Diseases	98394	33945			58014	29137.4	10170	3866			55.5	4.5	27	0	11	9104	2493	0	88	48	14	15267	1305	8
Intensive Care	97034	33477			6610	48587.4	847	322		0	42.75	14.25	21	0	63	21182	660	0	18	9	46	1753	184	78
TOTALS	1,513,102	512,397	727,600	8,900	566,901	409,782	74,579	28,351	23,200	33,500	709	113	304	2,603	4,411	119,875	18,375	154,953	1,855	1,355	2,424	150,058	10,179	127

Source: Authors.

TABLE 2.4 Illustrative Step-Down Cost Allocation for Issyk-Kul Hospital, Kyrgyz Republic

Departments	Issyk-Kul State Hospital	Direct cost	Indirect cost	Total Costs	Administration	Accounting	Security	Laundry	Kitchen	Transport	Laboratories	Pharmacy	X-Ray	Diagnostic Tests	Physiotherapy	Pathology	Dental	Blood Transfusion	Operating Theater	Emergency	Admission	Total cost of Department	# Beddays	Average Cost per Bedday	# Cases
					43,525																				
Administrative	Administration	34,669	8,856	43,525	698	64,608																			
	Accounting	50,841	12,987	63,828	779	3019602	21,272																		
	Security	16,269	4,156	20,425	499	348	3770533	42,246																	
	Laundry	32,054	8,188	40,242	1,091	686	227	150,058	38,143																
	Kitchen	28,761	7,347	36,108	1,216	615	204	0	150,058	90,757															
	Transport	69,837	17,840	87,677	1,091	1,494	495	0	0	10,179	244,436														
Paraclinical or Ancillary	Laboratories	188,063	48,041	236,104	2,976	4,024	1,332	0	0	0	147,063	44,058													
	Pharmacy	33,781	8,629	42,410	686	723	239	0	0	0	0	150,058	56,028												
	X-Ray	43,104	11,011	54,115	686	922	305	0	0	0	0	0	4,477	52,716											
	Diagnostic Tests	40,476	10,340	50,816	748	866	287	0	0	0	0	0	0	5,634	119,677										
	Physiotherapy	91,852	23,464	115,316	1,745	1,965	651	0	0	0	0	0	0	0	154,953	50,901									
	Pathology	39,111	9,991	49,102	686	837	277	0	0	0	0	0	0	0	0	127	14,960								
	Dental	10,863	2,775	13,638	187	232	77	0	0	0	0	0	826	0	0	0	10,179	246,249							
	Blood Transfusion	189,900	48,510	238,410	2,431	4,063	1,345	0	0	0	0	0	0	0	0	0	0	2,603	140,561						
	Operating Theater	107,960	27,578	135,538	1,948	2,310	765	0	0	0	0	0	0	0	0	0	0	0	2,603	181,435					
	Emergency	114,610	29,277	143,887	1,901	2,452	812	0	0	0	5,551	0	26,831	0	0	0	0	0	0	51	102,856				
	Admission	70,516	18,013	88,529	1,496	1,509	499	0	0	0	9,097	0	1,239	487	0	0	0	0	0	0	10179				
Clinical	Surgery	240,799	61,512	302,311	2,493	5,152	1,706	5,956	5,378	14,444	24,182	6,212	1,239	9,712	8,099	6,413	2,381	115,509	65,933	12,575	16,370	606,064	21,156	29	1,620
	Traumatology	269,529	68,851	338,380	3,304	5,767	1,909	5,344	4,825	11,627	22,658	5,573	18,334	1,282	18,279	2,004	1,917	44,274	25,272	31,437	13,177	555,360	18,981	29	1,304
	Urology	161,316	41,208	202,524	1,745	3,452	1,143	4,382	3,956	9,941	28,296	4,570	2,928	5,502	17,724	0	1,639	14,001	7,992	9,880	11,267	330,941	15,564	21	1,115
	Otolaryngology	156,854	40,068	196,922	1,590	3,356	1,111	4,044	3,651	10,842	10,948	4,217	688	711	11,789	0	1,787	51,653	29,484	10,778	12,287	355,859	14,364	25	1,216
	Ophthalmology	108,415	27,695	136,109	1,309	2,320	768	2,690	2,429	4,904	5,960	2,805	413	234	8,780	0	808	20,812	11,880	8,982	5,558	216,761	9,555	23	550
	Internal Medicine	231,194	59,059	290,253	2,805	4,947	1,637	5,909	5,335	10,031	43,318	6,163	1,802	9,011	19,197	1,202	1,653	0	0	15,269	11,368	429,901	20,990	20	1,125
	Cardiology	245,562	62,729	308,291	2,930	5,254	1,739	5,847	5,279	10,289	31,160	6,097	375	21,399	17,470	6,413	1,696	0	0	19,760	11,661	455,659	20,767	22	1,154
	Neurology	108,372	27,684	136,056	1,060	2,319	768	3,283	2,964	5,403	7,686	3,424	425	2,292	18,339	401	891	0	0	5,389	6,123	196,822	11,661	17	606
	Infectious Diseases	233,526	59,654	293,181	3,460	4,997	1,654	4,298	3,881	11,635	19,276	4,482	138	1,404	0	3,206	1,918	0	0	16,167	13,187	382,883	15,267	25	1,305
	Intensive Care	186,877	47,738	234,615	2,665	3,998	1,324	494	446	1,641	36,304	515	788	683	0	31,262	270	0	0	51,197	1,859	368,061	1,753	210	184
	Pediatric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	Delivery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	Gynecology	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	Neonatal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	Substances Abuse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	Mental Health	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	Oncology	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	TB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	TOTALS	3,105,112	793,200	3,898,312	43,525	64,608	21,272	42,246	38,143	90,757	244,436	44,058	56,028	52,716	119,677	50,901	14,960	246,249	140,561	181,435	102,856	3,898,312	150,058	26	10,179

Source: Authors.

Step 3. Determine allocation basis for apportioning indirect costs to each hospital department

Indirect costs are costs that may be difficult to attribute directly to each department—utilities are the primary example. These costs are allocated to each department using an "allocation basis." This is intended to reflect the factors that determine a department's use of the resources included in the indirect costs. In Issyk-Kul region, the initial idea was to use the space occupied by each department as this basis, because indirect costs consisted mainly of utilities, and space is related to the amount of utility cost incurred. There were some difficult issues, however, in calculating the space for each department in each hospital in the region, and keeping the methodology simple was the overriding factor. Therefore, the monitoring system stakeholder group decided to define the allocation basis for indirect costs as the share of the department's direct costs in the total direct costs for all departments, because the larger the share of direct costs, the more people in the department, and presumably the greater amount of space occupied.

In table 2.4, the "Indirect cost" column shows the allocation to each department, produced through dividing the direct costs for each department by the total costs to get that department's share in total direct costs, then multiplying the direct cost share by the total indirect costs. For example, the indirect costs are allocated to the administration department as follows:

$$\begin{aligned}\text{Indirect costs of administration department} &= \left(\frac{\text{Administration department direct costs}}{\text{Total hospital direct costs}}\right) \\ &\times \left(\text{Total hospital indirect costs}\right) \\ &= \left(\frac{34,669}{3,105,112}\right) \times \left(793,200\right) = 8,856\end{aligned} \tag{2.5}$$

Step 4. Determine allocation basis for apportioning administrative and ancillary department costs to clinical departments

After the indirect costs are allocated to each department, the total (direct and indirect) costs of the administrative departments are allocated to the ancillary departments. The total costs of the ancillary departments are then allocated to the clinical departments. Allocating the costs of the administrative and ancillary departments also requires an allocation basis as a proxy basis for determining what proportion of the costs of these departments should be received by other departments and ultimately allocated to each clinical department. The data needed to apply the allocation basis—the allocation statistics—must be collected during this step. The cost-accounting process is both art and science at this point. There are no perfect allocation bases and allocation statistics, so they should be selected to balance the relationship to cost and the need for a simple and consistent process.

Table 2.5 shows the allocation basis and allocation statistics that are used to allocate administrative and ancillary department costs to the clinical departments in Issyk-Kul Hospital.

TABLE 2.5 Basis for Allocation of Administrative and Ancillary Department Costs to Clinical Departments for Issyk-Kul Hospital

Department	*Basis*	*Rationale*	*Total basis*	*Allocation statistic*
Administration	Total staff	Major functional responsibility to manage staff	709	698
Accounting	Direct costs	Most of accounting transactions are for indirect costs	3,030,533	3,019,602
Security	Total costs	Assumes level of effort proportional to total cost	3,917,832	3,789,413
Laundry	Bed-days	Linens needed directly related to bed-days in dept.	150,058	150,058
Kitchen	Bed-days	Number of meals needed directly related to bed-days	150,058	150,058
Transport	Discharges	People or discharges are transported	10,179	10,179
Laboratory	Tests	Number of tests used by each clinical department	138,250	138,250
Pharmacy	Bed-days	The number of prescriptions for each clinical department was not available so number of bed-days was used	150,058	150,058
X-ray	X-rays	Number of x-rays used by each clinical department	4,411	4,411
Diagnostic tests	Tests	Number of tests used by each clinical department	5,634	5,634
Physiotherapy	Physiotherapies	Number of physiotherapies used by patients in each clinical department	154,953	154,953
Pathology	Deaths	Number of deaths in each clinical department	127	127
Dental	Discharges	Number of discharges in each clinical department assumes proportionate use by each patient	10,179	10,179
Blood transfusion	Surgeries	Number of surgeries in each clinical department	2,603	2,603
Operating theater	Surgeries	Number of surgeries in each clinical department	2,603	2,603
Emergency	No. of doctors in clinical depts.	Assumes transfers from emergency proportional to capacity of clinical dept. measured by no. of doctors	51	51
Admission	Discharges	Number of discharges in each clinical department	10,179	10,179

Source: Authors.

The "Basis" column shows the statistic according to which the department costs are allocated, the "Rationale" column states why that allocation basis was chosen, the "Total basis" column states the total actual value of the allocation statistic, and the "Allocation statistic" column states the figure actually used for allocation. For example, the administrative department costs are allocated to other departments based on the proportion of total staff each department has, as managing staff is one of the main functions of administration. Laundry department costs are allocated on the basis of the number of bed-days in each clinical department, as this is directly related to the amount of linen needed. Laboratory department costs are allocated to clinical departments based on the number of laboratory tests used by each department, etc. The difference between the "Total basis" column and the "Allocation statistic" column is because administration does not allocate costs to itself: 709 - 698 = 11, that is, the number of staff in the administration department itself. This difference is only needed for total staff,

direct costs, and total costs as the other allocation statistics do not apply to the department whose costs are being allocated.

Step 5. Perform step-down cost accounting

Table 2.4 shows why the cost allocation process is typically called step-down cost accounting, as costs from administrative and ancillary departments are literally "stepped-down" as they are allocated from the administrative to the ancillary departments, then from the ancillary departments to the clinical departments. This allows calculation of a final cost per bed-day and average cost per case that includes all the costs of the hospital. The order of the departments in the rows is important, as costs are only allocated downward. Departments providing services to the most other departments are placed at the top of the list, so their costs can be allocated "downward" to other departments. Allocations for specific departments are described as follows:

- *Administration*. The total costs to be allocated, of som 43,525, are shown in both the "Administration" row in total costs and above the bold-outlined box in the "Administration column." The allocation statistic of 698 total staff is contained within the bold-outlined box. As all departments have staff, the allocation statistic of total staff results in a cost allocation to all departments, which is reasonable, as the administration department serves all departments. Allocation statistics for each department are not shown but can be calculated. For example, the accounting department with staff of 12.5 divided by total staff of 698, multiplied by som 43,525 results in an allocation of som 779 from the administrative department to the accounting department.
- *Accounting and security*. These departments are allocated to the remaining departments below them in the same way as administration department costs, except the costs allocated from administration already have been added to their total cost. The total cost for the accounting department, above the bold-outlined box in the accounting department row, is now (rounded) 64,608 (63,828 + 779).
- *Laundry, kitchen, and transport*. The costs of these departments are allocated to the remaining departments below them either using bed-days or discharges as the allocation basis. The costs of these departments are not allocated to the ancillary departments but directly to the clinical departments, which are generally the only departments using laundry, kitchen, and transport services.
- *Laboratory and X-ray*. The costs of ancillary departments such as these, which provide services both to clinical departments and to other ancillary departments, should be allocated first before allocating the costs of the ancillary departments that provide services only to clinical departments. The laboratory department costs are allocated to the other departments on the basis of the number of tests provided to each department. Generally, laboratory

department costs are allocated only to clinical departments, but some ancillary departments also receive tests, such as the emergency and admissions departments. The X-ray department also provides services to other ancillary departments, such as to the dental, emergency, and admissions departments, so X-ray department costs should also be allocated to these departments.

- *Other ancillary (pharmacy, diagnostic tests, physiotherapy, pathology, dental, blood transfusion, emergency, and admissions)*. The costs of these departments are all allocated according to the allocation statistics shown in table 2.5, which shows the impact of using the different allocation statistics. For example, the pathology department costs are allocated only to departments with deaths, and the blood transfusion department and operating theater costs are allocated only to departments with surgeries.

Step 6. Determine cost per bed-day and average cost per case

After allocating the costs of the administrative and ancillary departments, the bottom right side of table 2.4 shows the new total cost of each of the clinical departments. Each department's total cost is calculated by adding the costs allocated from each administrative and ancillary department to the individual department's total (direct and indirect) costs. Using the total number of bed-days and cases summed across the clinical departments, a total average cost per bed-day (som 26) and average cost per case (som 383) is calculated for the hospital (or the set of hospitals being analyzed).

It is important during this step to check the cost-accounting worksheet for internal consistency. For example, the total cost of all departments after the cost allocation should match the total cost before allocation, which it does in this example at som 3,898,312. The cost per bed-day and cost per case in each clinical department should also be checked to be sure that they are reasonable. It is interesting that in this case, other than the intensive care department, the cost per bed-day and cost per case do not vary that much across departments. This is probably attributable to the collapse in health financing that occurred in the Kyrgyz Republic before this analysis was completed, which substantially reduced funds available for variable costs such as supplies and drugs, leaving mainly fixed costs that are spread relatively evenly across departments. This low variability in the cost per bed-day and per case may also be due to the administrative rules governing clinical practice at the time of the analysis, which required patients to stay in the hospital for a certain length of time.

One of the beneficial aspects of implementing a case-based hospital payment system in the Kyrgyz Republic was that hospitals were allowed to reinvest savings from reducing their fixed costs, money they would have lost under the old budget system, which was inflexibly partitioned into line items. Rationalization and reinvestment of savings then led to an increase in the availability of funds for variable costs directly related to patient care. The new financial incentives of

the case-based hospital payment system also facilitated a movement toward modernizing the content of medical practice (see the section, *Case Studies from Kazakhstan and the Kyrgyz Republic*, below).

Step 7. Incorporate the cost-accounting analysis into the development of case groups

The next step is to calculate the cost per case for each individual case contained in the hospital discharge database. As described above, it is not possible or necessary to calculate the exact cost of each individual case, and so it is estimated by multiplying the cost per bed-day of the department from which the patient was discharged by the actual length of stay for that case. Because the length of stay is contained in the hospital clinical information database (see the next section, *Designing an Information and Billing System*), the cost for each individual case can be calculated and then attached to the individual patient record within the database. The hospital discharge database that was used to construct the initial case groups in the Kyrgyz Republic contained about 50,000 cases. The national database that was used for hospital payment contained about 3 million cases in 2005.

As described in the section, *Defining Case Grouping Criteria*, above, the clinical and cost per case information is used to create the case groups and calculate the relative case group weights. The first case groups in the Kyrgyz Republic were largely based on departments and only a few groups were based on diagnosis, which were separated by whether the patient had a stay in the intensive care department. The cost-accounting worksheet in table 2.4 clearly shows the rationale for the separation by intensive care department stay. The average cost per bed-day there (som 210) is more than eight times the average cost per bed-day across all departments (som 26). If the hospital payment system does not account for this difference, it is not fair to the hospitals with a large share of patients in intensive care and could create perverse incentives, such as moving patients from the intensive care department too soon.

It may be difficult or impossible to estimate case group weights in countries where hospital departments are not specialized according to patient types that can form the basis of case groups. Some countries lacking this specialization and patient-level department charges have resorted to adopting case group weights from countries with established systems (Cots et al. 2000).

Step 8. Continue using cost-accounting analysis for management accounting

In addition to the contribution to the overall case-based hospital payment system, the cost-accounting process has considerable value as a tool to improve management in facilities. This is particularly true in formerly centralized health systems in which each provider institution is paid a fixed budget, and autonomy among hospitals is limited.

Before it has a new case-based provider payment system in place, the hospital can use the cost-accounting process to identify and answer questions such as:

Why are the costs of the neurology department significantly lower than those of other medical departments? What is the nature of the relationship between surgery and medical departments? Once it has the system running, the hospital can use cost accounting to match the payment with costs of each department in order to assess its financial condition and identify where increases in productivity or efficiency are needed.

CALCULATING CASE GROUP WEIGHTS

Case group weights are derived from the average cost per case in each case group calculated in step 3.2 above in the section on diagnosis-based care grouping, and dividing the case group cost by the global average cost per case to obtain the relative weight, as shown in equation (2.6):

$$\text{CGW}_i = \frac{\text{Average cost per case}_i}{\text{Global average cost per case}} \tag{2.6}$$

To calculate the global average cost per case, it is necessary to first determine which hospital costs are to be included in the hospital payment system, and to remove all costs from the hospital expenditure data that will not be included in the reimbursable cost per case. For example, if a hospital has an outpatient department or polyclinic, any related expenditures should be removed from that hospital's total expenditure data. However, services provided by outpatient units to inpatients in the hospital may be included in the per case payment, so it will be necessary to include those costs from outpatient departments. Other expenditure categories, such as capital or ambulance services, should also be removed if they are not reimbursed through the case-based payment system.

The global average cost per case can then be computed by dividing the total expenditures of all hospitals included in the payment system (h) by the total number of hospital cases (sum of all cases in group i in hospital h), as shown in equation (2.7), or it can be derived from the weighted average of the cost per case in each case group, as in equation (2.8):

$$\text{Global average cost per case} = \frac{\sum_h (\text{total expenditures}_h - \text{excluded expenditures}_h)}{\sum_h \sum_i \text{cases}_{i,h} \lim_{x \to \infty}} \tag{2.7}$$

or

$$\text{Global average cost per case} = \frac{\sum_h \sum_i (\text{cost per case}_{i,h}) \times (\text{cases}_{i,h})}{\sum_h \sum_i \text{cases}_{i,h}} \tag{2.8}$$

The case group weight for group i is calculated as the cost per case in group i relative to the global average cost per case (box 2.9). Again, the average cost per case in hospital h is the cost per bed-day in the department from which the cases

BOX 2.9 SERIAL EXAMPLE: CALCULATING CASE GROUP WEIGHTS

The example payment system has two case groups, X and Y. Cases in case group X have an average cost per case of $117, and those in case group Y, $45. There are two hospitals in the payment system, A and B. Last year, hospital A treated 35 cases in case group X, with an average length of stay of 11 days. The average cost per bed-day in hospital A in the department from which cases in group X are typically discharged is $9.00. Hospital B treated 25 cases, with an average length of stay of 14 days and an average cost per bed-day of $10.16. Hospital A treated 15 cases in case group Y, with an average length of stay of seven days. The average cost per bed-day in hospital A is $7.50. Hospital B treated 25 cases, with an average length of stay of six days and an average cost per bed-day of $6.80.

Suppose the global average cost per case is $90.00 per case. The case group weight for case group X is calculated as the average cost across hospitals of cases in case group X (summing across hospitals the cost per bed-day multiplied by the average length of stay multiplied by the number of cases in the hospital and dividing by the total number of cases in the case group) relative to the global average cost per case:

$$CGW_x = \frac{\left[\frac{(9.00)\times(11)\times(35)+(10.16)\times(14)\times(25)}{60}\right]}{90.00} = \frac{117}{90} = 1.3$$

The case group weight for case group Y is:

$$CGW_y = \frac{\left[\frac{(7.50)\times(7)\times(15)+(6.80)\times(6)\times(25)}{40}\right]}{90.00} = \frac{45}{90} = 0.5$$

Therefore, cases in case group X are 30 percent more severe than the average case, and cases in case group Y are 50 percent less severe than the average case.

were typically discharged (*d*), multiplied by the average length of stay for that case group (ALOS*i*). The calculation of the case group weight for group *i* is shown in equations (2.9) and (2.10).

$$CGW_i = \frac{\frac{\sum_h\left[\left(\text{cost per bed-day}_{d,h}\right)\times\left(\text{ALOS}_i\right)\times\sum_i \text{cases}_{i,h}\right]}{\sum_h \text{cases}_{i,h}}}{\frac{\sum_h\left(\text{total expenditures}_h - \text{excluded expenditures}_h\right)}{\sum_h\sum_i \text{cases}_{i,h}}} \tag{2.9}$$

or

$$\text{CGW}_i = \frac{\dfrac{\sum_h \left[\left(\text{cost per bed-day}_{d,h} \right) \times \left(\text{ALOS}_i \right) \times \sum_i \text{cases}_{i,h} \right]}{\sum_h \text{cases}_{i,h}}}{\dfrac{\sum_h \sum_i \left(\text{cost per case}_{i,h} \right) \times \left(\text{cases}_{i,h} \right)}{\sum_h \sum_i \text{cases}_{i,h}}} \tag{2.10}$$

Since the relative weight for each category is calculated by dividing the average cost for the category by the average cost for all cases, the average weight for all cases is 1.0.

With the case grouping criteria defined and the case group weights calculated, and before moving on to outlining how to calculate the base rate, it is useful to peruse a checklist for what has been done so far (box 2.10).

BOX 2.10 CHECKLIST FOR DEVELOPING CASE GROUPS AND CALCULATING WEIGHTS

- Decide on the type of case grouping (no case grouping, department-level, diagnosis-based, or hybrid)
- Choose the option for weighting surgical cases
- Determine the amount of variation in cost within a case group that is considered acceptable by the purchaser and providers who will participate in the payment system
- Determine the number of case groups
- Decide which hospital costs will be reimbursed on a per case basis.

CALCULATING THE BASE RATE

The base rate is the aggregate average cost per hospital case, which is the starting point for the set of prices per case that are developed when the base rate is multiplied by the case group weights. Determining the base rate is a major policy lever in a case-based hospital payment system (box 2.11).

As said, in the simplest case-based hospital payment system, all hospital cases are reimbursed at the same flat rate—the base rate. The base rate is computed from an estimate of the amount of funds available to pay for hospital services for all hospitals included in the payment system in a defined geographic or administrative area—that is, the hospital pool—divided by the projected total number of hospital cases across all hospitals in that area. See box 2.12 and equation (2.11):

BOX 2.11 SIGNIFICANCE OF THE BASE RATE

The base rate is an important policy variable that influences the allocation of health care resources between the hospital sector and other parts of the health care system, and the allocation of hospital resources across hospitals and regions. It can be used as a tool to promote equity, for example, when it is increased in areas that have been chronically underfinanced historically. By including or excluding capital costs, the base rate also influences capital investment decisions by hospitals, the purchaser, or other government funders, and the overall allocation between labor and capital in the production of health care services.

BOX 2.12 COMPUTING A SIMPLE BASE RATE

In this example, a case-based hospital payment system has no case groups. The purchaser pays two hospitals in this payment system, A and B. This year, the hospital pool is $10,000. Last year hospital A treated 50 cases and hospital B treated 50 cases.

The base rate calculation is:

$$BR = \frac{\$10{,}000}{50 + 50} = \$100$$

(2.11)
$$BR_t = \frac{HP_t}{\sum_h Cases_{h,\,t-1}}$$

where

BR_t = base rate in year t
HP_t = hospital pool in year t
$Cases_{h,\,t-1}$ = total number of cases in hospital h in year $t-1$

The hospital pool serves as a ceiling on expenditures for hospital services, excluding direct out-of-pocket payments. The ceiling applies collectively to all hospitals in the payment system, rather than to a specific hospital. The hospital pool may include funding for capital expenditures (or they may be allocated separately). This ceiling may be a hard budget cap (providers are not compensated and bear the financial risk for budget overruns) or a soft budget cap (providers are compensated for budget overruns). Because the hospital pool is set as an aggregate pool for paying all hospitals included in the payment system, the hard budget cap is determined jointly for all hospitals in a defined geographic or administrative area rather than for an individual hospital.

If the hospital pool is a hard budget cap, two consequences follow. First, the construction of the base rate must include a mechanism for maintaining budget neutrality, or the sustainability of the financing system. A budget-neutral payment system (discussed in more detail in the section, *Budget Neutrality*, below), is one that generates total payments to providers that are consistent with the level of funding in the system. In order to preserve budget neutrality, the base rate is not computed from a simple average of resources available per hospital case, but rather from an average weighted by case mix, or average resource intensity of hospital cases (also discussed further in *Budget Neutrality*). Second, the health purchaser must decide how to respond to budget overruns once total payments to hospitals in the payment system reach the total amount in the hospital pool. The purchaser may simply stop paying for hospital cases that continue to be billed, stop paying for all cases except emergency cases, or adopt some other response that maintains budget neutrality.

If the hospital pool is a soft budget cap, a consequence may be that hospital costs increase unchecked, thereby raising the costs of the health care system as a whole or, if the overall health care budget is capped but the allocation between levels of care is not, crowding out expenditures in other parts of the health system, such as primary health care.

Estimating the Hospital Pool

Bottom-up costing vs. top-down allocation

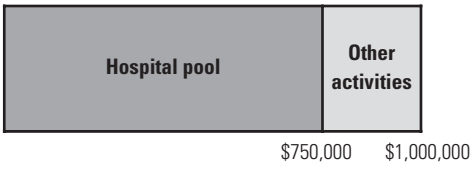
There are two main approaches to estimating the hospital pool: bottom-up costing and top-down allocation. In bottom-up costing, the cost of all inputs used to provide hospital care in the most recent year (or years) is added up and divided by the annual total number of hospital cases. The costs can be based on actual expenditures in the previous year(s) or on projections from historical expenditures and utilization. This assumes that the current cost structure and overall internal resource allocation within and across hospitals are desirable, reflect the actual cost of production of services and case mix (that is, the average severity of treated hospital cases), and can and should be maintained. More complicated methods of imputing costs based on desired expenditure patterns can be used, though, to stimulate changes in the cost structure.

In top-down allocation, the proportion of available funding that is to be allocated to the hospital sector is defined in advance. If the hospital pool is derived through this approach, there is a clear mechanism to limit the growth of expenditures on hospital services: the pool is typically specified as a proportion of the total health care budget, which can then be used as a policy tool to administratively direct health care resources toward or away from the hospital sector (box 2.13).

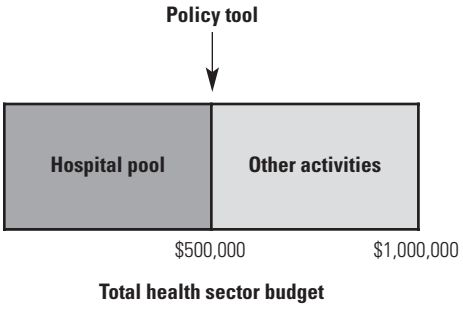
Whichever method is used to estimate the hospital pool, the size of the pool is driven not only by the case mix and the resource intensity of the case management technologies, but also by historical funding patterns and policies. Par-

BOX 2.13 TOP-DOWN ESTIMATION OF THE HOSPITAL POOL AS A HEALTH POLICY TOOL

The hospital sector consumes the majority of health care resources in many countries. The top-down method for estimating the hospital pool is a powerful tool for priority setting in the health sector, and it makes explicit the trade-off between expenditures on hospital services and on other activities. For example, if the total health sector budget is $1 million, a hospital pool estimated from bottom-up costing based on historical expenditures might total $750,000, or 75% of the health sector budget.



If other priorities are to be adequately funded, however, the health purchaser may decide to actively limit the expenditures on hospital services by determining a top-down allocation to the hospital pool. For example, the purchaser may decide that only 50 percent of available health care resources are to be allocated to the hospital sector. In that case, the base rate is calculated from a hospital pool that is determined from a top-down allocation of 50 percent of available health care resources.



ticularly in low- and middle-income countries, the hospital pool may reflect underfunding—either explicit or implicit—leading to chronic supply shortages or neglect of maintenance. In the Russian Federation, for example, it is claimed that only about 30–50 percent of the financing required to maintain the current level of technology for hospital services is provided. The historical funding patterns may also reflect policies that distort hospital cost structures, such as subsidizing some services or writing off debts. In short, constructing the hospital pool from historical funding patterns may perpetuate underfinancing of the hospitals or distorted cost structures. The process of estimating the hospital pool, though,

may be used to redress historical imbalances and distortions by, for example, reducing the projected volume of cases in exchange for a higher base rate for each case.

Costs included in the base rate

The base rate can be defined to include one the following sets of cost types:

- all fixed costs and all variable (recurrent) costs
- a subset of fixed costs and all variable costs
- only variable costs
- only a subset of variable costs.

Whether or not fixed costs are included in the base rate depends on the goals of the case-based payment system. For example, if one goal is to drive rationalization of the delivery system, it may be more effective to exclude fixed costs. What can be considered a fixed cost will be different in different settings. Typically fixed costs refer to space (maintenance and utilities) and infrastructure and equipment (capital), but in countries where health care workers are public employees and not easily hired and fired, staff salaries may be considered a fixed cost.

If capital costs are included in the payment system, the optimal labor-capital mix as well as the amount of reimbursement necessary to stimulate this optimal mix must be determined by the purchaser, which can be very difficult to predict. If capital costs are excluded, labor is treated as an operating cost and is therefore subject to limits under the payment system, whereas capital is not; and if capital is reimbursed separately, hospitals have a strong incentive to replace labor by capital.

Under either option, distortions are possible in the labor-capital mix used to produce health services, although this could be partially mitigated through the use of clinical practice guidelines monitored by the health purchaser. Because of the importance of this policy decision and the lack of a clear superior alternative, the U.S. Congress delayed the inclusion of capital reimbursement in the Medicare hospital payment system and continued to pay hospitals for capital costs on a "reasonable cost" basis in the interim period while alternative proposals were being evaluated. In countries such as those of Central Asia where the government owns and has always controlled hospital assets, the economic or opportunity cost of hospital capital assets may not appear in health care budgets as accounting costs, because depreciation is not made explicit and there is no rental or sale of buildings at market prices. In this case there is no clear basis on which to include capital costs in the hospital payment system.

Capital expenses can be divided into two categories: those related to physical plant (buildings, land, and major nonmovable equipment) and those related to major movable and minor equipment. Most experts agree that the decisions on

the physical plant, including expansion, renovation, or new construction, should be part of an overall health sector planning process rather than be driven solely by the payment system (Smith and Fottler 1985). Expenses related to major movable and minor equipment, in contrast, should eventually be included in case-based payment systems, because this capital equipment is involved in the direct provision of patient care.

If capital expenses are reimbursed through the case-based payment system, there are several options for incorporating them into the base rate. They could, for example, be included as a fixed proportion of the base rate, or they could be linked to the case mix. Because a strong correlation is often seen between the complexity of the cases treated by a hospital and the use of equipment, hospitals with more complicated cases on average could receive a proportionally higher capital allocation (Smith and Fottler 1985).

Including only variable costs or only a subset of variable costs in the base rate initially may be a good option to gradually introduce the new payment system and give the hospital delivery system time to adapt, particularly in public systems that tend to be more rigid and can only introduce structural changes slowly. (This was the option chosen for the case-based hospital payment system in the Kyrgyz Republic—see the section, *Implementation Issues*, below—where the base rate initially comprised only variable costs related to drugs, supplies, and performance-based salary bonuses. This policy choice was made to gradually address the mismatch between the funding available to the purchaser, that is, the MHIF, and the volume of cases for which the MHIF committed to pay.)

Some costs should always be excluded from the hospital pool and should be funded separately by a mechanism other than the case-based payment system. These costs include those for research and development, and for other hospital functions not related to direct patient care. The reimbursement of health care institutions for capital costs (or capital expenses) has long generated a great deal of controversy and debate (Smith and Fottler 1985). This is because the inclusion (or not) of capital costs in the case-based hospital payment system has a strong influence on investment decisions in the health sector as well as on the labor-capital mix adopted by hospitals in the production of hospital services.

Budget Neutrality

If the hospital pool is a hard budget cap, the hospital payment system has to be budget neutral over a defined time period. To maintain budget neutrality, therefore, either the base rate or the volume of cases has to be adjusted.

The base rate will need to be adjusted if either the total number of cases or the average severity of cases is higher than was projected for a given period, thereby causing total payments to exceed the hospital pool. Alternatively, the purchaser can try to keep the base rate stable and make adjustments instead to the volume of cases. This is a potential policy for elective hospitalizations, the volume of which may be controlled by a rationing mechanism such as waiting lists.

BOX 2.14 SERIAL EXAMPLE: COMPUTING A BASE RATE WITH CASE MIX

As seen in box 2.7, case group X has a case group weight of 1.3, and Y of 0.5. This means that cases in case group X cost 30 percent more, and cases in case group Y cost 50 percent less, to treat than the average case.

Last year hospital A treated 35 cases in case group X and 15 cases in case group Y. Hospital B treated 25 cases in case group X and 25 cases in case group X.

Hospital	*No. of cases in case group X (case weight = 1.3)*	*No. of cases in case group Y (case weight = 0.5)*	*Case mix*
Hospital A	35	15	[(35) x (1.3) + (15) x (0.5)]/[35 + 15] = 1.06
Hospital B	25	25	[(25) x (1.3) + (25) x (0.5)]/[25 + 25] = 0.90
Total	60	40	[(1.06) x (50) + (0.90) x (50)]/[50 + 50] = 0.98

Hospital A's case mix is calculated as 1.06, which means that it generally treats cases that are more severe than the average. Hospital B's case mix is calculated as 0.90, that is, it treats cases that are less severe than the average. Calculating the base rate for this year:

$$BR = \frac{\$10{,}000}{\left[(35)\times(1.3)+(15)\times(0.5)\right]+\left[(25)\times(1.3)+(25)\times(0.5)\right]} = \$102.00$$

or

$$BR = \frac{\$10{,}000}{(0.98)\times(100)} = \$102.00$$

Now, suppose the case mix becomes more severe and increases to 1.2. To maintain budget neutrality, the new base rate will be:

$$BR = \frac{\$10{,}000}{(1.2)\times(100)} = \$83.33$$

The base rate is weighted by the estimated case mix to maintain budget neutrality (box 2.14). Case mix reflects the resource intensity of cases treated in a hospital or in the system as a whole defined by the complexity and intensity of services required to treat the cases. The case mix index (CMI) is a summary measure of case mix using the average case group weight as a proxy for severity, volume of care, and resource intensity.

The CMI for a single hospital (*h*) is given in equation (2.12):

$$CMI_h = \frac{\sum_i \left(Cases_{i,h}\right)\times\left(CGW_i\right)}{\sum_i Cases_{i,h}} \tag{2.12}$$

The case mix for the system is defined as the weighted average case mix across hospitals, as given in equation (2.13):

$$\text{CMI} = \frac{\sum_h (\text{CMI}_h) \times (\text{Cases}_h)}{\sum_h \sum_i \text{Cases}_{i,h}} = \sum_h \left[\frac{\sum_i (\text{Cases}_{i,h}) \times (\text{CGW}_i)}{\sum_i \text{Cases}_{i,h}} \right] \times \left[\frac{\sum_i \text{Cases}_{i,h}}{\sum_h \sum_i \text{Cases}_{i,h}} \right] \tag{2.13}$$

As shown in equation (2.14), to adjust for a variable number of cases and case mix, the base rate is calculated from the weighted average amount of funds per case available in the hospital pool, weighted by the historical resource intensity of cases in each hospital in the payment system.

$$\text{BR}_t = \frac{\text{HP}_t}{\sum_h \sum_i \left[(\text{Cases}_{i,\,h,\,t\text{-}1}) \times (\text{CGW}_i) \right]} \tag{2.14}$$

where

$\text{Cases}_{i,h,\,t\text{-}1}$ = No. of cases in case group *i* in hospital *h* in time *t-1*
CGW_i = Case group weight for case group *i*

Rearranging terms, it is shown in equation (2.15) that the base rate is proportional to the CMI and the total number of cases in the system:

$$\text{BR} = \frac{\text{HP}}{(\text{CMI}) \times \left(\sum_h \sum_i \text{Cases}_{i,h} \right)} \tag{2.15}$$

Therefore, as shown in equation (2.16), if either the CMI or the number of treated cases is higher than projected, the base rate will need to be adjusted downward to ensure that total payments do not exceed the hospital pool. Alternatively, the number of cases may be controlled somewhat by the health purchaser to maintain both a stable base rate and budget neutrality. Although the number of acute and emergency cases has greater uncertainty, the number of elective cases may be controlled through waiting lists, bed capacity, referral rules, or other rationing devices.

$$\text{HP} = \text{BR} \times (\text{CMI}) \times \left(\sum_h \sum_i \text{Cases}_{i,h} \right) \tag{2.16}$$

The adjustment of the base rate should meet the dual objectives of preserving the budget neutrality of the payment system and of maintaining stable prices for hospital services that providers can respond to in making management and service delivery decisions. The flexibility of the base rate during a year will depend on the flexibility of the national or regional budget system and of the health purchaser. The hospital payment system is linked to the government budget cycle, and some systems may allow periodic adjustments to resources allocated to the health sector in a given year (though others may not). Furthermore, the base rate is often stipulated in a national law or regulation, so changing the rate may be a lengthy bureaucratic process, probably outside the control of the health purchaser.

To maintain the stability of the payment system, the base rate should be fixed for at least six months, but ideally should not be adjusted more than once per budget year. The number of cases and the case mix will, however, fluctuate from month to month, reflecting both random components and predictable seasonal variations. These variations should be incorporated into the process of planning the annual resource allocation and estimating the hospital pool.

In order to adjust to these volume and case mix fluctuations and to maintain budget neutrality, the purchaser can establish a reserve fund (also referred to as a contingency fund), apply an economic adjustment coefficient, or use a combination of the two.

A reserve fund is a portion of the hospital pool that is set aside and not included in the calculation of the base rate. This fund can be used to accumulate funds in months when there is a surplus in the hospital pool, which can then be used to cover deficits in other months.

Alternatively, the purchaser can include an economic adjustment coefficient in the base rate formula that is under purchaser control and can make minor adjustments to payment rates (equation 2.17):

$$\text{BR} = \frac{\text{HP}}{(\text{CMI}) \times \left(\sum_{h} \sum_{i} \text{Cases}_{i,h} \right)} \times \text{E} \tag{2.17}$$

where

E = economic adjustment coefficient

The economic adjustment coefficient can be used at the discretion of the purchaser to recalibrate the base rate to maintain budget neutrality following significant unanticipated changes in the number of cases, the case mix, or external economic factors, such as inflation or regional variations in the cost of resources. If the economic adjustment coefficient is not combined with a reserve fund, it may in fact serve as a "legitimate" tool for underfunding hospital services in a possible trade-off between budget neutrality and the quality of hospital services.

In the Kyrgyz Republic the MHIF uses a combination of a reserve fund and an economic adjustment coefficient to maintain the budget neutrality of the case-based hospital payment system. The MHIF estimates the hospital pool as follows (Kutzin et al. 2002):

Hospital pool = (MHIF revenue forecast) – (reserve funds) – (administrative costs) – (primary health care pool) – (funds for supplemental programs)

The MHIF forecasts the total number of hospital cases expected in the coming year and makes a first calculation of the base rate by dividing the hospital pool by the projected number of cases. This rate is then submitted and officially approved by the Health Reform and Health Insurance Coordination Commission (Kutzin et al. 2002). The base rate is revised periodically during the year;

however, the approved base rate is multiplied by the economic adjustment coefficient necessary to maintain budget neutrality given the actual number of cases and the actual case mix.

Price Per Case

The hospital payment amount for each case is determined prospectively and consists of the base rate multiplied by the case group weight for the case group to which the case was assigned on discharge. The final price per case shown in equation (2.18) may vary slightly across hospitals, if the price includes adjustors, such as economic adjustment coefficients for the type of hospital.

$$\text{Price per case}_i = \text{BR} \times \text{CGW}_i \times [\text{E}] \times [\text{H}_t] \times [\text{O}] \tag{2.18}$$

where

Price per case$_i$ = price paid to hospital per case in case group *i*
BR = base rate
CGW$_i$ = case group weight for case group *i*
E = economic adjustor
H$_t$ = hospital adjustor for hospital of type *t*
O = other adjustors

Other adjustments may be made for particular characteristics of the case, such as time in intensive care or whether the case is an outlier (atypically short or long lengths of stay within a particular case group). The total payment that a hospital receives in the billing period is based on the number of cases that it treats and the average case mix of its cases, as shown in equations (2.19) and (2.20):

$$\text{Total payment}_h = \sum_i (\text{cases}_{i,h}) * (\text{CGW}_i) * \text{BR} \tag{2.19}$$

or

$$\text{Total payment}_h = \left[\sum_i (\text{Cases}_{i,h})\right] \times [\text{CMI}_H] \times \text{BR} \tag{2.20}$$

Box 2.15 offers a checklist for the above steps on calculating the base rate.

DESIGNING AN INFORMATION AND BILLING SYSTEM

A case-based hospital payment system requires an information and billing system so that each hospital can both record the information about each case to be used by the purchaser to determine the payment rate, and document the billing and payment process. In addition, this health information system (HIS) should help improve management among both providers and purchasers, through generating information that providers can use to improve their resource allocation and service delivery, and that purchasers can use to improve quality assurance systems, resource use, and overall management of the health system.

BOX 2.15 CHECKLIST FOR CALCULATING THE BASE RATE

- Select method for estimating the hospital pool:
  - bottom-up costing
  - top-down allocation to the health sector
- Determine which types of costs will be included in the hospital pool:
  - all fixed costs and all variable (recurrent) costs
  - a subset of fixed costs and all variable costs
  - only variable costs
  - only a subset of variable costs
- Determine whether and how capital expenses will be included in the hospital pool
- Decide whether the hospital pool will be a hard or soft budget cap
- If the hospital pool is a hard budget cap, determine which mechanism(s) will be used to maintain budget neutrality
  - reserve fund
  - economic adjustment coefficient
  - a combination of the two

The purpose of this section is to describe the operational aspects of the HIS that is needed to support the design, development, and implementation of a case-based hospital payment system. The HIS of the MHIF of the Kyrgyz Republic is used to illustrate the structure, elements, and operational procedures of the HIS.

The HIS described in this section focuses on the process of hospitals billing the purchaser for treated cases, but the data generated through the billing process also feed the systems that are used to manage health services delivery, resource allocation, and purchasing. These systems should, therefore, be integrated into a larger HIS framework, although this is not discussed as it is beyond the scope of this chapter. (Chapter 5 discusses health management information systems in detail.)

The HIS used in the development and implementation of the case-based hospital payment system should both support the goals of the new provider payment system and fit into and be compatible with the overall information system structure in the national health care system, which can be separated into three levels:

- *Datasets integrated and maintained nationally* to form an information infrastructure, such as a national provider database, physician databases, clinical codebooks and health information standards, particular disease registers, drug classification system, and strategic management and analytical information
- *Data collected and maintained regionally*, such as national population register(s), regional hospital and physician databases, financial reports, routine medical statistics, and quality management data

- *Data collected and maintained by health providers,* including service delivery data, provider financial data, population enrollment detail and patient databases, and internal quality management data.

A basic HIS has two main components, both of which are established among providers and purchasers:

- *Hospital case database*, including basic discharge information about each hospital case at each hospital in the payment system
- *Financial database*, including cost-accounting and expenditure information.

The hospitals submit the information about their treated cases on discharge forms to the purchaser, and the purchaser calculates and then transfers payment to the hospitals. In the simplest case-based hospital payment systems, billing can be on paper without computers. In more complicated or diagnosis-based payment systems, or when the billing system is used to monitor trends in case mix and to refine the case grouping and case weights, a computerized HIS is needed. The HIS developers should work closely with the purchaser and regulators both to make sure that the information flow follows the cycle of health service purchasing, and to develop accounting reports and relevant processes and flows of documents (which generate the required information in the most useful way and which are compatible with existing regulations).

The HIS should not only support billing and payment calculations, but also support such functions as internal health services delivery and management decision-making processes, a monitoring and quality assurance system, and computerization of statistical reports. Implementation of a case-based hospital payment system requires a relatively small volume of data, including the disease code (ICD-9 or ICD-10) of the principal diagnosis, a surgical operation code, patient's age, admission date, discharge date, and basic accounting information in the financial database. Nevertheless, wider uses for the databases should be taken into account in the development of an HIS.

Moreover, a particular information subsystem must fit in the national health information strategy and follow systems architecture (standards). In the Kyrgyz Republic, for example, one reason for the successful development of the HIS and operational procedures of the payment system was that the development was integrated and institutionalized within the overall Ministry of Health and MHIF systems. The development of the HIS was also used as a mechanism to build human resources capacity.

Hospital Case Database

The hospital case database system has three core modules: data entry, data transfer, and grouper and billing/payment. It can also link with other databases.

Each of the modules should be installed at both providers and purchaser. In the former case, the system is used to enter the data on discharged cases and to estimate the volume of activity and of anticipated payment. In the latter case,

the system receives case discharge data from all the hospitals in the payment system and calculates payment to them. Figure 2.6 shows the flow of information between hospitals, purchaser, and the national health statistics system. The following paragraphs discuss the three core modules in detail.

Data entry module

This module supports hospital-level data entry for all discharged patients, and is based on the hospital discharge form that is standardized nationally and approved by the health purchaser. The module should be compliant with the relevant national health information standards (which can include ICD-9 and/or ICD-10 diagnosis classification, and national surgical procedure coding) as well as other procedures that may be required by law. The module design may also allow verification of information, such as the eligibility status of patients, to maintain the consistency and integrity of data.

The main data entry form for the hospital case database is the discharge summary form that is filled out at the time of a patient's discharge. Many existing discharge forms (currently filled out for statistical purposes) can be adapted to the needs of the payment system. The developers of the patient administration system should ensure that the flow of information and activities in the hospital are optimal and that there is no fragmentation of systems and duplication of paperwork for providers. These goals are usually achieved through appropriate procedures for information systems development and commissioning. The form should be designed to make data entry and processing efficient at each stage through process mapping and optimization. A sample hospital discharge form used in the Kyrgyz Republic is shown in figure 2.7.

The basic principles for data entry programs should be followed in the design of the hospital data entry interface. Data entry systems must be compliant with the national health information standards and other procedures that may be required by law. At the design phase, rules should be established for data that can only be retrieved from national/regional databases and data elements that can be generated in hospitals (such as personal data for patients who are not found in the enrollment or any patient list available to hospitals). In some sophisticated systems, and with the advance of information technology, some data may be maintained by the health purchaser and be accessible to providers via the Internet.

For example, the national health purchaser in Turkey maintains all the databases relevant to health insurance payments at the national level, which large institutional providers and small vendors such as pharmacies can access from their Web-based interface. The pharmacies can verify patient identity and eligibility by logging on to the Web page of the purchaser, where the eligibility of each person to receive particular drugs is listed.

It is recommended that information not be entered if it can be generated from existing data in the database. There is no need to enter the patient's age, for example, if the date of birth was entered, or the number of bed-days if the dates

FIGURE 2.6 Information Flow in the Hospital Case Database System

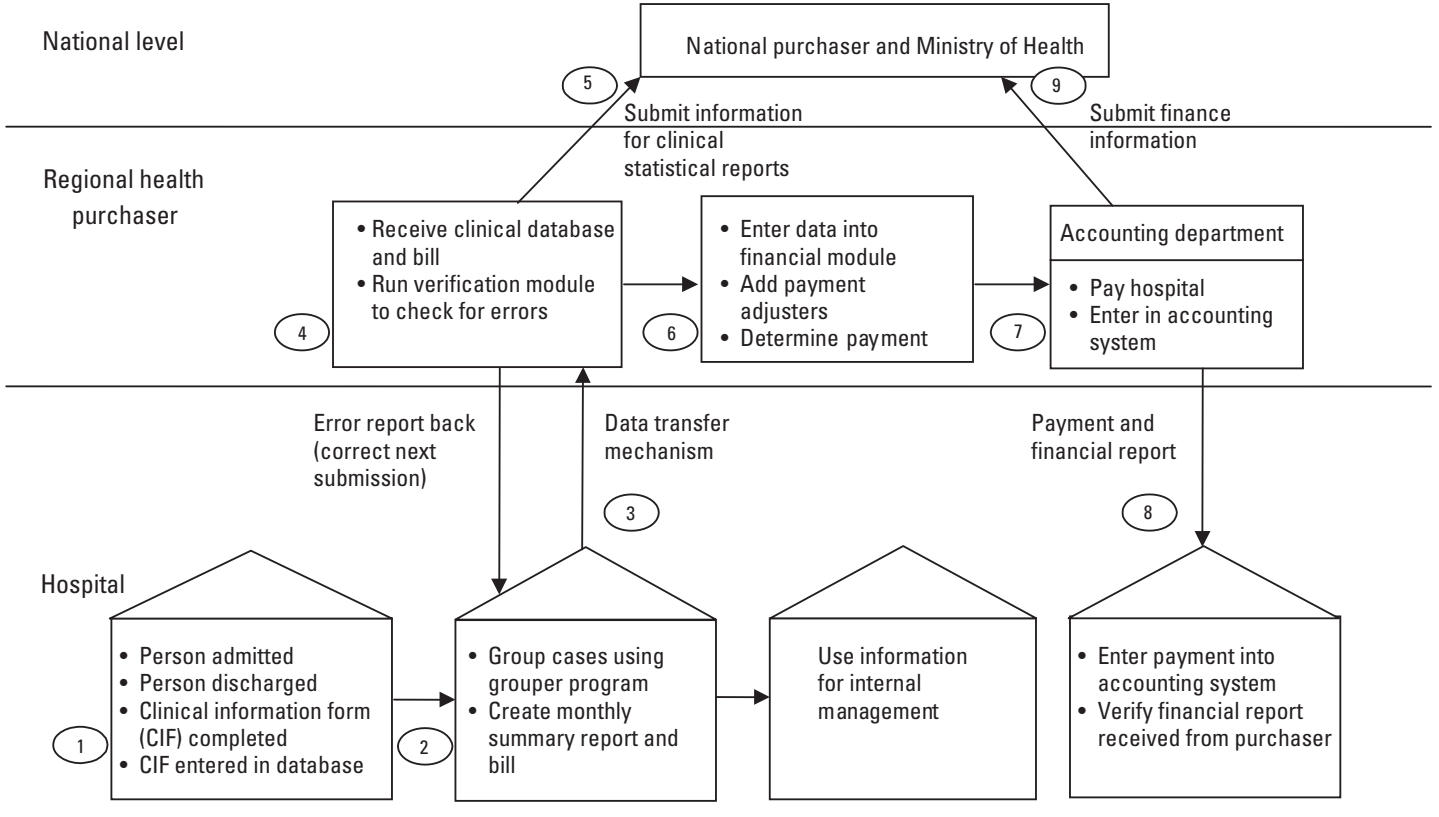
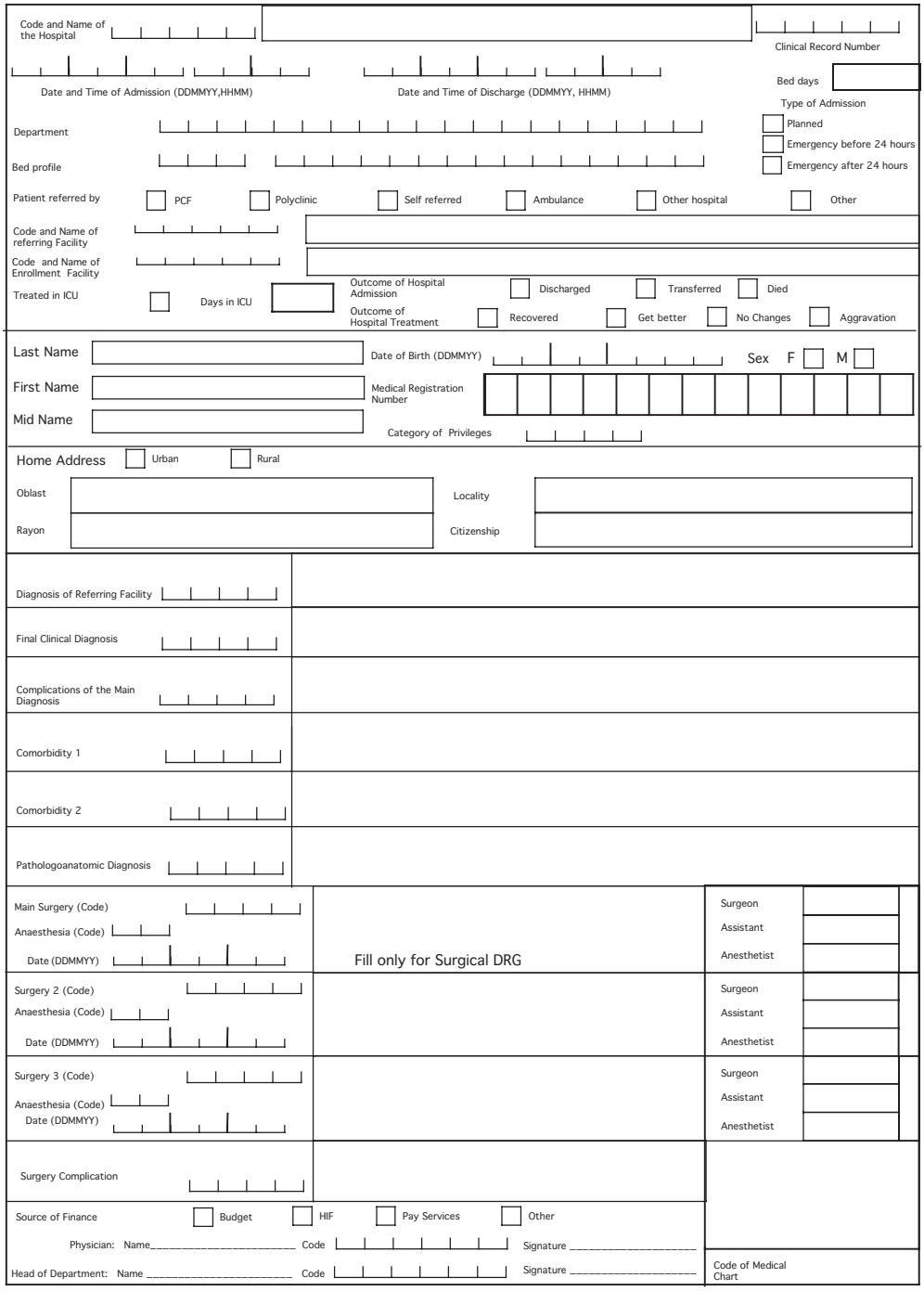


FIGURE 2.7 Example: Hospital Discharge Form and Data Fields



Statistical Form of Discharged Hospital Patient

of admission and discharge are entered. It is also recommended to minimize subjective information that cannot be used to directly support the objectives of the system or to generate further meaningful information.

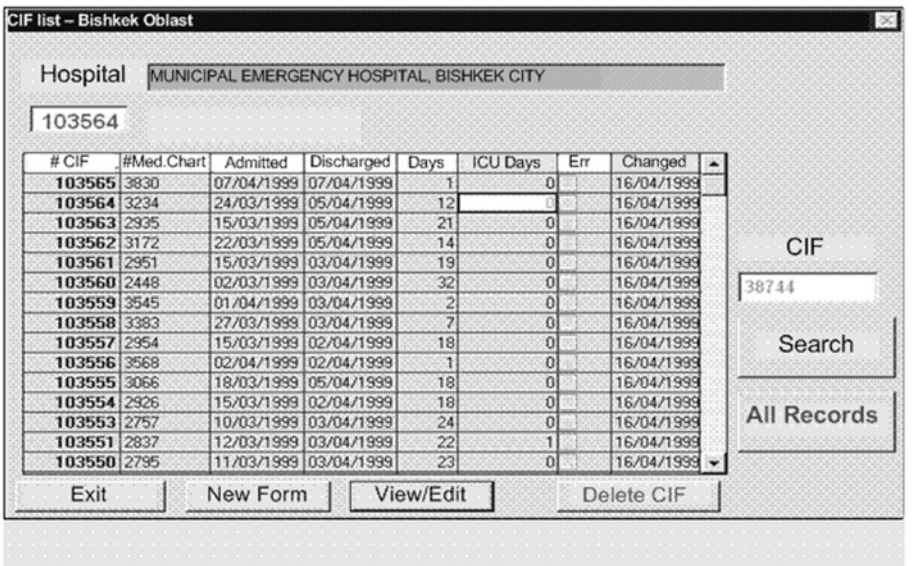
The data entry program should be developed to include verification functions to minimize errors during data entry, including perhaps verification of date-of-birth information, verification of hospital entry and discharge dates, and relationship of the patient's age and sex to specific diagnosis (a gynecology diagnosis, for example, is for females only).

Although data management may be at the discretion of each provider (unless there are software interface standards recommended for use), procedures should be in place for monitoring the quality of the data, and recommendations should be developed on data improvement among providers through collaboration between purchaser and providers.

An example of a computerized system for the hospital discharge information developed for the national case-based hospital payment system in the Kyrgyz Republic is illustrated in the following series of screenshots.

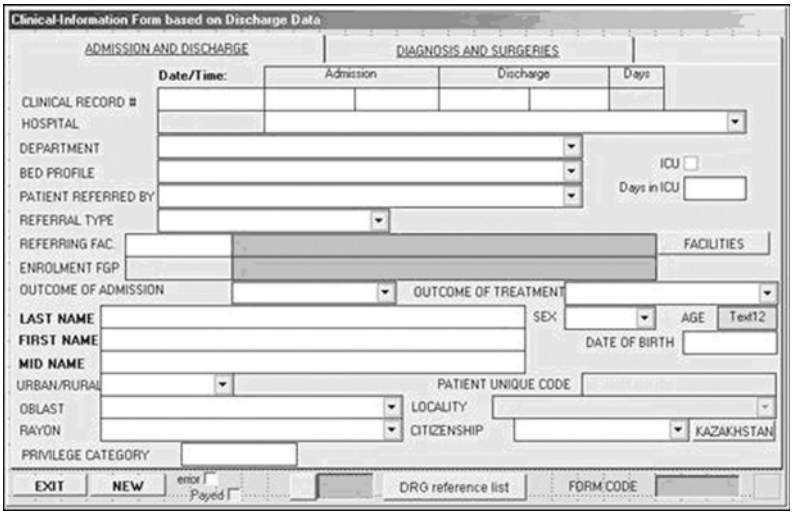
Screenshot 2.1 shows the main operator window. This window shows the name of the hospital and the record ID (top of the window), and a list of the cases for the hospital, including the case ID number, the date of admission, the date of discharge, the number of bed-days for the case, the number of days in intensive care, and the date the record was entered or last changed. The screen also shows highlighted records with errors that cannot be transferred and used for payment. The screen provides access to information in each form.

SCREENSHOT 2.1 List of Completed Discharge Forms with Search, View, and Editing Functions



Source: Kyrgyz Republic Mandatory Health Insurance Fund/ZdravReform Program 2001.

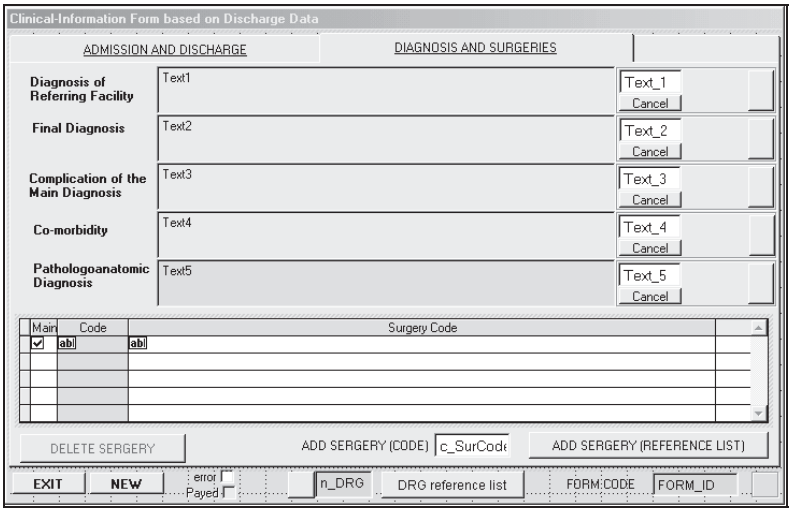
SCREENSHOT 2.2 Data Entry Screen Registration Information Block



Source: Kyrgyz Republic Mandatory Health Insurance Fund/ZdravReform Program 2001.

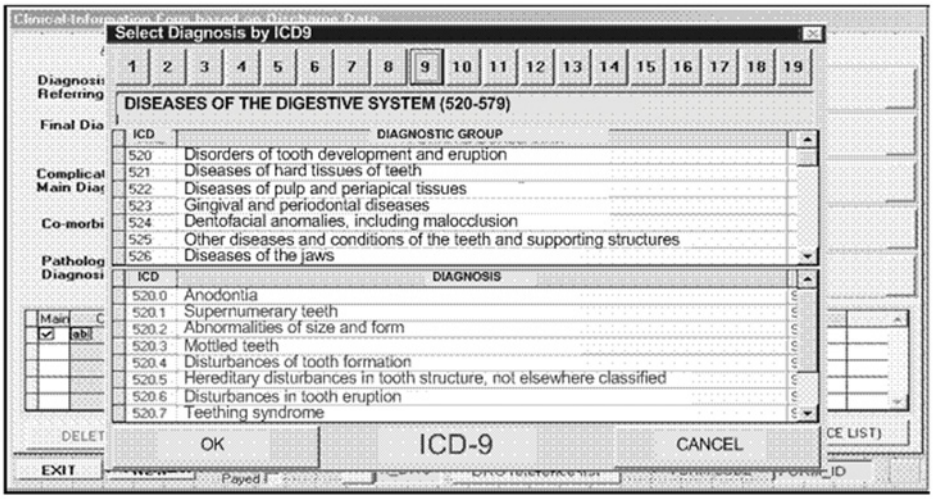
The discharge data entry screen is divided into two sections: a registration section with general patient information (screenshot 2.2), and a clinical block with information about the clinical characteristics of the hospital case (screenshot 2.3).

SCREENSHOT 2.3 Data Entry Screen Clinical Information Block



Source: Kyrgyz Republic Mandatory Health Insurance Fund/ZdravReform Program 2001.

SCREENSHOT 2.4 Disease Classification Codes (ICD-9)



Source: Kyrgyz Republic Mandatory Health Insurance Fund/ZdravReform Program 2001.

The database program may include ICD-9 or ICD-10 disease classification, which makes it possible to enter diagnoses by code (screenshot 2.4). If a code is entered correctly, the corresponding diagnosis name will automatically appear on the screen.

Data transfer module

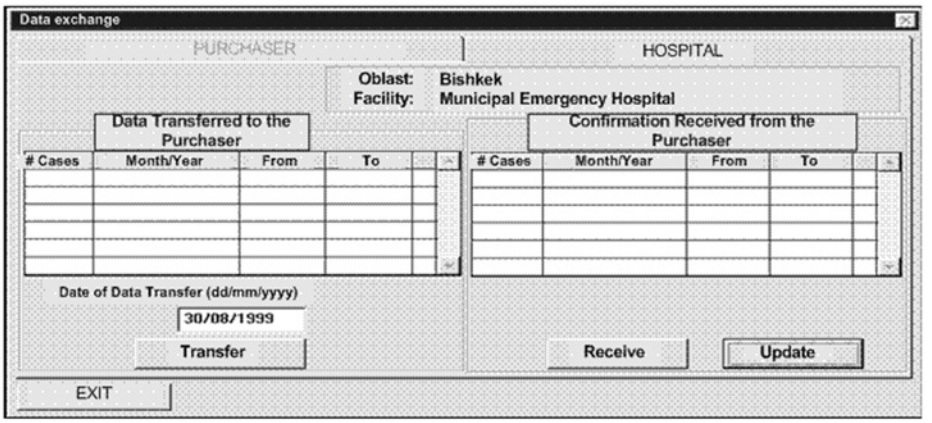
The data transfer module supports data exchange between the hospitals and purchaser. Data can be transferred on a diskette, by e-mail, or over a network or the Internet. The following data-exchange operations must be supported by the data transfer module:

- *Hospitals*—preparation of data for export, including proper coding and formatting, data transmission, and confirmation of successful export to the purchaser
- *Health purchaser*—receipt of data from hospitals and confirmation of successful data receipt.

The data transfer module should allow the hospitals to verify the hospital data prior to export, and create summary reports for exported records. The module should allow the purchaser to create a log-file and summary reports of received records.

Screenshot 2.5 shows the data exchange dialog screen at the hospital level. The outbox, on the left side, lists the records that are ready to be sent to the purchaser. The confirmation box, on the right side, lists confirmation of the successfully imported records from the purchaser.

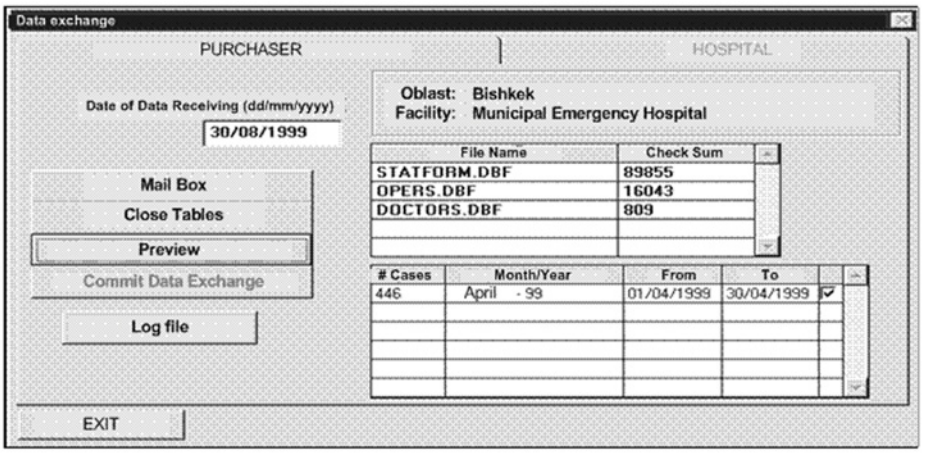
SCREENSHOT 2.5 Hospital Data Exchange Dialogue Screen



Source: Kyrgyz Republic Mandatory Health Insurance Fund/ZdravReform Program 2001.

Screenshot 2.6 shows the data exchange screen at the purchaser level. The top box on the right side of the screen displays the name of the source hospital. The second box displays the name and size of each file received from the hospital. The third box displays the total number of hospital records received and the time period covered. The screen also contains pre-import preview and records import buttons. During the import process the system compares data in the mailbox with the records in the database. The system also maintains a receiving log file where the database administrator can keep track of data exchange sessions and make sure that the data exchange procedures are compliant with the accounting regulations of the purchasing organization.

SCREENSHOT 2.6 Health Purchaser Data Exchange Dialogue Screen

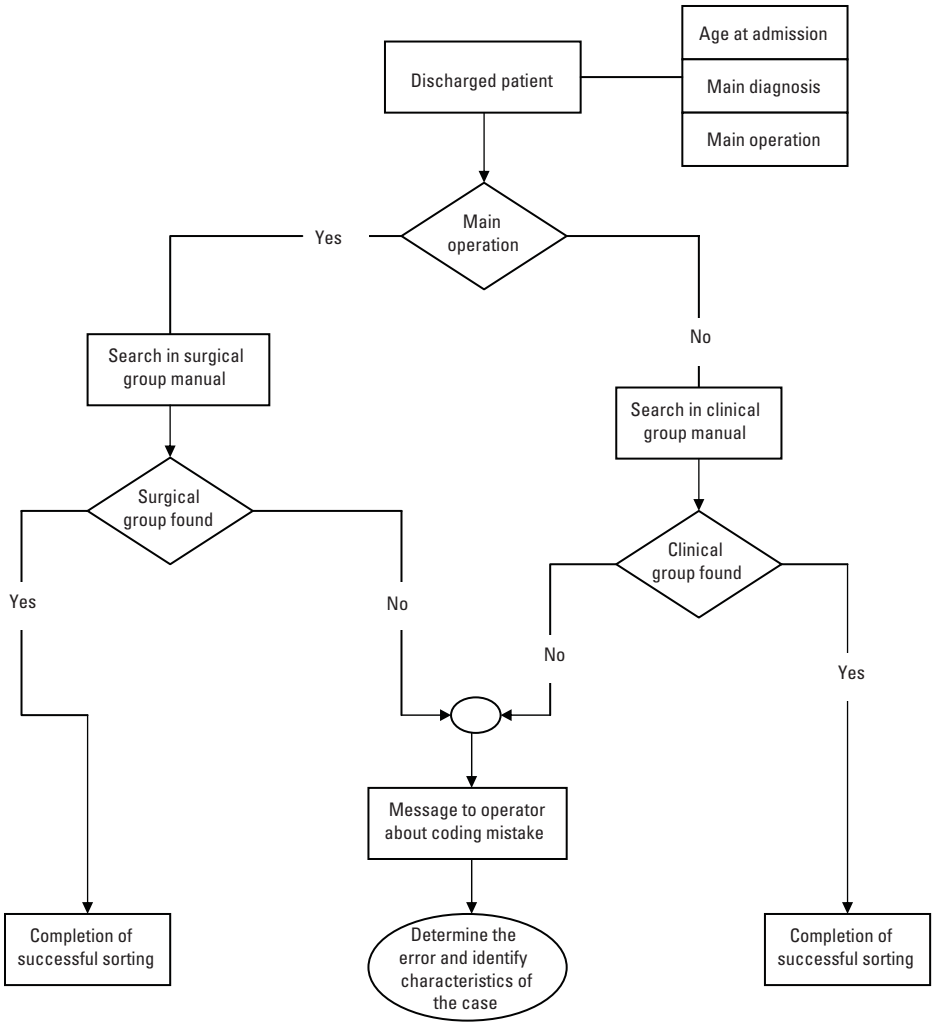


Source: Kyrgyz Republic Mandatory Health Insurance Fund/ZdravReform Program 2001.

Grouper and billing/payment module

The grouping parameters for cases entered into the hospital case database are used to assign each case to a case group, by means of a grouper module, which is a special software module that runs the case grouping algorithm. The grouper module uses an algorithm to compare the characteristics of each case to the case grouping criteria to assign the case to a case group. The decision tree in figure 2.8 shows the algorithm used for case grouping in the Kyrgyz Republic.

FIGURE 2.8 Algorithm for Hospital Case Grouping in the Kyrgyz Republic



Source: Samyshkin and Lisitsin 1998b.

The grouper program can be run by hospitals, the health purchaser, or both. In addition to submitting the hospital bill and case file electronically, hospitals usually also submit a paper invoice to the health purchaser as official request for payment. Examples of two possible formats for hospital invoices are presented in figures 2.9 and 2.10.

After the system assigns cases to case groups, packages are created for data exchange, which are sets of discharge records for a selected hospital and a selected discharge period marked with a package-unique code. The packages form the basis for payment to individual hospitals. The date of the data exchange transaction determines which economic parameters will be applied to the calculation of the hospital's payment, since such parameters as base rates and hospital-specific adjustors change over time and are recorded in the information system's journals. Screenshot 2.7 shows the pop-up screen for economic parameters.

Screenshot 2.8 shows the summary table of data packages for the region. The screen displays the list of hospitals located in the region, the number of discharge records for each hospital, and the number of records not yet included in the packages. The operator can preview the table contents in report format and print the report.

FIGURE 2.9 Simple Hospital Invoice

Hospital code: < >

Hospital name: < >

Reporting period: < >

Case group	Case group weight	No. of patients	Total charge
Total for hospital:			

Chief Physician_____

Chief Accountant_____

FIGURE 2.10 More Detailed Hospital Invoice

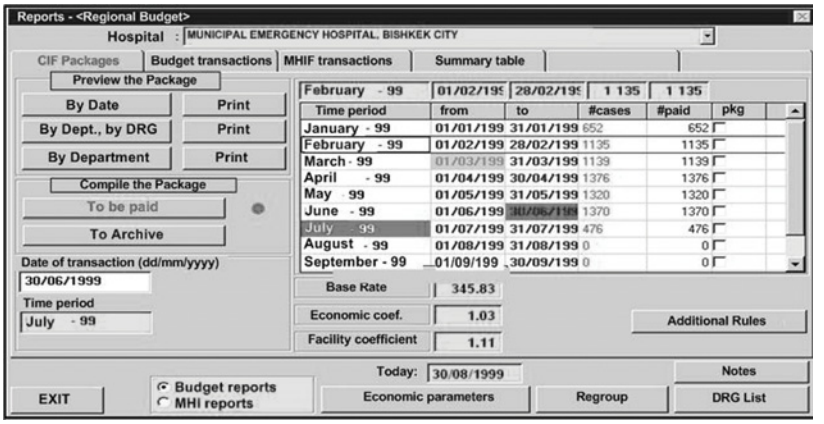
Health facility name: Health facility code:

No.	No. of medical card	Name	Sex	Date of birth	Admission date	Discharge date	Bed-days		Emergency/elective	First/secondary	Diagnosis			Operation code	Anesthesia code	City/village	Result	Eligibility category
							In department	ICU			Final clinical Code	Complication Code	Concomitant Code					
Name of department:																		

Chief Physician_____

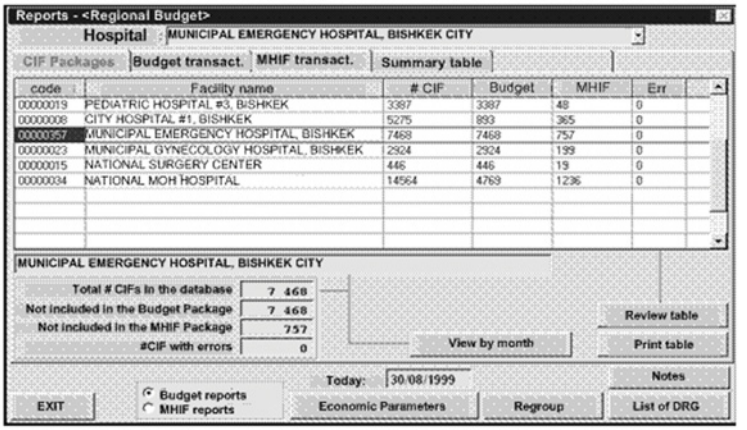
Chief Accountant_____

SCREENSHOT 2.7 Pop-Up Screen for Economic Parameters (Purchaser Side)



Source: Kyrgyz Republic Mandatory Health Insurance Fund/ZdravReform Program 2001.

SCREENSHOT 2.8 Summary of Packages for All Hospitals in the Region (Purchaser Side)

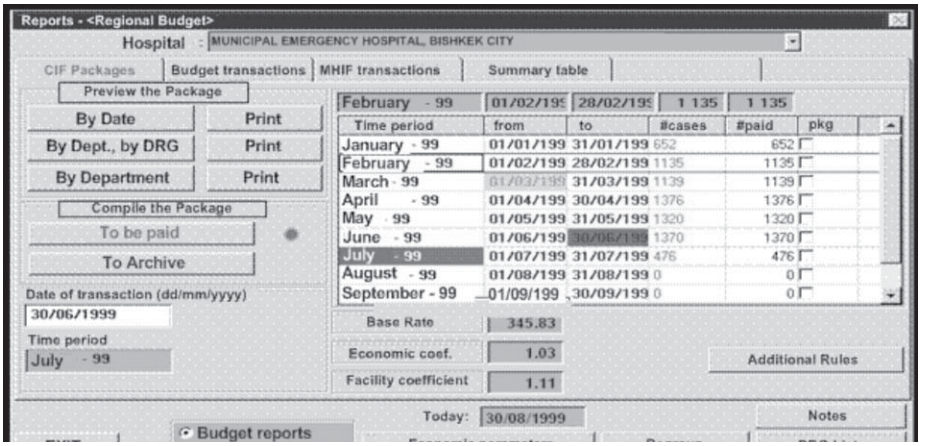


Source: Kyrgyz Republic Mandatory Health Insurance Fund/ZdravReform Program 2001.

The administrator can select a hospital from the list and obtain a detailed breakdown of billing by the hospital for previous periods. Screenshot 2.9 shows the package dialogue screen for an individual hospital.

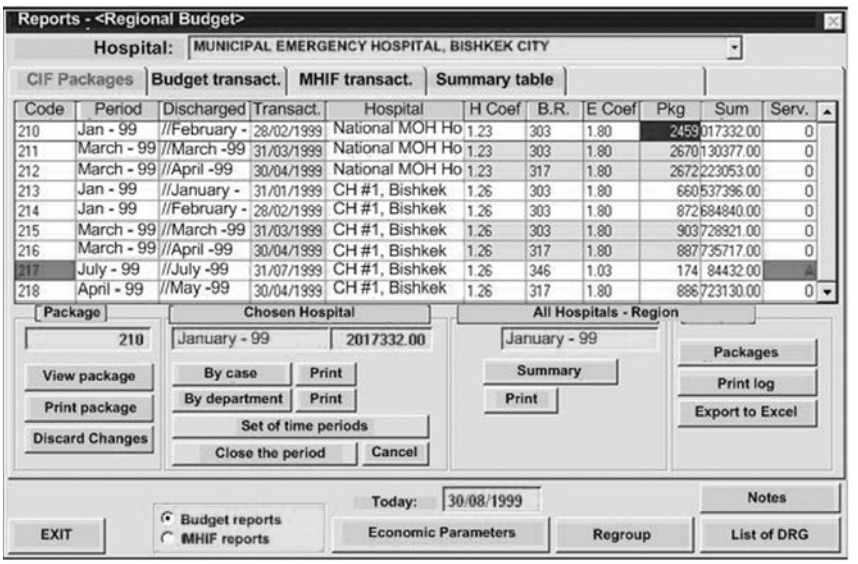
Screenshot 2.10 shows the main payment report screen, which displays all the packages in the database. The journal of packages can be sorted by package unique code, by discharge period, by accounting period, or by hospital. The table can be previewed in report format, printed, or exported into a spreadsheet. In the example, suspended packages are highlighted (in red on the screen) in the first and last columns of the table. Closed fiscal periods are highlighted in gray (on the screen). The system administrator can create payment reports for a

SCREENSHOT 2.9 Individual Hospital Package Dialogue Screen



Source: Kyrgyz Republic Mandatory Health Insurance Fund/ZdravReform Program 2001.

SCREENSHOT 2.10 Main Payment Report Screen for the Region



Source: Kyrgyz Republic Mandatory Health Insurance Fund/ZdravReform Program 2001.

selected hospital for a selected fiscal period (one payment report may include more than one package), decide on the closing of the fiscal month, and preview and print summary reports. Monthly payment reports are used for actual payment to hospitals.

Other features of the hospital case database

The hospital database can contain pop-up screens linking to other databases to facilitate data entry and analysis. For example, the purchaser's system may include links to government administrative databases that list all regions and districts in the country, a hospital database that lists all hospitals and their relevant characteristics, and a database of physicians.

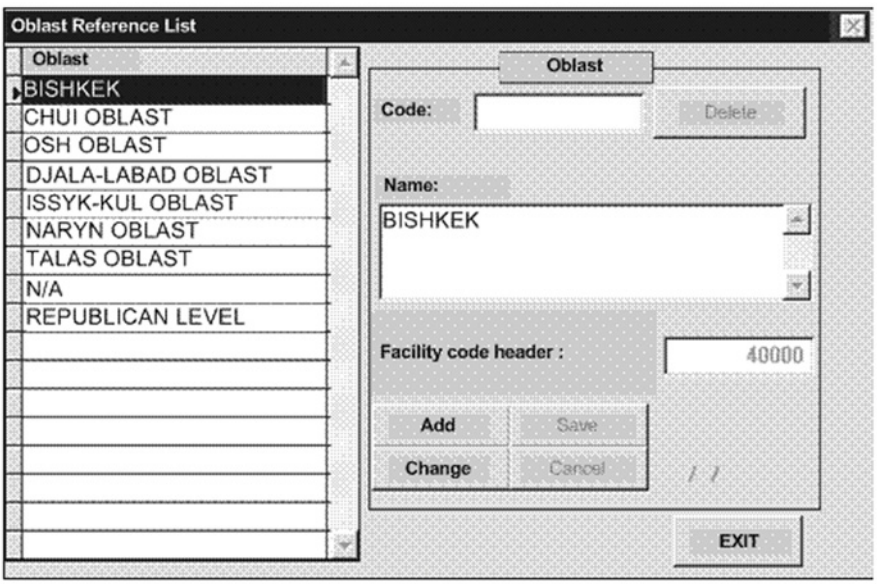
Screenshot 2.11 shows an example of a pop-up screen from the Kyrgyz Republic hospital database showing all regions in the country, and screenshot 2.12 shows one of all districts in each region.

Screenshot 2.13 shows the pop-up screen linking the hospital case database to the database of all hospitals in the country. This database contains information about the type and specialty of each hospital, department structure of the hospitals, as well as additional hospital profile parameters useful for data analysis. The hospital database also contains the journal of facility-specific adjustors for the case-based payment system.

Financial Database

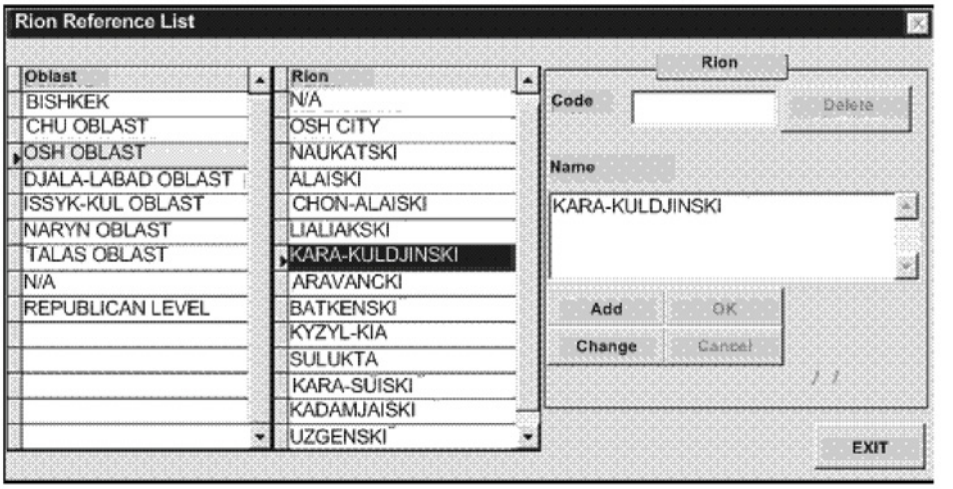
A financial database should be established to compile the results of hospital cost-accounting analysis, which is completed initially to develop the case-based payment system (see the earlier section, *Cost accounting and analysis*), but should

SCREENSHOT 2.11 Administrative Regions in the Kyrgyz Republic



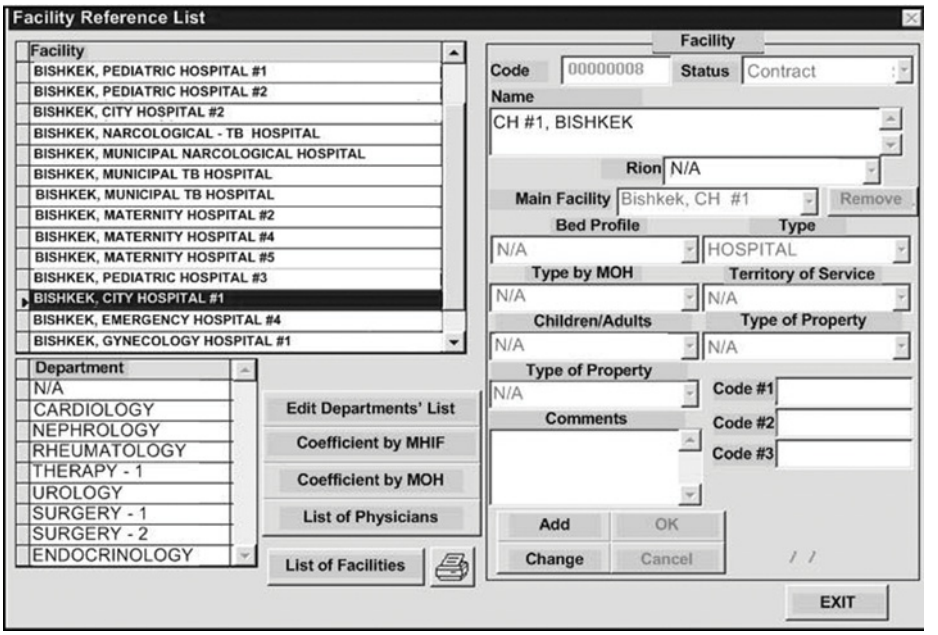
Source: Kyrgyz Republic Mandatory Health Insurance Fund/ZdravReform Program 2001.

SCREENSHOT 2.12 Districts in the Regions of the Kyrgyz Republic (part of the national information standards system)



Source: Kyrgyz Republic Mandatory Health Insurance Fund/ZdravReform Program 2001.

SCREENSHOT 2.13 Pop-Up Screen Linking to Hospital Database



Source: Kyrgyz Republic Mandatory Health Insurance Fund/ZdravReform Program 2001.

also be updated to include recent cost-accounting information from all hospitals in the payment system. The information in the financial database allows the purchaser to analyze changes in the cost structure of hospitals that the payment system may have brought about and that should be used to update the calculation of the base rate and any adjustment factors. As the payment systems develop and data are collected through the billing system, the process of submitting cost-accounting reports from facilities should be standardized and made compulsory.

Information System Requirements

Policies and manuals

An important component of the HIS is the set of core rules that govern the development of national and regional health finance and management policies and, consequently, HIS standards. This process should be modular and incremental, building a scalable and consistent HIS with core standards that allow flexibility. Consequently, policies and procedures should be developed that define core rules and outline how they should be implemented, as well as the procedures that must be used to amend them.

Information manuals as well as their updates should be part of the HIS, so they can be accessed throughout the process of data entry and analysis. The development of manuals should involve all key stakeholders, including those responsible for the clinical information systems. The HIS standards and manuals define the architecture of information systems and the degree of flexibility available to designers and developers. The standards and manuals define the framework within which a particular system can be developed. Potential developers of systems should be given access to minimum compulsory requirements. (Box 5.10, *Types of Data Standards*, in chapter 5 discusses standards further.)

Infrastructure requirements

The infrastructure needed to support the HIS is largely determined by three main factors:

- *Throughput of the data entry system*—the volume of discharged inpatient cases in the payment system each month and the time it takes to enter each form
- *Capacity of the communication channels*—which may depend on the technology available (such as network speed, Internet connection speed, posting diskettes, and e-mail availability and security)
- *Verification and data audit procedures* among providers and purchaser.

The number of workstations that will be needed by the purchaser may be estimated as follows:

$$\text{Number of workstations} = \frac{\text{Number of forms to be entered each month}}{\text{Number of forms that can be entered each month per computer}}$$

(2.21)

$$\text{Number of workstations} = \frac{\text{No. of cases} \big/ \text{month}}{\left(\text{forms} \big/ \text{hour}\right) \times \left(\text{hours} \big/ \text{month}\right)}$$

For example, if the hospital discharges 3,000 cases per month, the hospital discharge form takes five to six minutes to enter, and the workstation is operated for one 8-hour shift per day during a five-day work week, the number needed by that hospital will be about two, calculated as follows:

(2.22)

$$\text{Number of workstations} = \frac{3{,}000 \text{ cases} \big/ \text{month}}{\left(10 \big/ \text{hour}\right) \times \left(160 \text{ hours} \big/ \text{month}\right)} \approx 2$$

Taking into account that additional time will be needed—for system maintenance activities, development, editing and transmission of reports, analysis of collected information by a hospital staff member—the number of workstations calculated by the above formula should be scaled up by a coefficient of 1.4. In the example above, the number of workstations needed would therefore be rounded up to 3. Discharge data for the purpose of payment can be generated in hospitals that have well-developed HISs, and in this case discharge forms can be produced as part of the hospital's overall information analysis rather than through a billing system designed only for that purpose.

With more sophisticated computer technology becoming increasingly affordable, hospitals are better able to do the data entry in-house and to integrate the data entry for payment purposes into their general management information system. With the wide availability of the Internet, more data entry and transmission operations can be performed online with connection to a database shared by the purchaser and providers.

The operating costs for the HIS include salaries for computer operators, costs of software maintenance and upgrading, technical maintenance, and training of personnel. The matter of operating costs in provider payment systems has been a subject of controversy and debate. The generally accepted rule is that any provider payment system more complex than simple budget transfers is more expensive than a team of paper-based accountants, so the investments in administrative systems should be justified by the benefits of implementing them. Such benefits may include better outcomes, greater cost-effectiveness, cost savings from reallocation of resources across types of care, and minimization of care costs.

System development

The hardware and software capacity of the information system may start with basic infrastructure, evolving as the needs for the system and capabilities of the purchaser evolve. The information systems in Central Asia, for example, were initially developed using low-cost software platforms, such as Windows-based Microsoft Access or Microsoft FoxPro. The databases that were developed required personal computers of average capacity available on the market, and the local staff had previous experience working with these software programs. As the systems evolved, however, more demand for data was created and capacity to manage information systems was developed within the Ministry of Health and MHIF. It then became necessary to scale up data and knowledge management, and the systems were upgraded nationally (to Oracle and Microsoft SQL Server). In the Kyrgyz Republic these changes were also driven by the simultaneous development of pension reform and an accompanying population register, which made it possible to establish data exchange between the Ministry of Health and the Ministry of Social Protection.

Lessons learned

Despite some specific technical aspects, some general lessons can be learned from the successes, and occasional pitfalls, of the development and implementation of hospital information and payment systems in Central Asia, and the Kyrgyz Republic in particular.

- *Establishing national standards for information systems development is essential*. Rather than developing a compulsory software program to be given to providers, the role of the information systems regulators is to develop standards that can be used by the health purchasers to develop or procure specific information systems. This is a core and essential requirement for the success of new information systems. Standards are also essential to ensure that information systems developed in one country or region are compatible and interoperable, and that multiple information systems do not emerge that cannot be united or work together in the future.
- *Information systems are successful where they are part of a well-managed organizational change and development process*. This may seem obvious, but information system projects are often seen as having value in and of themselves, and the connection between the goals of organizations and new information systems is not often part of the decision framework.
- *A health information strategy needs to be in place*. This conceptually unites particular systems and subsystems and is essential for the continuity and sustainability of future development.
- *It is essential to involve key stakeholders, and have strong and sustainable leadership and ownership*. This is needed to ensure the success of organizational change where information systems play a substantial role.

- *The realization of benefits of the information system should be made clear to leaders*. This is important, at every stage of development, for the managers who will operate the system.
- *Development of well-documented standards and upgrading them should be modular, incremental, and scalable*. This is important because technology and concepts are developing rapidly, and any information system will become obsolete within a few years. Standards and conceptual consistency allow the system designers to avoid losing any elements of the data when upgrading the systems.
  - *Modular* development means that a large-scale information project, such as the hospital payment system in Central Asia, can be divided into modules that are small, manageable in development and implementation, and can "talk" to each other (exchange data securely with no loss of meaning).
  - *Incremental* development means that the developer can start working on different modules and gradually expand the functionality of each module as the system evolves.
  - Development can be simultaneously modular and incremental, particularly for large-scale projects. This was the approach used in the Kyrgyz Republic. Modular development, proper documentation of the systems, and standards all make the development of information systems *scalable* and independent of the software platform used.

The above approaches were tested in the Kyrgyz Republic and proved effective there. Currently, the case-based hospital payment information system has expanded from a pilot system largely backed by donor investment and technical assistance, to a full-scale national system that is fully functional and evolving within the Ministry of Health and the MHIF. The information system was entirely transferred to these two national institutions, where it is upgraded by developers in a way that is consistent with organizational requirements and the availability of technology.

REFINING CASE GROUPING

Perhaps the most important measure to counteract the adverse incentives to reduce inputs or avoid costly cases is to adequately compensate hospitals for legitimate cost differences between cases. A case-based hospital payment system must include routine revision and refinement of the case groups and case group weights to periodically incorporate new data from the hospital case database into the cost per case estimates, case groups, and case group weights. As more data become available from the information system, case groups may be refined by increasing the number of case groups (as discussed above); increasing the number and range of clinical characteristics used to group the cases, such as adding comorbidities or severity measures; and developing supplementary payment mechanisms for outlier cases. The last two approaches are now discussed.

Increasing the number and range of clinical characteristics for case grouping

Diagnosis-based case groups may also take into consideration characteristics of the case other than the main diagnosis and characteristics of the patient. This step is typically done only after some iterations of the system have already been made, and further refinement is feasible because the volume of hospital case data and administrative capacity have increased. A common way to increase the range of clinical characteristics is to differentiate cases with different degrees of severity. Severity has been shown to be an important determinant of cost of care in individual cases (Brewster, Bradbury, and Jacobs 1985).

Severity of illness is a rather subjective concept, embodying short- and long-term prognoses, as well as the general health of the patient (Jencks et al. 1987; Jencks and Dobson 1987). Because of the difficulty in defining and measuring severity, a variety of proxies is used to estimate the variation in resource use associated with different degrees of severity. Case grouping inherently captures some differences in severity by differentiating by primary diagnosis and age. These variables, however, account for only some of the differences in severity. Other characteristics may include a secondary diagnosis or comorbidity (a condition that is not related causally to the patient's principal disease process but that increases a patient's total burden of illness [Shwartz et al. 1996]), whether the patient spent time in intensive care, whether the patient was transferred between departments, and whether the patient died in the hospital. Comorbidities have been shown to be related to the cost of treating individual cases and are therefore valid proxies for severity. The initial team that designed the U.S. Medicare DRG system decided that death would be used to classify patients only if it resulted in lower overall resource consumption, because, obviously, Medicare did not want to reward hospitals if patients died (Jencks et al. 1987; Jencks and Dobson 1987).

Developing supplementary payment mechanisms for outlier cases

An outlier is a hospital case with an atypically long or atypically short length of stay for a particular case group. Early research and evaluation of the U.S. Medicare DRG system found that outliers were an important determinant of cost variations between hospitals (Jencks et al. 1987; Jencks and Dobson 1987). Therefore, a policy for reimbursing outliers is necessary to maintain equity in the system, protect hospitals from random risk, protect certain hospitals with a large number of outliers, and ensure that the most severely ill patients are not denied hospital care (Carter et al. 2001; Carter and Farley 1993). Outlier payment policy must be designed carefully, however, because outlier payments may create additional incentives that weaken the efficiency incentives of the case-based payment system, and may make it more difficult for the purchaser to predict total expenditures and therefore achieve budget neutrality (Carter et al. 2001).

Outlier payment policy must define those cases considered to be outliers as well as a mechanism to pay hospitals differentially for outliers. The definition of outlier cases in a payment system depends on the "trim points" (cutoffs) for

each case group that differentiates cases with typical and atypical lengths of stay. Each case group has at least one trim point (a long-length-of-stay trim), and some may have a short-length-of-stay trim (Grimaldi and Micheletti 1983). Trim points may be based on statistical or medical criteria as well as the policy decisions of health purchasers and regulators. Trim points are often defined in terms of the average and standard deviation of the length of stay within a case group. For example, defining the trim points as two standard deviations above or below the mean length of stay within a case group has been found to adequately identify high-cost cases (Cots et al. 2003). Other definitions of trim points include three times the average length of stay for the case group, which is used in some states in Australia, and the third quartile of the length of stay distribution for the case group.

Various options exist for the method of payment for outlier cases. Australian states use varying approaches, and in New South Wales, for example, hospitals are paid on a per diem (per bed-day) basis for days beyond the trim point. Hospitals in Western Australia receive additional funds for long-length-of-stay outliers, but funding levels are deliberately set below the actual estimated costs of care, on the assumption that a portion of the additional costs are a consequence of inefficiency (Russell-Weisz and Hindle 2000). Queensland hospitals are paid a discounted per diem rate for short-stay outliers and an additional per diem rate for long-stay outliers. There are two long-length-of-stay trim points, for "long" and "extra long" stays. Extra-long-stay outliers are paid twice the "inlier" payment (or the typical payment for cases that are not outliers) plus per diem payment for days above the extra long trim point.

In the United States, Congress initially mandated that hospitals be paid the actual marginal cost of outlier cases. This approach proved impractical, however, because the marginal costs could not be determined from available data (Jencks et al. 1987; Jencks and Dobson 1987). A critical challenge is, therefore, given this difficulty of estimating the cost of outlier cases, how to avoid making them profitable. Use of length of stay as a proxy for identifying them is one example of this difficulty, because relatively inexpensive long stay cases may be profitable. The United States generally uses an insurance approach, where the objective is to share financial risk with hospitals. Hospitals must bear an additional loss (in effect, a deductible or excess), until a threshold is reached for an outlier case, and losses are shared beyond the threshold (as in a copayment arrangement).

IMPLEMENTATION ISSUES

The way in which case-based hospital payment systems are operated and tailored to the specific contextual factors in a country or region strongly influences how successfully they contribute to achieving health policy goals. This section discusses several key aspects of implementation and presents examples of specific implementation strategies and experiences.

This section does not address several important implementation issues, either because they are beyond its scope or because they tend to be highly country specific. They include: creating the legal and regulatory framework for implementing the new payment system; getting leadership and the support of key stakeholders; establishing the roles and relationships between the health purchaser and providers; establishing new internal management and accounting systems in hospitals; linking the case-based payment system both to provider payment methods at other levels of the health system, such as primary health care, as well as to physician payment; and monitoring and evaluation of the new payment system.

Transition to a Case-Based Payment System and Risk Management

It is generally recommended that new case-based hospital payment systems be implemented incrementally, because of the potentially large effects on resource allocation between hospitals relative to historical patterns, and because of the time needed to accumulate the data necessary to design more sophisticated payment systems. An incremental approach gradually shifts financial risk to hospitals, allowing them time to adapt to the new incentives, and provides the opportunity to establish information systems and accumulate the data necessary to refine the payment system.

It is often best to pilot a new payment system first as a safe "paper system" without any real change in the flow of funding. This is part of the process of organizational learning for both the purchaser and providers, and may help gain the understanding and support of key stakeholders. The pilot paper system is useful to model the changes and benefits that will be brought about by the new way of working. It also puts the information systems in place and begins collecting hospital case data to simulate the changes in resource allocation that will occur in a case-based payment system. The paper system can be used to show hospitals how their budgets will be affected if the new payment system is introduced, so they can begin to adapt their internal management to the new system before facing any actual financial risk.

After the pilot system, the new payment system may be implemented incrementally in several ways. For example:

- *Transitioning*—this may be from other output-based hospital payment systems, such as a per diem payment system
- *Incremental inclusion of hospitals*—introducing the new system in some hospitals and gradually adding other hospitals, or introducing the system in all hospitals in one administrative or geographic area and gradually adding other areas
- *Incremental inclusion of costs reimbursed by the payment system*—reimbursing a subset of hospital costs through the system initially and gradually increasing the types of costs reimbursed

- *Incremental inclusion of types of cases*—reimbursing a subset of cases on a per case basis initially and gradually including other types of cases
- *Incremental adoption of a systemwide base rate moving from facility-specific rates*—introducing hospital-specific adjustors to the base rate to maintain historical allocation between hospitals and gradually shifting to a single base rate for all hospitals in the system.

In Zhezkazgan region, Kazakhstan, a case-based hospital payment system was introduced through a transition from the Soviet-era input-based budgeting system to a per diem system in 1995, and then to a case-based system in 1996. This gradual transition allowed the hospitals to begin to adjust their internal management systems to output-based payment, while installing data systems. The first case-based system introduced in 1996 grouped cases by department. As more data were collected in the hospital case database, the payment system was refined to a diagnosis-based system in 1998.

In Israel, a case-based hospital payment system was rolled out incrementally in a gradual increase in the types of cases reimbursed. During the first three years of the new system, hospitals were paid on a per case basis for cases in the surgery and intensive care departments, but on a per diem basis for cases in all other departments (such as internal medicine or geriatrics) and readmissions. After three years all hospital cases were paid according to the new case-based system (Shmueli, Intrator, and Israeli 2002). In the United Kingdom a performance-based payment system (known as "payment by results") is being introduced by incremental inclusion of increasing numbers of clinical specialties in per case payment, but on a full-cost basis.

The U.S. Medicare DRG hospital payment system was implemented incrementally through gradual introduction of a national base rate. The payment system began with a base rate that was a blend of each individual hospital's historical costs, a regional base rate, and a national base rate during the early transition period. In addition, an adjustment was added for teaching hospitals, and a rural/urban adjustment was included to further reduce sudden changes in the revenues of individual hospitals (Jencks et al. 1987; Jencks and Dobson 1987). The transition from the blend of a hospital, regional, and national base rate to a national base rate is shown in table 2.6.

The Kazakhstan MHIF also adopted hospital-specific adjustors to the base rate to move to a regionwide base rate gradually. As the data systems were put in place, however, it became clear that the hospitals with the highest historical costs, and therefore the highest adjustors, were not always those with the most severe case mix. In Karaganda region, for example, the regional teaching hospital had the highest average cost per case, but the hospital case database revealed that the average case mix for the hospital ranked 11 out of 16 hospitals in the region (Katsaga 2000). Such adjustors often serve to compensate hospitals for cost variations that are not related to the types of cases they treat, but rather to differences in efficiency of input use. Therefore, they should only be used for a

TABLE 2.6 Transition to a National Base Rate in the U.S. Medicare DRG Hospital Payment System (%)

	Composition of base rate—time period				
Source of base rate	*1 Oct. 1983–30 Sep. 1984*	*1 Oct. 1984–30 Sep. 1985*	*1 Oct. 1985–30 Sep. 1986*	*1 Oct. 1986–30 Sep. 1987*	*After 1 Oct. 1987*
Hospital-specific	75	50	50	25	0
Regional	25	37.5	37.5	37.5	0
National	0	12.5	12.5	37.5	100

Source: Federal Register 1986 reported in Jencks et al. (1987).

brief transition period to allow hospitals time to adjust their cost structures. As a word of caution, however, hospital-specific adjustors are often politically difficult to remove once they have been (even temporarily) introduced.

Incremental implementation of a new case-based hospital payment system often involves some combination of the five bulleted approaches outlined above. In the Kyrgyz Republic, for example, the MHIF incrementally expanded the geographic areas covered by the new payment system, gradually included hospitals in the new payment system through an accreditation process, and started with a subset of variable costs reimbursed by the case-based payment system. In the Republic of Korea the case-based hospital payment system was introduced on a pilot basis for nine disease categories (25 case groups) in 54 health care facilities (clinics and hospitals) in 1997. The nine disease categories accounted for only about 25 percent of all hospital cases. In the second year of the program, coverage of the new payment system expanded to 132 facilities, and by 2000 to nearly 800 facilities (all voluntary) in what was still considered to be a pilot scheme (Kwon 2003).

Measures to Counteract Adverse Incentives

The main incentives created by a case-based hospital payment system are for hospitals to increase efficiency by reducing excess inputs used to treat each case. These incentives can, however, potentially induce hospitals to reduce inputs excessively to the point of undertreating cases, discharging patients prematurely from the hospital, or otherwise reducing quality of care. Because hospitals are paid according to output (that is, discharged cases), they have an incentive to increase the number of admissions (and therefore discharges). Furthermore, when cost differences between cases within a case group are large, hospitals have an incentive to avoid more costly cases, which may present a barrier to necessary hospitalization for severely ill patients.

Another adverse incentive is "gaming" with upcoding, or assigning cases to a case group that is reimbursed at a higher rate than the case group to which the

case actually belongs. Upcoding does not affect the quality of patient care directly, but is an important source of excessive costs and inefficiency in the system.

Other perverse incentives can include repeated admissions after discharge, and shifting some services to before hospital admission and after hospital discharge. In the Republic of Korea, for example, there is some evidence that hospitals performed a larger share of diagnostic tests before hospital admission after a case-based payment system was implemented (Kwon 2003). To discourage such behavior, the U.S. Medicare program has a policy of not paying for diagnostic tests performed on an outpatient basis in the three-day period before a hospital admission.

All these adverse incentives are inherent in the case-based hospital payment system and will not be avoided without explicit measures to counteract them. Therefore, all such payment systems require measures to counteract the adverse incentives inherent in the payment system. These measures may be part of an integrated quality assurance system to monitor the performance of hospitals in the payment system, or may be individual administrative regulations that are enforced by the purchaser and/or regulator. Such measures may include:

- *Reduction or denial of reimbursement for hospital readmissions.* In Israel, for example, readmissions within seven days of discharge are not reimbursed (Shmueli, Intrator, and Israeli 2002)
- *Minimum lengths of stay.* Federal legislation introduced in the United States in 1996 mandated that group health insurance plans may not restrict benefits for hospital stays for new mothers and their infants to less than 48 hours after vaginal delivery or 96 hours after cesarean delivery (Madlon-Kay, DeFor, and Egerter 2003)
- *Measures for the purchaser to monitor and control the volume of admissions.* This may be in the form of rationing for elective cases above a certain level
- *Medical audit or other review processes.* These assess a sample of cases for medical necessity and coding accuracy.

CASE STUDIES FROM KAZAKHSTAN AND THE KYRGYZ REPUBLIC

This final section of the chapter offers the experience of Kazakhstan and the Kyrgyz Republic in implementing new case-based hospital payment systems in the form of brief case studies. (Chapter 1, in the section *Experience from Four Central Asian Republics*, has a parallel section on primary health care, or PHC.) These payment systems were introduced in these two Central Asian republics as part of comprehensive health sector reforms, which were initiated in the context of broader economic liberalization following independence from the former Soviet Union in the early 1990s. At that time the countries faced similar crises in their health care systems, which were brought about by a combination of economic

collapse following the breakup of the Soviet Union and the burdens of the inherited health care systems.

The case studies describe why a case-based hospital payment system was appropriate for these two countries and the role it played in the broader health reform process. The case studies also provide contrasting examples of how the process of design and incremental implementation of a new system may lead to permanent shifts in health sector roles and relationships, both in a more centralized system with a coherent national health policy agenda (the Kyrgyz Republic), and in a more decentralized and at times unstable health policy environment (Kazakhstan). In addition, they illustrate how policy decisions and technical design issues can be addressed, and show some of the compromises that are often necessary to roll out and then operate a case-based hospital payment system in the context of the political, economic, and social realities of low- and middle-income countries.

Health Policy Context

As discussed throughout this chapter, there is no perfect hospital payment system, and each of the options has advantages and disadvantages. Some hospital payment systems may, however, be more appropriate for certain environments or countries at certain times. In addition, any hospital payment system should be designed in the context of broader health policy goals, the current capacity of the system, and the desired or expected changes in the system. Following the collapse of the former Soviet Union, newly independent states such as Kazakhstan and the Kyrgyz Republic faced similar health system reform and development challenges, and a case-based hospital payment system was considered to be the best hospital payment option to address the following common issues, which are discussed (along with proposed solutions) in subsequent paragraphs:

- Excess capacity, inefficiency, and lack of competition
- Changing health sector roles and relationships, including provider autonomy
- Lack of consumer responsiveness
- Weak health information systems.

Excess capacity, inefficiency, and lack of competition

The legacy of the Soviet system and the turbulent transition to a market-based economy had dramatic consequences for the health sector in Central Asia. Resources available virtually collapsed, with health care expenditures as a share of gross domestic product (GDP) falling from approximately 6 percent at the end of the Soviet period to 3 percent in the mid-1990s (World Bank 2004), in a context of GDP itself falling by approximately half, resulting in a huge reduction in real per capita health expenditures. Informal health payments grew rapidly to fill the financing gap, further eroding access to health care services.

As illustrated in figure 1.7 in chapter 1, the system inherited from the former Soviet Union can be likened to an inverted pyramid. The hospital sector at the top of the pyramid was overdeveloped, and the PHC sector, which should have served as the broad base of the pyramid, was underdeveloped, underfinanced, and underused. The declining health sector resource base simply could not sustain that infrastructure.

The allocation of health resources in Central Asia used to follow the traditional Soviet line-item budgeting process, allocating health funds across facilities by input measures rather than by the quantity and quality of services delivered. Budgets were guaranteed, and providers did not have to compete to attract people by providing lower-cost, higher-quality health services than their peers. Specifically, the hospital payment system was a line-item budget for inputs based on normative standards, including number of beds, with the result that hospitals had a strong incentive to increase the number of beds as well as overall infrastructure capacity.

The above incentives led to significant excess capacity in the health sector. Each government unit (national, region, city, and district) owned and operated often overlapping and duplicative hospitals. The hospital sector was overspecialized and fragmented. Each major city, for example, would have separate hospitals serving adults, women, and children, as well as specialized hospitals for emergency care, cardiology, oncology, endocrinology, ophthalmology, tuberculosis, dermato-venereology, as well as other specialties. The nature of clinical practice also fed into an environment of excess capacity and low efficiency in the hospital sector. PHC was inadequately provided through catchment area physicians with poor clinical skills and incentives to refer quickly to hospitals. Clinical practice was not based on evidence, and promoted the overutilization of health services, consistent with the large physical capacity of hospitals. (Further details on the wider health system in Soviet times, and its post-independence transition for countries in Central Asia, are given in the section, *Experience from Four Central Asian republics*, in chapter 1, *Primary Health Care Per Capita Payment Systems*.)

After independence, some attempts were made to rationalize excess hospital capacity using a central planning approach. In general these attempts were unsuccessful, because they focused on reducing beds, not buildings, and generating the significant unintended consequence of further decreasing the health budget as capacity in the system was reduced. Because budgets were largely based on the number of beds, when the number of beds was reduced the budget was cut without a decrease in underlying costs such as utilities.

It quickly became clear that it was impossible to reduce excess capacity and increase efficiency by rationalization or central planning alone. Changes in financial incentives from a new hospital payment system were also necessary to allow shared responsibility between health purchasers and health providers for streamlining the delivery system. Such shared responsibility could not be achieved using centrally planned rationalization. The need to reduce excess

capacity and increase efficiency was a major rationale for the introduction of a case-based hospital payment system in Kazakhstan and the Kyrgyz Republic.

In addition, the new payment system served as a mechanism to stimulate competition, which in some circumstances such as large urban areas, was necessary for increasing efficiency and consumer responsiveness. Competition was not seen as relevant or beneficial in all situations, however, such as remote rural areas, where there may be no effective competition and it is critical to invest in just one hospital to serve the population. In general, though, case-based payment systems can still be appropriate for such areas, because increasing hospital autonomy to allocate internal resources is also vital. Other ways are appropriate to adapt this payment system in remote rural areas where increasing competition is not the goal. For example, the type and number of cases treated can be used as an input into the creation of a global budget, or an additional payment adjustment can be added to compensate for low population density and the related low numbers of admissions.

Finally, the introduction of a case-based hospital payment system contributed to increasing overall health sector efficiency by facilitating a shift of resources to PHC. The hospital payment system relies on a pooling mechanism, which allows transparent policy decisions to be made about the allocation of health resources to different levels of the system, so resources can be explicitly shifted to PHC. It also provides a mechanism to rationalize excess capacity and increase efficiency in the hospital sector, which can gradually release health care resources to the more cost-effective PHC sector.

Changing health sector roles and relationships, including provider autonomy

In the former Soviet Union, the Ministry of Finance with the Ministry of Health (MOH) served as both the purchaser and provider of health services. They set priorities, decided resource allocation, and made many of the small, day-to-day management decisions within the hospitals themselves. In both Kazakhstan and the Kyrgyz Republic the case-based hospital payment system served as a pivotal component of the health reform agenda, sparking profound changes in the relationship between health purchasers and providers and in the approach to health sector resource allocation.

The roles of the health purchaser and provider were separated, with the MOH or MHIF serving as the health purchaser and focusing more on allocating resources according to health priorities and less on day-to-day management of health providers. The providers had more autonomy to adapt to the changing financial incentives in the new provider payment systems, to allocate resources more efficiently and effectively, and to improve hospital management. This separation of functions and changes in roles and relationships also increased the transparency of resource allocation decisions through the use of predetermined and publicized payment rates, which were directly connected to services received by the population. Lastly, the new hospital payment system con-

tributed to decentralizing management (but not finance) functions in a previously overcentralized health system.

Lack of consumer responsiveness

In the Soviet system the population had been inadequately involved in decisions on health care. People had few rights, as well as few responsibilities. They were unable to choose their primary care providers, and their health care provider did not provide them with information about their health status and treatments. Provider payment systems funded the infrastructure of the health sector, not the health services received by the population, and as the state provided everything, people did not take responsibility for their own health.

A case-based hospital payment system facilitated a shift in mentality and increase in consumer responsiveness, because hospitals were now paid to provide services to individuals rather than to maintain infrastructure and buildings. Thus hospital revenue depended, at least in part, on the satisfaction and choice of patients or the primary care providers referring them.

Weak health information systems

Although much information was collected under the old Soviet system, very little analysis was carried out and data were used for political rather than decision-making purposes. A case-based hospital payment system required the development and implementation of an improved HIS, which could be used for health statistics, quality improvement, billing, and internal hospital management.

Case-Based Hospital Payment and Health Reforms in the Kyrgyz Republic

The Kyrgyz Republic is one of the poorest former Soviet republics. Between 1990 and 1994, per capita GDP fell by nearly 50 percent (World Bank 2004), and health expenditures also collapsed. By the early 1990s the health care system was in crisis, with deteriorating quality and accessibility of basic health care and worsening health outcomes, including outbreaks of previously controlled infectious diseases, as well as emerging public health threats.

Overview of health reforms in the Kyrgyz Republic

The health reforms in the Kyrgyz Republic were some of the most far-reaching in their scope and achievements in the former Soviet Union, with the exception of the Baltic republics (ZdravPlus Program 2008). The comprehensiveness of reform, using a broad health systems approach, has extended its impact well beyond the health sector and has resulted in sweeping changes in the way in which the government delivers services to the population. The reforms were initiated in 1994 with the top-down development of the Manas National Health Care Reform Program (1995–2005) and the bottom-up implementation of

reforms in the pilot of Issyk-Kul *oblast*. Donor coordination has always been a strength of the Kyrgyz Republic's health reform process, with a core group of donors including WHO, World Bank, USAID, Swiss Development Corporation, and the Department for International Development working closely with local partners to integrate activities into a common conceptual framework.

While it is not the purpose of this brief case study to describe the broad content or process of the Manas Program, the following elements may be listed: formation of a new PHC sector through the creation of family group practices (FGPs); restructuring of the hospital sector; new health financing mechanisms and provider payment systems implemented through a single-payer system; specification of a basic benefit package, including a new outpatient drug benefit and formalized population copayments; new HISs; strengthening of health management; introduction of family medicine; strengthening of priority programs, including maternal and child health and infectious diseases; promotion of evidence-based medicine and the introduction of new clinical practice guidelines; improvements to health facility infrastructure, services, and health provider accreditation; promotion of rational drug use; health promotion; and increased community involvement in the health sector through the formation of new community health action entities (village health councils).

Health reforms have been implemented nationally—in all seven *oblasts* and in Bishkek and Osh cities—and have touched the health sector at all levels that provide individual health services. While pilot programs around the world are too rarely rolled out, the Kyrgyz health reforms quickly and successfully built on and expanded their initial pilot efforts: the Manas-Taalimi National Health Reform Program 2005–2010 consolidated the achievements of the Manas Program and initiated interventions in next-generation reforms, such as the public health system, medical education, and infectious disease vertical systems, while simultaneously increasing the capacity of the MOH to design and implement health reforms and measure their impact.

The role of case-based hospital payment in health reforms

The new case-based hospital payment system served as a major driver for a step-by-step health reform process. When the newly established MHIF began health insurance in 1997, significant progress had already been made in national health policy development and pilot implementation. The roll-out of the health reform model had begun, including formation of new FGPs, free choice of FGP and population enrollment, introduction of family medicine, and development of new provider payment and HISs.

However, it was the MHIF and its implementation of a case-based hospital payment system with 13 contracted hospitals in 1997 that really initiated health financing reform, which became the driver of the next and expanded phase of the health reform program in 2001, when a single-payer system was piloted (and rolled out nationally by 2004) and all hospitals were part of the case-based payment system. Through extensive policy dialogue between the MHIF, MOH, and

international partners, a decision was made that health insurance would not offer the following: full coverage for a defined population with a benefit package completely separate from the population and benefit package funded by the state budget (a system used in the Russian Federation and Kazakhstan). Rather, the payroll tax funding generated by the health insurance system would serve as an additional or supplemental benefit, in effect reducing population copayments.

Being in the position of providing incremental benefits to the insured population allowed the MHIF the freedom to innovate. The objectives of the MHIF were to leverage its small amount of money (about 10 percent of total health funding) to drive broader health reform, increase health delivery system efficiency, and make the health insurance program visible to the population. The mechanism selected to accomplish these objectives was the introduction of new provider payment systems to create competition, population choice, and provider autonomy. The new case-based hospital payment system was innovative in that it only reimbursed hospitals for variable costs directly related to patient care, while the budget still paid for fixed costs. Specifically, hospitals could use the incremental funds from the case-based payment system to purchase drugs, supplies, and food, and to fund performance-based staff bonuses. This resulted in positive support for health insurance both from the population (especially pensioners), since copayments for drugs and supplies were reduced, and from providers, since salaries were formally supplemented with bonus payments.

Competition and patient choice were promoted, as patients selected hospitals in which drugs, supplies, and food were available. Hospitals that attracted more patients in turn generated more funds for drugs, supplies, and food. In addition, providers were granted more autonomy and began to develop their capacity to manage and allocate resources. This implementation strategy established the case-based hospital payment system as a trigger for health reform, and it continued to play that role as the health reforms took root and expanded after 2001.

Step-by-step implementation

One of the characteristics of the Kyrgyz Republic's health reform process was a step-by-step implementation process and a focus on institutionalization, which had political, technical, and operational benefits. Politically, it facilitated the building of support for both current and future steps. Technically, it allowed a process of experimentation and refinement, which improved and solidified the interventions. Operationally, it built capacity through actual implementation experience, which increased the understanding and ownership of the reforms among the government, the MOH and MHIF, and providers, as well as providing the major development asset of time.

Initially, 13 hospitals were selected to be brought into the new case-based hospital payment system in 1997. Their eligibility to participate was linked to health facility accreditation. This criterion also helped stagger implementation and avoid overwhelming the young and fragile MHIF. After the first year participation was expanded to 36 hospitals, and by 2001 all 66 hospitals in the country were participating in the new payment system.

Early implementation of a case-based hospital payment system for only variable costs was an important element of this step-by-step approach. As the new MHIF was not immediately responsible for the collection of revenue and payment of expenditure for a complete benefit package for a subset of the population, the MHIF had time to develop its policies, procedures, human resources capacity, and operating systems. Thus implementation of the case-based hospital system also served as a vehicle for MHIF institutional development.

Time and an implementation-oriented approach also benefited the development of health provider capacity. Under the old system health providers had very little autonomy to allocate resources or to make even the most basic management decisions. The case-based hospital payment system prompted greater hospital autonomy to allocate resources, which led to a perceived improvement in hospital management functions and systems.

Initially these hospitals' managers showed reluctance. Accustomed to a high level of central control, they did not immediately believe that they would have greater autonomy nor readily understood what to do with the autonomy, since the management functions and systems were not well developed. After about six months, though, their perspective had completely changed. They ran with the autonomy and rapidly began improving management functions and systems. The HIS, used for billing in the case-based hospital payment system, was also used to assess the types of cases that the hospitals were treating. Accounting, including management and cost accounting, had improved and hospital managers were starting to use it for financial analysis as well as the routine recording of expenses. They had a better understanding of the need to match revenues and expenses and were more aware of what neighboring hospitals were doing. They had also considered and improved their procurement processes for supplies and drugs. Very importantly, most of the hospitals had established a personnel committee to decide on the procedures for allocation of performance-based staff bonuses.

As the case-based hospital payment system was rolled out—and by 2001 it was used to pay all the general hospitals in the country—this pattern of institutional development remained the same: the MHIF as health purchaser continued to develop its capacity, the payment system granted greater autonomy to hospitals to allocate resources, and the hospitals quickly began to improve their health management functions and systems. New provider payment systems (including a capitated-rate payment system for FGPs) were driving realignment of roles and relationships in the health sector, development of the MHIF as health purchaser, and substantial and critical organizational behavior change among providers.

Although the first variable-cost case-based hospital payment system for additional or supplemental benefits under the health insurance system created the conditions to drive improvements in hospital management, there was little restructuring of hospitals to reduce excess capacity. This was because the payroll tax for health insurance only represented about 10 percent of the total health budget, and the Ministry of Finance and MOH were operating the old line-item budgets in parallel. The financial incentives contained in these two provider

payment systems were contradictory, and given the larger share paid under the line-item budgets, the incentives to maintain capacity (and not restructure) were stronger. This led to the next step in the health reforms, with the case-based hospital payment system again playing a major role.

Outcomes in the health system driven by the case-based payment system

In 2001 the government established a single-payer system with both the general revenue health budget and health insurance payroll tax funds pooled in the MHIF, which served as the single payer under the MOH. The system was initially piloted in two *oblasts*, then rolled out nationally step by step. By 2004 the single-payer system had been largely implemented throughout the country. Common financial incentives rewarding the rationalization of excess hospital capacity and increasing efficiency enabled dramatic restructuring and rationalization (table 2.7). Results show that one of the major challenges of the health system inherited from the former Soviet Union was addressed—excess capacity in the hospital sector was rationalized, with savings reinvested in direct patient care such as drugs and in increases in very low health professional salaries (Ministry of Health of the Kyrgyz Republic 2008). Hospital capacity was reduced by at least 40 percent by 2004. No significant reductions were made between 2004 and the MOH evaluation in 2008 (Ministry of Health of the Kyrgyz Republic 2008), and capacity may now be at the appropriate level. In addition, the technical efficiency of hospitals has increased, as the share of health expenditures allocated to direct patient care expenses increased from 16 percent to 33 percent between 2001 and 2007 (Ministry of Health of the Kyrgyz Republic 2008). At the same time, an evaluation of the impact of restructuring found no evidence that downsizing created access barriers to care for the poor. The allocative efficiency of the health system also improved, as the share of health care expenditures devoted to PHC more than doubled from 15 percent to 38 percent between 2001 and 2007 (Ministry of Health of the Kyrgyz Republic 2008). A new capitated-rate payment

TABLE 2.7 Hospital Resource Rationalization in the Kyrgyz Republic, 2001–04

Infrastructure parameter	*2001 (actual)*	*2002 (actual)*	*2003 (actual)*	*2004 (planned)*	*Change 2001–04*	*% change 2001–04*
No. of buildings	1,598	921	921	843	755	–47
Total floor space	804,960	523,019	523,019	477,149	327,811	–40
No. of total staff	49,371	50,201	51,087	47,639	1,732	–5
No. of hospital staff	38,615	30,364	28,764	26,243	12,372	–32
Average salary/month (som)	533	645	754	932	399	+73
Amount spent on drugs per case (som)	135	157	207	277	142	+105
No. of treated patients	503,877	465,115	529,206	549,789	45,912	+8

Source: Authors' analysis of Ministry of Health data as summarized in Ministry of Health of the Kyrgyz Republic (2008).

system was used to reimburse FGPs, which led to better funding of salaries, medicines, and supplies at the primary level, and thus significantly contributed to the process of strengthening PHC cost-effectiveness.

The new hospital payment system contributed to the development of improved service delivery and quality improvement. One example is the establishment of a connection between health insurance program implementation and facility accreditation. A hospital was not permitted to enter and be reimbursed by the health insurance system until it was accredited. This policy benefited the MHIF initially, because it took time to accredit facilities, which provided a window for development and the ability to manage their growth. The policy also benefited the new Medical Accreditation Commission, as the commission was validated, and licensing and accreditation were accepted and in demand. An unexpected benefit was an increase in the allocation of resources to the health sector, as some local governments invested in improving the condition of their health facilities to ensure that they would be eligible for participation in the health insurance program. The MHIF launched a quality assurance system for hospitals. This system is currently being linked to the introduction of new evidence-based clinical practice guidelines. Finally, although PHC practitioner salaries are still low and require further increases, the shift of resources from the hospital sector to PHC, which was facilitated by the new hospital payment system, is enabling the introduction of family medicine and a gradual increase in the scope of services provided in PHC.

The MHIF implementation strategy, including the case-based hospital payment system, created time for the MHIF to establish its institutional identity, build capacity within the organization, and make investments calculated to provide returns through increased efficiency and equity. With the implementation of the single-payer system, the MOH and MHIF specified a basic benefit package for the population, which included both guaranteed (free) benefits for some health services and formal population copayments for other health services. In addition, the MHIF solidified its status as a leading agent of change by evolving into an active and intelligent health purchaser.

The case-based hospital payment system in the Kyrgyz Republic matured along with the reforms. The system started as a simple system of 28 groups based on data available combining department-level groups with diagnosis-based case groups (see the section, *Defining Case Grouping Criteria*, above). By 2005 the system was completely diagnosis-based, with about 150 groups and a very well-developed HIS, including an automated billing and accounting system that had paid hospitals for about 3 million discharged cases since its inception.

In summary, implementation of a case-based hospital payment system in the Kyrgyz Republic served as a triggering—or at least core—element of a step-by-step approach to health reform that now encompasses the entire health sector and is rapidly being institutionalized for long-term sustainability.

Table 2.8 offers a summary of the main elements of the restructuring and rationalization process that took place in the Kyrgyz Republic from 1992 to 2001.

TABLE 2.8 Timeline of Health Reforms in the Kyrgyz Republic, 1992–2001

1992
Government of the Kyrgyz Republic passes Health Protection Act and Law on Medical Insurance
1994
Memorandum of understanding signed between World Health Organization Regional Office for Europe and the Ministry of Health (MOH) to undertake the MANAS Health Care Reform Program
Government of the Kyrgyz Republic requests United States Agency for International Development (USAID) technical assistance in health care financing reform and plans pilot in Issyk-Kul *oblast*
Health Financing and Sustainability Project sends a team to develop a health insurance reform demonstration in Issyk-Kul *oblast*
National Health Policy developed and approved by the government
USAID awards Health Care Financing and Service Delivery Reform Program in Russia, Ukraine, and Central Asia (later renamed ZdravReform Project)
1995–96
Primary health care in Issyk-Kul *oblast* restructured, including development of new family group practices, introduction of family medicine, open enrollment, and development of new provider payment and health information systems
Government approves MANAS Health Care Reform Program
World Bank-funded Health Sector Reform Project begins (1996–2000) in Bishkek city and Chui *oblast*
1997–99
Introduction of mandatory health insurance; 13 hospitals contracted with the Mandatory Health Insurance Fund (MHIF) and are paid by a new case-based payment system
MHIF brought under MOH
MHIF contracting and new provider payment systems expand to 66 hospitals and 290 family group practices
Roll-out of family group practices and open enrollment in Bishkek city and Chui *oblast*
Republican, *oblast*, city, and *rayon* (district) health care budget funds pooled in Issyk-Kul *oblast*
Roll-out of reforms and formation of first family group practices in South Kyrgyzstan *oblast*
2000
MANAS health reform team institutionalized into MOH, MHIF, and other health sector entities
USAID awards 5-year Central Asia Quality Health Care Project (later renamed ZdravPlus Project)
2001
Single-payer system established and pilot-tested in Issyk-Kul and Chui *oblasts*
Development of monitoring and evaluation systems with support from World Health Organization/Department for International Development (DFID) Health Policy Analysis Project
Copayment policy introduced in single-payer system pilot sites; evaluated by Swiss Red Cross
Clear positive results in Issyk-Kul and Chui *oblasts*, including rationalization of beds, buildings, and staff; reinvestment of savings; increases in salaries; reduction in fixed costs; acceptance of copayments by the population; and apparent decline in informal payments
World Bank-funded Health Sector Reform Project II begins

Source: Adapted from McEuen (2004).

Case-Based Hospital Payment as a Stable Element of Uneven Reforms in Kazakhstan

Health indicators in Kazakhstan deteriorated during the transition period, as did those in other former Soviet countries in the region. Life expectancy at birth was estimated to be only 59 years in 2006 (WHO 2008).

Kazakhstan is characterized by a sophisticated and fluid health policy environment. There were particularly volatile changes early in the transition period. Between 1995 and 2004 the structure and leadership of the health sector changed often, and the pendulum of health policy swung widely from progressive reform agendas to repeal of reforms and back again. New hospital payment systems have been part of the health financing policy in Kazakhstan, even during the periods of most stagnant overall health reforms. The role of a case-based hospital payment system has been different in Kazakhstan than in the Kyrgyz Republic, however. In the Kyrgyz Republic the new system served as a major driver of health reform; in Kazakhstan it served as a constant policy approach in a changing health policy environment. These equally critical but different roles reflect the core importance and flexibility of hospital payment systems in the overall development of health systems. Hospital payment systems determine the incentives faced by—and therefore strongly influence the behavior of—hospitals, which has a profound effect on the performance of the entire health system.

Health financing reform in Kazakhstan was initiated with the introduction of mandatory health insurance in 1996. Following a pilot test of mandatory health insurance schemes beginning in 1993, Kazakhstan established the legal basis for a national MHIF in 1995. The insurance system became operational and began financing health care services in mid-1996, but was canceled at the end of 1998. Thus the existence of Kazakhstan's mandatory health insurance system was brief, lasting less than three years. The MHIF was burdened from the start with inappropriate goals, flawed design and institutional structure, and an unrealistic implementation strategy. There is also evidence, however, that during its brief existence the MHIF was beginning to effect some change in the roles and relationships among the government, providers, and patients in the health care system. Innovations in provider payment systems, contracting with providers, and computerized information systems were driven by the MHIF rather than the MOH between 1996 and 1999. The new case-based hospital payment system implemented by the MHIF was central to many of these innovations.

The health insurance system was intended to provide nearly universal coverage, with a 3 percent payroll tax contribution to cover the formally employed, and local government transfers to cover children, pensioners, and the officially unemployed. The budget transfer to the MHIF to insure the socially protected nonworking population was a per capita amount set by the federal MHIF but subject to modification by local governments. Self-employed or unofficially unemployed individuals were required to pay a per capita premium directly to the MHIF to obtain coverage. The system was hampered from the beginning by

a focus on revenue collection to compensate for inadequate transfers from local governments to cover an ambitious set of services for nearly all the population, and an unclear relationship with the MOH.

The MOH also continued to have responsibility for financing some health services, which contributed to unclear roles and relationships between the MHIF and MOH. The MHIF financed a "basic package" of services, which was in addition to the "guaranteed package" financed by national and local budgets through the MOH. The basic and guaranteed packages together covered nearly all health services for all population groups. These packages were poorly defined in terms of types of services, however, allowing opportunistic interpretation by both institutions and health care providers.

The unclear roles and relationships of the MOH and the new MHIF also resulted in inconsistent, contradictory, or duplicative health policies and technical interventions. For example, the payroll tax funding for health insurance was pooled at the *oblast* level, and the MHIF was able to start implementing new provider payment systems. The local budget contribution to health funding, however, was transferred to providers according to the former historical input-based budget system. Therefore, health providers received funding from two different purchasers in a way that created contradictory incentives.

From the beginning of the health insurance system in Kazakhstan, however, the MHIF took steps to drive the system away from fixed input-based budgets for health facilities to new provider payment systems based on the number of services provided. A national case-based hospital payment system was rapidly developed and implemented by the MHIF, with the legal basis provided by the Law on Health Protection, as well as the mandate laws and regulatory decrees governing the MHIF.

The first case-based hospital payment system was the simplest model with region-specific (geographic) payment per case and no case grouping or price differentiation for the types or groups of cases. This system was a reasonable first step in a continuous refinement and improvement process. However, it also included facility-specific coefficients, which differentiated payment to hospitals by their type and administrative level (region, district, rural). These coefficients created payment rates that approached hospital-specific rates. Thus hospitals had no incentives for restructuring or increased efficiency, but did have incentives to admit low-cost cases and to underserve severely ill patients.

Retrospective analysis showed only a minimal correlation between cost per case and the administrative level of the hospitals. For example, the regional or higher administrative level hospitals that received a higher payment coefficient had only an average case mix index (case severity). This provided a perspective on the natural political inclination to separate hospital payment rates by administrative level, and played a role in ensuring that the next generation of hospital payment systems did not contain hospital-specific coefficients.

In 1995–1998, Zhezkazgan and Semipalatinsk *oblasts* were the primary pilot *oblasts* in Kazakhstan. The USAID-funded ZdravReform Project supported interventions there, including the development and incremental implementation of

case-based hospital payment systems. Both *oblasts* implemented new hospital payment systems incrementally, with Zhezkazgan *oblast* transitioning from the Soviet-era input-based line-item budgeting system to a per diem payment system, then to a case-based system with cases grouped by diagnosis. However, Semipalatinsk *oblast* worked to develop a system with cases grouped by diagnosis, first using a paper system that did not initially change the flow of funds in the health system. The systems developed by the two *oblasts*, as well as other experimental sites in Kazakhstan, varied by other factors as well, including which costs were included in the case-based hospital payment system and how surgeries were classified.

Reflecting the changing administrative environment in Kazakhstan, Zhezkazgan and Semipalatinsk *oblasts* were merged into Karaganda and East Kazakhstan *oblasts*, respectively, in 1998. At around the same time the MOH merged into a broader Ministry of Education, Culture, and Health, and the capital of the country moved from Almaty to Astana. These major changes translated into uncertainty in health policy directions. In addition, health insurance was canceled at the end of 1998, for a variety of political and technical reasons. Politically, the multipayer system where both the MOH and MHIF purchased health services created unclear roles and relationships, institutional conflict, and fragmented health policy. In addition, the national vertical structure of the MHIF was not accepted by the relatively autonomous *oblasts*. Technically, the preconditions for national health insurance were not met prior to implementation, including health delivery system restructuring, sufficient health provider management capacity, clear benefit packages, and provider payment systems with clear and nonconflicting incentives.

Following the cancellation of the health insurance system, a health purchasing center was established in the MOH and in *oblast* health departments. Although several other reform initiatives were stalled or reversed at that time, the implementation of new provider payment systems, including the case-based hospital payment system, continued or even advanced in some regions, particularly in Karaganda *oblast*.

The health reforms were extended from Zhezkazgan to Karaganda *oblast*, which became the lead pilot site in Kazakhstan, with the accelerated development and implementation of the case-based hospital payment system a major element of the health reform model. After implementation of the case-based hospital payment system with cases grouped by diagnosis in Karaganda *oblast* in 1998–2001, the number of hospital admissions stabilized, inappropriate admissions declined, the average length of stay dropped by about two days as hospitals began to restructure and increase efficiency, and resources began to be shifted to more cost-effective PHC. The process of extension of the new case-based hospital payment system with cases grouped by diagnosis to other *oblasts* began after these positive results began to emerge and were disseminated to national and regional health policy makers.

In 2001 changes in several overarching national laws impacted the health sector and made implementation of health financing reform very difficult for sev-

eral years. The Law on Budget and Law on Self-Governance decentralized health funding to the district (*rayon*) and city levels, which fragmented funding pools and severely reduced equity. In addition, the decentralization of health funding inhibited the implementation of new provider payment systems containing incentives for increased efficiency in the health sector, because funding could not follow patients across administrative boundaries. In addition, the Law on State Procurement (Goszakaz) established a tender process for health services that was implemented through negotiations with health facilities on line-item budgets, which returned to funding facility inputs and infrastructure.

This legal framework, in place in 2001–2004, hampered the implementation of case-based hospital payment systems. However, some *oblasts* and cities, including Karaganda city, continued to operate a modified version of the system. For example, in a number of sites, although the case-based payment system could not be used directly to reimburse providers, it was used as a tool to negotiate the volume of cases in hospital budgets under the Law on State Procurement. During this time advances were made in refining the case groupings, and broader implementation of the automated hospital database required for the case-based hospital payment system was achieved. An increasing number of *oblasts* and cities used the system, and by 2004 Kazakhstan had approximately 7 million hospital cases in the hospital database.

In addition, connections were made between the automated hospital database and other health system interventions, particularly related to quality. For example, a PHC monitoring system was developed in Karaganda *oblast* and then extended to other *oblasts*. The monitoring system relied on the hospital case database to monitor hospitalizations for primary care-sensitive conditions, an indicator of PHC performance. This significant progress provided a strong foundation for future expansion of health purchasing reform and development.

Since 2004 the health policy environment in Kazakhstan has stabilized significantly. A participatory policy dialogue process including most stakeholders resulted in presidential approval of the State Health Care Development Program (SHCDP) 2005–2010 in September 2004. This is a solid strategy that encompasses nearly all elements of health system development. Many working groups were involved in its development, and discussions were held to obtain input from various stakeholder groups, including educators and nongovernmental organizations. The corresponding implementation plan approved by the government, also in September 2004, details activities, assigns responsibilities, and attaches state budget funds to contribute to and institutionalize implementation of the strategy. In 2004–2008, implementation of SHCDP activities has progressed largely as planned and the new provider payment systems have remained an important part of the foundation, stabilizing overall health system development.

The year 2004 also saw the development and approval of a comprehensive national legal framework for implementation of health financing reform. This framework includes pooling of funds and establishment of a single-payer system at the *oblast* level and implementation of the new provider payment systems

developed in the pilot *oblasts*. In addition, the government decided not to reintroduce health insurance but rather to double the health budget over three years, and government per capita health expenditures did in fact do this, rising from $64 to $128 in 2004–2006 (Kulzhanov and Rechel 2007).

Implementation of the SHCDP and the legal framework for health financing reform have contributed to stabilizing the wide swings of the health policy pendulum and allowed the country to embark on a less chaotic and more planned step-by-step approach to health policy and health system development and strengthening. Kazakhstan is moving forward rapidly with full implementation of a national case-based hospital payment system with cases grouped by diagnosis under the new legal framework, as many of the supporting HISs have already been developed. The case-based hospital payment system also serves as a primary resource allocation mechanism for the greatly increased health budget.

Many technical issues remain to be addressed, however. For example, ensuring maintenance of the pooling arrangements and changing how health funds flow through the treasury system remain a challenge, as the funds-flow process is inconsistent with case-based hospital payment system implementation and increased hospital autonomy. The step-by-step implementation process should help address most of these issues and challenges.

In summary, it appears that the role of the case-based hospital system in Kazakhstan's health reforms will continue to evolve from a constant in an unstable health policy environment to an agent of change in a more stable environment.

NOTES

1. In this chapter and chapter 1, "implement" has a fairly wide sense and aims to capture the complexity of the process of changing these payment systems, and of breaking down the process into those steps. Implementation is a complex, iterative, nonlinear process of developing the policies, technical parameters, and supporting systems, introducing them step by step, gaining experience, refining them, rolling them out, and continuing to refine them.
2. Jakab et al. (2002) provide a thorough discussion of hospital autonomy and international experience with granting varying degrees of decision rights to public hospitals.
3. What qualifies as a "significant" surgical operation will have to be determined in the local context, but may include surgical operations that require the use of an operating theater.
4. Coefficient of variation =

$$\frac{\text{Standard deviation of the cost per case}}{\text{Mean cost per case}} = \frac{\sigma_{cost}}{\overline{X_{cost}}}$$

5. In the formation of DRGs in the U.S. Medicare system, case groups were formed using a computer program AUTOGRP. AUTOGRP partitioned the cases in the database into various subgroups based on diagnosis, procedures, age, sex, and other variables believed to be related to resource use. Series of binary splits were used to subdivide cases, which were arranged in ascending order by length of stay. The objective of the process was to find the partitioning variables that minimized the sum of squared differences between the mean length of stay of the group and the length of stay of each individual case in the group (TSSQ):

$$\min \text{TSSQ} = \sum \left(LOS_i - \overline{LOS} \right)^2$$

The final DRGs reflect modifications suggested by more detailed cost data addition to length of stay.

REFERENCES

Brewster, A. C., R. C. Bradbury, and C. M. Jacobs. 1985. "Measuring the Effect of Illness Severity on Revenue under DRGs." *Healthcare Financial Management* 39 (7): 52–3, 56–60.

Carter, G., and D. Farley. 1993. "Interaction of Outlier Payment with DRG Refinement and Recalibration." RAND Health, Santa Monica, CA.

Carter, G. M., M. Beeuwkes Buntin, O. Hayden, et al. 2001. "Analyses for the Implementation of the Inpatient Rehabilitation Facility Prospective Payment System." MR-1500-CMS. RAND Health, Santa Monica, CA.

Cots, F., D. Elvira, X. Castells, and E. Dalmau. 2000. "Medicare's DRG-weights in a European Environment: The Spanish Experience." *Health Policy* 51 (1): 31–47.

Cots, F., D. Elvira, X. Castells, and M. Saez. 2003. "Relevance of Outlier Cases in Case Mix Systems and Evaluation of Trimming Methods." *Health Care Management Science* 6 (1): 27–36.

Department of Health and Ageing, Government of Australia. 2008. http://www.health.gov.au/internet/main/publishing.nsf/Content/health-casemix-ardrg-v51_descriptions.htm.

Eichler, R., P. Auxila, and J. Pollock. 2001. "Performance-based Payment to Improve the Impact of Health Services: Evidence from Haiti." *World Bank Online Journal*. rru.worldbank.org/documents/publicpolicyjournal/236Eichl-080201.pdf.

Finkler, S., and D. Ward. 1999. *Essentials of Cost Accounting for Health Care Organizations*. New York: Aspen Publishers.

Government of Kazakhstan. 1993. Resolution No. 1174. "The Introduction of a Medical Insurance Program in the Republic of Kazakhstan." November 23. Almaty, Kazakhstan.

Grimaldi, P., and J. Micheletti. 1982. "Homogeneity Revisited: The New DRG." *Journal of the American Medical Records Association* 53: 56.

———. 1983. *Diagnosis Related Groups: A Practitioner's Guide*. Chicago: Pluribus Press.

Jakab, M., A. Preker, A. Harding, and L. Hawkins. 2002. "The Introduction of Market Forces in the Public Hospital Sector: From New Public Sector Management to Organizational Reform." Health, Nutrition and Population Discussion Paper. World Bank, Washington, DC.

Jencks, S., and H. Dobson. 1987. "Refining Case-mix Adjustment: The Research Evidence." *New England Journal of Medicine* 317 (11): 679–686.

Jencks, S., H. Dobson, T. Kay, and J. Walton. 1987. *Report to Congress. DRG Refinement: Outliers, Severity of Illness, and Intensity of Care*. Washington, DC: U.S. Department of Health and Human Services Health Care Financing Administration. Office of Research and Demonstrations.

Katsaga, A. 2000. "Analytical Report of Hospitalization in Karaganda Oblast, Kazakhstan." Technical Report. USAID-funded ZdravPlus Program, Abt Associates Inc., Almaty, Kazakhstan.

Kulzhanov, M., and B. Rechel. 2007. "Kazakhstan: Health System Review." *Health Systems in Transition* 9 (7). Copenhagen: WHO Regional Office for Europe on Behalf of the European Observatory on Health Systems and Policies.

Kutzin, J., A. Ibraimova, N. Kadyrova, G. Isabekova, E. Samyshkin, and Z. Kataganova. 2002. "Innovations in Resource Allocation, Pooling and Purchasing in the Kyrgyz Health System." Manas Health Policy Analysis Project, Policy Research Paper No. 21.

Kwon, S. 2003. "Payment System Reform for Health Care Providers in Korea." *Health Policy and Planning* 18 (1): 84–92.

Lee, K., and S. Lee. 2007. "Effects of the DRG-based Prospective Payment System Operated by the Voluntarily Participating Providers on the Cesarean Section Rates in Korea." *Health Policy* 81: 300–308.

Liu, X. 2003. *Policy Tools for Allocative Efficiency of Health Services*. Geneva: World Health Organization.

Madlon-Kay, D., T. DeFor, and S. Egerter. 2003. "Newborn Length of Stay, Health Care Utilization, and the Effect of Minnesota Legislation." *Pediatrics and Adolescent Medicine* 157 (6): 579–583.

McEuen, M. 2004. "The Pilot Process: Case Study on Piloting Complex Health Reforms in Kyrgyzstan." PHRplus Project. Abt Associates Inc., Bethesda, MD.

Ministry of Health of the Kyrgyz Republic. 2008. "Mid-Term Review Report: Manas Taalimi Health Sector Strategy." Bishkek, Kyrgyz Republic.

Russell-Weisz, D., and D. Hindle. 2000. "High Length-of-stay Outliers Under Casemix Funding of a Remote Rural Community with a High Proportion of Aboriginal Patients." *Australian Health* Review 23 (2): 47–61.

Samyshkin, E. 1999. "Hospital Payment Reform in Kyrgyzstan." USAID-funded ZdravReform Program, Abt Associates Inc., Almaty, Kazakhstan.

Samyshkin, E., and Y. Lisitsin. 1998a. "Technical Note. On the Development of the New Revision of Hospital DRGs for Kyrgyzstan: Analytical Framework for the Health Care Purchaser." USAID-funded ZdravReform Program, Abt Associates Inc., Almaty, Kazakhstan.

———. 1998b. "Construction and Refining of the DRG for the Mandatory Health Insurance Fund Hospital Payment System in Kyrgyzstan: Preliminary Analysis of Hospital Cases Grouping and Recommendations for Refining DRGs." USAID-funded ZdravReform Program, Abt Associates Inc., Almaty, Kazakhstan.

Sheppard, D., D. Hodgkin, and Y. Anthony. 1998. *Analysis of Hospital Cost: A Manual for Managers*. Geneva: World Health Organization.

Shmueli, A., O. Intrator, and A. Israeli. 2002. "The Effects of Introducing Prospective Payment to General Hospitals on Length of Stay, Quality of Care, and Hospitals' Income: The Early Experience of Israel." *Social Science and Medicine* 55: 981–989.

Shwartz, M., L. Iezzoni, M. Moskowitz, A. Ash, and E. Sawitz. 1996. "The Importance of Comorbidities in Explaining Differences in Patient Costs." *Medical Care* 34 (8): 767–782.

Smith, H., and M. Fottler. 1985. *Prospective Payment: Managing for Operational Effectiveness*. Rockville, MD: Aspen Systems Corporation.

Wood, W., R. Ament, and E. Kobrinksi. 1981. "A Foundation for Hospital Case-mix Measurement." *Inquiry* 18: 249.

World Bank. 2004. *World Development Indicators*. http://publications.worldbank.org/WDI.

WHO (World Health Organization). 2008. http://www.who.int/countries/kaz/en/.

Young, D. 2003. *Management Accounting in Health Care Organizations*. Jossey-Bass Publishers: San Francisco.

ZdravPlus Program. 2008. http://www.zplus.kz/default.asp?URL=/KR.asp.

CHAPTER 3

Hospital Global Budgeting

Robert Dredge

OVERVIEW

Hospital funding mechanisms are a key part of the process of reform in health care systems in many low- and middle-income countries. For some time many countries with publicly funded health care systems have been moving to adopt global budgets. A global budget can encourage the development of changes to service delivery patterns and the inclusion of incentives (and in the event of nonperformance, penalties) to reward quality, appropriate clinical practice, and efficiency. One of the major attractions of a global budget is that it can do this in an administratively simple manner, and can therefore encourage more rational decisions in the use of health care resources, cost-effectively and with relatively unsophisticated data. The data are in fact usually readily available in even the less developed management cultures of health care.

The overriding aim of a global budget is to limit the total amount of money spent on health care. The total will be predetermined by the funding body, such as the Ministry of Health, regional health fund (authority), or equivalent, and will act as a cap on that agent's exposure in the overall system. This total defines the volume of services to be delivered, and the overall price (at preset minimum quality standards). It is usual for the budget to be prospective and agreed on for a defined period (such as the budget year). The global budget can have many forms, but it must be explicit about the services that it funds (and does not fund). This is fundamental to the design as well as operation of the budget.

The services to be included can be defined in various ways, including the sectors of health care (nursing homes, preventive care hospitals); services of facilities (all services provided at defined institutions); and specific treatments (an inclusive list of medical and clinical conditions). Services falling outside this "positive list" are excluded. Given the nature of medical practice and the impact of technology, such a prescriptive approach has inherent problems. These relate to the need to consistently review and revise this list's appropriateness and effectiveness. However, most systems of publicly funded health care have some form of exclusion, usually on the basis of cost-effectiveness and/or of clinical appropriateness.

Hospitals' interest in the population covered focuses on identifying patients to whom they are committed to provide services. The global budget needs to have a precise method for verifying those with rights to care, usually through a health-based population registration index of eligible beneficiaries. This index

has to be sensitive to the demands of nonresident emergency and specialist (tertiary) referral treatments. Proper verification must not become a barrier to treatment in cases of emergency or in the interest of wider public health matters.

Identification of the population to benefit from the budget will, in the first instance, rely on existing data. These will be variable in quantity and early efforts will be needed to identify the full population included in the risk pool. Where employment or tax-based systems exist, registration cards are often used or modified to provide proof of eligibility to benefit. Where there is a positive individual payment or contribution, the payment record can serve as this proof. Failing this, a simple registration system has to be developed.

The manner in which the global budget is funded is not a feature of the budget itself, and the collection of revenue to fund the global budget and the process and mechanics of risk pooling are not considered in this chapter. However, the design of the budget and the manner in which it is managed are likely to be strongly influenced by the funding method. The extent to which the global budget can comprehensively include all sources of revenues will certainly impact the strength of its success in achieving policy objectives.

A global budget will operate more effectively if there is a single agent acting as the purchasing body. This may be an identifiable, legal entity or a consortium of agents working together in collaboration to set and monitor agreed-on policy outcomes (box 3.1). This arrangement will incorporate any policy issues and requirements of the funding body. In cases where the funding body also acts as the purchaser, that is to say it does not allocate funds to another agent to undertake this task, the relationship is easier as the single body should be more aware of its main policy goals. This may extend to specific initiatives targeted at small elements of the population covered by the budget, according to the service program or based on geography.

The administrative mechanism by which many global budgets are managed is often some form of contract between the purchaser and provider (see the section, *Performance Incentives*, below). This can be a formal legal instrument or an administrative quasi-legal process. It can incorporate elements of financing, volume, and quality standards. The extent to which these various elements are developed depends on the management capacity of providers and on the policy objectives of the purchaser.

The hospital global budget is a prospectively agreed-on sum within which operating expenses of the health care institution must be contained. It acts as a cap on total spending, and leads to a clearly defined limit to the resources available from the purchaser. The purchaser may be tempted to impose specific constraints on the use of the budget by, for example, requiring fixed-sum budgets (within the total) for certain input lines. However, experience strongly suggests that such constraints act against the overall effective utilization of the budget. Hospitals should be given freedom to spend their budgets as they wish, provided that they meet service targets.

Some commentators (Gottret and Schreiber 2006, for example) argue, though, that this resource constraint on hospital spending is essential because of

BOX 3.1 PURCHASER OVERVIEW

The purchaser is taken to be the organization or agent who, at the simplest level, agrees to and funds the payment to the provider. In the context of this chapter the purchaser (which can also be the funding body) generally has both the following characteristics:

- It is a statutory organization charged with purchasing, commissioning, or paying for health care on behalf of a preselected population
- It is financed largely or entirely from a public funding source, whether direct tax collection, a social insurance fund, or a hypothecated tax base.

Within this framework purchasers generally undertake their role within a national or regional health policy framework. They attempt to quantify and prioritize the health needs of the population for whom they are responsible and they purchase health care that fits within this framework. They have an active interest in the effectiveness of their purchasing, and consider this alongside initiatives in education and prevention that will lead to reduced demand for future interventions.

The main role of purchasers is to secure health services for the population that they service. In so doing they must ensure that the services are appropriate to and satisfy the health needs of their population. The services must be cost effective and meet any preset standards of quality.

Purchasers can exist at various levels in a system hierarchy, and can be responsible for very different populations (both size and health needs). In terms of increasing size there are models emerging that group responsibility around the following types of organizations:

- *Family doctors, either individual or in small groups*. The budget is used to provide services only for patients registered or responsible to that group of doctors
- *Family doctor collaboration*. To achieve better economies of scale or to reduce risk, doctors join together to pool their individual budgets into a larger fund
- *District health funds (authorities)*. These are generally based on the first tier (lowest level) of local government administrative boundaries
- *Regional health authorities*. These are usually based on second-tier government boundaries
- *Consortia*. These can be put into place at any or all the above levels, and are a formal association of the organizations. They are often used when the risk to individual organizations is such that an enlarged population pool is appropriate. They are useful in the provision of high-cost and low-volume activities that are irregular in their demands. Consortia arrangements can also be driven by the desire to secure economies of scale in administrative functions. Consortia can, in some countries, be formalized into distinct legal entities, perhaps called an agency, whose costs are met by the health bodies and others who are financing the consortia. (See also the section, *Consortia*, in chapter 4.)

If the government, ministry, or heath authority chooses to decentralize some purchasing functions to more local agencies, an equitable allocation formula must be developed. This will rely on the demographic distribution and relative needs of the local area. Funding for that area would be made proportionate to the total available, based on the quantification of relative needs, or some other assessment of rational and equitable distribution.

the economic characteristics of the health care environment: in many countries most of the population are included in a risk pool arrangement and do not bear the full cost of decisions on how they use health services—that is, the consequences of their behavior do not act as a financial constraint on their demand for health services. Given a commonly held view that an economic market (based on ability to pay) should not be used to ration access to health care, proponents of the global budget argue that it is a fairer way to limit and allocate the use of health care. Advocates of market forces (such as Ham 2003) hold a counter view, that global budgets distance patients from the rational and efficient use of resources. This is because individuals are shielded from the full financial consequences of their actions, and have few incentives to act in a cost-effective manner. They point out that a global budget is an artificially imposed spending limit and, as such, frustrates the full efficiency of a true market.

Yet the reality is that global budgets are an integral part of health care systems in many countries (see, for example, the description given by Wiley 2004). These countries do not operate them in a uniform way. Budgets cover a range of populations and services and are not necessarily comprehensive. The degree of prescription within the budget is also variable, and can range from indicative hospital spending targets to detailed input-line budget allocations. Other expenditures, such as capital, research and development, and teaching, are generally funded outside the global budget (but may be allocated through a parallel, global budget-type system).

The key financial objective of a hospital that uses a global budget is to contain operating costs within the allocated budget. This is often achieved by some elements of control over the volume of activity performed. Hospital budgets can also be varied to reflect the marginal cost for differences between planned and actual levels of activity.

A global budget is only effective if it can be used to change behavior and responses such that the purchaser's objectives are better achieved. It must, therefore, have positive incentives for providers' cost-effective behavior, including explicit measures and tools (see the section, *Performance Incentives*, below). These may lead to medium- to long-term developments of explicit case-mix and quality indicators, linked to payment mechanisms that incentivize appropriate clinical interventions.

Countries with experience of global budgets have recognized that full efficiency gains do not materialize automatically. They require some explicit delegation of management responsibility to the hospitals. In turn this relies on sufficient management capacity in place at the hospital to realize the potential of the budget. Decentralization of management capacity and responsibility is an important prerequisite for obtaining efficiency.

SETTING THE HOSPITAL GLOBAL BUDGET

The underlying principle on which the budget for the hospital should be set is that of equity. This means that budgets are set with a clear aim of establishing an

allocation that is fair to all patients, within the constraints of available resources; that fairness will be demonstrated by an equivalent potential spending per head of covered population with due regard to the demographic, epidemiological, and socioeconomic factors that influence the demand for health care; and that where changes are proposed to the funding system, a reasonable period is allowed for transition to allow hospitals and patients to plan for the continuity of services.

From a financial perspective, a global budget system operates on the assumptions that fixed and predetermined sums are available for the provision of health care, and are allocated to a national or local purchasing agent; and that a prospective settlement of the total will be allocated from the purchaser to the provider (that is, the global budget).

The first step for a global budget is to define the population it is to cover, the services it is to provide, and the financial allocation in the initial base year of the budget. Once this base allocation is determined, periodic reviews (annual if possible) are needed to allow for such factors as any change in share of gross domestic product (GDP) allocated to health care, input price inflation, technological advances, demographic changes, and changes in system efficiencies (see the section, *Annual Adjustments*, below). Inflation would need to reflect the particular impact of medical-related expenses and not general prices as measured by, for example, the retail price index, because such expenses tend to increase faster than general inflation, thus eroding the real purchasing power of the health budget.

To set the budget for the first time, data are required on the price of services and the volumes to be delivered. The degree of sophistication of existing sources and the level of data disaggregation—facility, clinical specialty/program, or individual case—determine where the calculation process can begin. But most systems have at least some data that can be used to build these basic building blocks. Patient-based data and procedure-based costing are not prerequisites for global budgets.

The contract for each provider lists the financial budget, specifies the volume of services to be delivered, and introduces some measurement of quality (see chapter 4 for a more detailed discussion on contracts and contracting). Global budgets therefore require a trade-off between the cost (price) of a service and the volume of services delivered from the budget, assuming that a predetermined minimum quality standard is maintained, since budget = price x volume. If a provider can reduce the unit cost of an output, the total volume of services provided by the budget increases; equally, if unit costs rise, total volume falls.

Some sources of funds for hospitals are kept outside the global budget, such as legitimate copayments (that is, not informal payments); self-pay (private) patient fees; and payments by nonresidents for emergency or specialist (tertiary) referral treatment. In addition are payments for special categories of services such as capital investment, medical and other staff training and education, and research and development (see the section, *Nonbudget Funding*, below). Each of these special categories may not be the same one year to the next in an individ-

ual hospital (although within the whole health care system the relationship between them in terms of costs is likely to be broadly stable over the years). Because of their interyear variability they cannot form part of the annual global budget and thus need some form of separate funding system.

The introduction of a global budget system usually requires changes to other elements of management and financing, and without many of these changes the system cannot achieve its full benefits. The provider is no longer a simple cost center that can be subjected to detailed and direct central control. It has to respond to the overall strategic or service plan of the purchaser by delivering cost-effective and appropriate care. Its managers need to organize the resources available—human, capital, supplies, and services—in an optimal way. They must have the managerial autonomy to realign existing budgets and should not be constrained by residual line-item budget requirements. In practice it may be wise to introduce such autonomy in a phased manner, so that local management capacity can be developed and management can behave accordingly, and service continuity can be secured in the changeover to the new system.

Setting the hospital global budget has three broad approaches—historical, capitation, and normative (as discussed in the following three sections)—and within each approach it is desirable to include a mechanism to adjust the budget for any differences ("variances") between the planned and actual volumes of services (see box 3.4, below). The global budget will be set, initially, on a mixture of these three approaches (see the fourth section below, *Mixed Model*). The subsequent section, *Transforming Line Items into a Global Budget*, demonstrates how traditional line item-type funding systems can be changed.

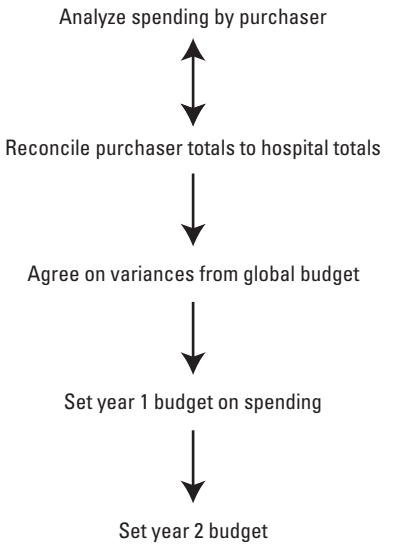
Historical Approach

For the first year of the global budget it is important both that purchasers and providers be satisfied that a fair allocation of resources is made and that services can be maintained. If an existing geographic or institutional relationship is kept (or both relationships), it is easy to have such continuity: the current funding level is maintained, a nominal global budget based on the new mechanics for setting budgets is calculated, and transitional arrangements are planned. If, as is more likely, a degree of decentralization to more local purchasers is an element of the reform process, a two-stage process may be required, enabling existing expenditure to be reallocated to the responsible purchaser before the new funding model is adopted.

This approach could be represented, based on total spending in the hospital, as in figure 3.1. The Ministry of Health or Ministry of Finance carry out these tasks in the first instance.

To analyze spending by the purchaser, it is necessary to establish patient flows and costs. Ideally an average of three years of flows gives some trend-based stability. Patient flows should be categorized by specialty and if possible by division of complexity. Procedure-based data are not necessary; average specialty-level

FIGURE 3.1 Historical Budgeting Chronologies



Source: Author.

data are adequate for this initial exercise. The patient flows need to be costed, and the process shown in table 3.1 may help in this.

The reconciliation process in step 8 also resolves any issues of overspending in the current year, in that only available resources will be allocated to the new global budget. To deal with any service issues that this gives there will need to be an understanding of the cause of such a problem and agreement on how it can be resolved.

In some cases the providers will have more robust data on the residence of patients. In this case a simple process could be undertaken as shown in table 3.2.

This process will establish the expected global income budget to be allocated by each purchaser to the hospital. It will, by simple reanalysis, enable the purchaser to set its total global budget for each of its providers and to reconcile this to its overall resource limit.

The historical approach should lead to an agreement and understanding of the global budget by both purchasers and providers. It will demonstrate that purchasers can afford to continue to buy the current volume of services for the

TABLE 3.1 Costing Patient Flows: Historical Data

Step	*Task*	*Data (and comments)*
1	Quantify total activity by each purchaser	Three years of activity data Exclude services outside global budget
2	Agree to transfer and cost of patients responsible to other purchasers	Volume and costs of patients
3	Allocate activity to provider	Provider code or source
4	Establish price base	Determine if cost per case, per stay, or per specialty
5	Establish value of activity by purchaser/provider	Agree on current year prices
6	Reconcile total costs in step 5 to current spending	Current and projected costs
7	Establish any purchaser/provider variances	Determine if caused by change in unit price or variance
8	Recost total costs and balance to global budget	Prorate between purchasers and providers, if needed

Source: Author.

TABLE 3.2 Costing Patient Flows: Patient Residence Data

Step	*Task*	*Data (and comments)*
1	Quantify activity by purchaser	Three years of activity data Residence code/address
2	Analyze purchaser base into pricing categories	Treatment codes
3	Determine price base	Could be share of total cost, cost per case, or similar
4	Establish purchaser cost	Volume x price
5	Compare total cost in step 4 to current operating budgets	Establish any variances on a facility or specialty base
6	Adjust total in step 5 to current budgets	Prorate if needed

Source: Author.

population for which they are responsible. Providers can also be confident that their current income is secured and that their operating cost base is affordable and sustainable. The historical cost base has clear merit in that there is some certainty for both parties, and further for patients, that services can be maintained.

Capitation Approach

Despite its merits of simplicity and stability, the historical approach perpetuates existing resource flows. If population and service provision are, in some way, out of balance the historical approach will not rectify issues of equity, an important point in low-income (or primarily rural) countries where the main population centers often have a disproportionate centralization of services. In these circumstances a move toward a capitation-based funding model will lead to a more equitable distribution of resources. If, however, there are significant inequalities in the current allocation, such a move may have to be phased in to enable transition and capacity-building issues to be addressed.

Capitation aims to distribute resources between providers on the basis of the relative needs of the populations that these providers serve. This distribution has to be done within the context of the total amounts available, since a "zero-sum" game is at play: any provider who gains from the new formula will do so at the expense of others.

Capitation funding directly to providers is a very complex arrangement. It requires that both the provider-served population and the range of services be defined with certainty. However, when a provider offers a very narrow or specialized range of services that can be clearly disaggregated from the services of other providers, such as single-specialty hospitals, the model can be relatively straightforward. Equally, when a comprehensive range of services is given to a clearly delineated population in which there are no other providers, such as district hospitals, a simple model is also possible. Since most situations in reality have a range of providers, as well as some cross-boundary flow of patients, more complicated models are required.

TABLE 3.3 Costing Patient Flows: Capitation Basis

Step	*Task*	*Data (and comments)*
1	Agree on services to be covered	Analyze total activity by specific code
2	Determine factors that drive needs for service	Demographic, socioeconomic, and access data
3	Establish formula that isolates step 2 from total global budget	Weighted capitation base model
4	Calculate share of global budget	Prorate to relative needs Use cost-weights approach
5	Determine which providers deliver services	Historical provision, verified by quality accreditation
6	Allocate budget share to eligible providers on basis of population covered	Capitation basis of provider population

Source: Author.

A method of developing a capitation-based global budget is shown in table 3.3.

This approach requires a considerable volume of relatively sophisticated data, as well as advanced modeling skills. It may also be expensive to maintain and refine. For these reasons it has not been widely adopted.

Normative Approach

There are many variants of the normative approach to setting budgets. In essence they all share the same principle that external rate-setting mechanisms determine a unit price for services. This predetermined rate is then applied to the volume of services that the purchaser requires from the provider. This is usually a prospective rate, fixed for the budget year.

In its simplest form this approach takes no account of current levels of activity, access, or provider costs. The method can be applied as shown in table 3.4.

This approach is simple and very transparent, provided that the appropriate level of data is available. It also allows purchasers to apply a cost norm that represents their view of an acceptable level of cost, forcing efficiency from providers, because if the provider has a cost structure that exceeds the norm it

TABLE 3.4 Costing Patient Flows: Normative Approach

Step	*Task*	*Data (and comments)*
1	Determine activity base for global budget	Historical data from provider Aggregate at appropriate patient care level
2	Agree on price norm to be used	"Industry best" if no data available National average cost per case/procedure Procedure-based cost if known
3	Apply price norm to activity	Cost x volume
4	Aggregate budget for provider	Total of (cost x volume) by patient care level

Source: Author.

will be forced to become more efficient to survive. But if this efficiency pressure is too great there is a real risk of the provider exiting the market, leading to a withdrawal of services to elements of the population and hence real issues of unequal access. Yet if a provider is efficient and can deliver service at less cost than the cost norm, it will benefit by being able to use the resulting financial surplus to develop more services, improve quality, or reward its staff (or a combination). This is a very simple and powerful dynamic, but likely requires some provider regulation to guarantee continued comprehensiveness of services. It may also need an explicit regulation defining the proportion of any such gain that can be paid to staff. A risk is that all will go in extra staff costs, with no overall health gain to the system.

There may be legitimate short-term reasons for providers to be granted some financial support in a system of normative budgeting. These could include the poor physical condition of the facility (militating against efficient service delivery) or weak local infrastructure.

If a normative method is used, the factors that enter the calculation, such as case mix, disease severity, and even localized market factors (primarily pay), must be fully allowed for, otherwise the formula could lead to inappropriate responses by providers.

One application of the normative approach that is sensitive to the relative cost positions of individual hospitals and the need for them to become more efficient is the use of norms to set differential efficiency-based reimbursement rates. This process sets the norm as the general reimbursement rate, but allows some time-based flexibility to achieve it. For example, if the norm was 100, but a provider could demonstrate a current cost of, say, 120 then it could be reimbursed at the rate of 110, 105, and 100 over a three-year period. This would give the purchaser an immediate efficiency gain and the provider a period of adjustment.

Mixed Model

In practical terms it may be useful to incorporate elements from all the approaches described above, at least initially, in order to maximize gains from global budgeting. This helps achieve a positive balance between stability and incentives for change, and allows the designer of the financing system to use the most robust data and methodologies available.

There may be a need to refine this to allow for the cost of patients treated "out of boundary." Such cross-boundary flows of patients are not uncommon and, if material and not balanced on the basis of being equal to outflows, a process of budget correction is needed. A simple method is to take appropriate cost weights and apply them to the activity flows. The global budget is then adjusted for the net cost of this activity.

The performance element of the budget can initially be based on the achievement of a small number of high-level performance targets. In most systems data support items such as:

TABLE 3.5 Transition to Global Budget

Year	*Historical share (%)*	*Capitation share (%)*	*Performance-based share (%)*
1	95	5	0
2	90	5	5
3	70	20	10
4	50	30	20
5	0	50	50
6+	0	50	50

Source: Author.

- The percentage reduction in average length of stay
- The percentage reduction in number of patients readmitted after discharge
- The change in number of patients admitted.

Appropriate targets can be set and the performance component will only be released on the achievement of these targets.

Each provider can be allocated a global budget on the basis of a combination of historical budget, capitation share, and (possibly) performance-based incentives. The share allocated under the historical budget declines over time, shifting the emphasis to a performance-based process. In practice this could be done by changing the weighting components, as shown for illustrative purposes in table 3.5.

Other factors can easily be added to the overall formula if they are established and accepted.

Transforming Line Items into a Global Budget

Background

Hospitals in many low- and middle-income countries have traditionally been financed on the basis of centrally directed line-item budgets, where the central funding body determines not only the total budget of the hospital but decrees exactly how the budget is to be spent. In many cases this prescription is enshrined in laws or regulations, and the hospital has little or no ability to move moneys between line items, irrespective of local needs, demand, or ability to spend the line-item budget effectively.

A simple line-item budget may include the headings shown in table 3.6.

The hospital is required to account for its expenditure in accordance with this categorization. This approach has the benefit of assuring the funding body that it can determine and control the input costs. It may also be a positive tool in

TABLE 3.6 Example of a Simple Line-Item Budget

Salaries
Salaries tax
Food
Drugs
Operating expenses
Supplies
Repairs
Other expenses
==========
Hospital total

Source: Author.

that it can give some assurance about maintaining employment. However, it has many obvious drawbacks including inflexibility (it does not allow for in-year or interyear changes in the relative costs of inputs); lack of incentives (it gives no incentives to clinicians or managers to refine their behavior or treatment patterns); and the cutoff at year-end (a perverse incentive exists to ensure that all the budget is spent, as it is rare that the surplus or deficit can be carried forward to subsequent years).

In conceptual terms a line-item budget can be regarded as a collection of very specific global budgets, each line item being a self-contained and discrete budget. However, its rigidity invariably leads to suboptimal provider performance.

Building a global budget

Line items can, though, be transformed into a global budget by a series of relatively simple steps. These steps rely on data being available for each line item, and on a breakdown of the purpose, function, and treatment specialty to which the data were applied. A global budget could be built as shown in table 3.7.

The "salaries" and "salaries tax" input lines in the line-item budget can be allocated directly to most of these service areas. This is done on the basis that individual staff members will be working in one of these departments, and thus the total staff budget for each can easily be aggregated. If a staff member works in more than one function then his or her costs can be apportioned on the basis of the hours spent in each. The full employment cost, including any payroll tax, must be allocated to the department.

The allocation of nonpay expenditure from the current line items will depend on the level of disaggregates of the existing accounting data. There are two extremes:

- Line-item expenditure is already analyzed to individual functional cost centers such that data on use (and cost) of expenditure are collected at the department level. In this case the individual line items can be allocated to departments, and to the department budget.
- Line-item expenditure is not analyzed in any detail other than to the subjective line (that is, a description of the expenditure). In this case there are two options, namely:
  - Allocate, on the basis of indirect cost apportionment methods, the current expenditure to a function on a national usage basis

TABLE 3.7 Building a Global Budget

Step	*Task*	*Data (and comments)*
1	Determine functions/program basis for future management/budgeting	Analyze function of hospital into clinical areas and supporting services (see step 6)
2	Allocate current line-item expenditure to revised structure	Current expenditure data analyzed to each new function on basis of: Actual data (i.e. function as a cost center) Allocation on basis of: Direct cost Indirect cost allocation (see *An Overview of Costing*, below) Or Transition year established for data capture during which expenditure is accounted for on functional cost center lines
3	Review functional/department split of historical basis expenditure	Activity-related data for each department
4	Agree on global budget for hospital	Sum of existing line items
5	Set internal functional budgets	Based on historical split and review to reflect current/planned practice
6	Determine functional (or department) cost centers for management accountability (financial reporting and budgeting)	Examples: clinical department (surgery, medicine, therapies, laboratories, and radiology); facilities support; maintenance (energy, catering, and cleaning services); transport; administration

Source: Author.

– Instigate a data capture period during which new cost centers for the functions are established; code expenditure to each function, rather than the hospital as a total; and at the end of the period set the functional budgets.

In both examples it will be necessary to reconcile the new functional budgets, by line-item category, to the overall current line-item budget.

For many of the line items the level of aggregation may be too high for meaningful management, such as supplies. It may be more helpful to disaggregate these line items into more detailed subheadings that reflect the type of analysis required to understand the assumption of resources in the hospital. Local circumstances determine the type and extent of subanalysis. If such disaggregation is to be done, the accounting code structure should be changed to allow data to be captured directly to this level of analysis.

The costing and cost allocation techniques, and examples of practical methods of apportionment, are explained in detail in the section, *An Overview of Costing*, below.

The output of the above exercise will be a matrix that analyzes the line-item budget into functional cost centers, such as shown in table 3.8.

TABLE 3.8 Functional Cost Centers Derived from Line Items

		Clinical department			
Input line item	*Line-item total*	*Surgery*	*Medicine*	*Therapy*	*Maintenance*
Salaries	A	A_1	A_2	A_3	A_n
Salary tax	B	B_1	B_2	B_3	B_n
Food	C	C_1	C_2	C_3	C_n
Drugs	D	D_1	D_2	D_3	D_n
Operating expenses	E	E_1	E_2	E_3	E_n
—					
—					
Other	X	X_1	X_2	X_3	X_n
Total	Y	1	2	3	n

Source: Author.

The hospital now has a two-way analysis of its expenditure, that is by subjective input line item, and by operating functional cost center.

The hospital management then needs to review these initial budgets and to be satisfied that they reflect the current patterns of expenditure and planned workload. The management can then address any imbalance between the line items and the function. If, for example, it thinks that any one line-item budget is greater than the total needs of the hospital, but has been spent to ensure no overall loss of budget, it can reallocate this surplus to other, more needy, budgets.

The hospital global budget is, then, the total of all the functional budgets. It is also the total of the old line items. However, the budget is now expressed in terms of direct lines of management accountability. It can be used within a flexible framework to ensure overall control and flexibility. In terms of overall control, function heads are responsible and accountable for service and budget delivery. As regards flexibility, movement should be allowed, within predetermined and known financial limits, between the individual lines of the budget. It is usual to have restrictions on any movement between pay and nonpay lines as this protects the funding for the recurring commitment to pay budgets. There can also be some flexibility at year-end to allow for limited carry forward of end-of-year balances on each budget, to discourage spending of unused budgets on other than optimal purchases.

In this process function heads become budget holders, and take responsibility for their costs and productivity. They will require training and technical coaching. They will also need reliable and credible financial and activity data.

PERFORMANCE INCENTIVES

Within the fixed spending cap of the global budget, there needs to be a framework to ensure that volume levels are achieved, quality standards are maintained, and changes to the way in which services are delivered are consistent with the purchasers' wishes. This framework must have incentives for good performance, and penalties for poor performance, applied to both purchasers and providers (as well as the necessary monitoring system); and must be able to stimulate efficiency.

Agency theory suggests that there are few real incentives for publicly funded health care systems. Several such systems have therefore introduced quasi-market instruments, usually some form of contract between the purchaser and provider. The contract's design is fundamental to the way in which players act and respond. The less sophisticated the contract, the greater the need for incentives, penalties, and monitoring. The real administrative cost of monitoring must be considered, and overelaboration may not result in an optimal solution.

To ensure that there is clarity and transparency in the relationship between the funding body (purchaser) and provider of care, it is important that there be a written agreement of the responsibilities and obligations of both parties. (Box 3.2 outlines three categories of contracts.) Where the structure is such that formal, legally enforceable contracts are possible, this should be put in place. Where the relationship between the purchaser and provider is administrative, a service-level agreement should be made. This is a quasi-contract and the parties behave as if it were a contract, although there is no recourse in a court of law. (However, it is advisable to have a process of arbitration overseen by the Ministry of Health. This will allow the parties to present their cases in a thorough but cost-effective way without the delays and adversarial approach inherent in a legal process. Parties should agree that the arbitration will be binding on both of them.)

In themselves global budgets cannot guarantee incentives. The budget must have the power to change the flow of future payments if providers are to respond to volume and quality performance targets by changing their behavior and patterns of service delivery. A clearly defined and measurable connection between performance and payment is therefore required. The financial mechanisms must be constructed in a way that they give incentives to achieve the overall budget aims, and that they can be used to penalize nonperformance.

(Without such mechanisms, a global budget can become, in effect, a block grant to be spent at the will of the provider with no guarantee of services to the public.)

The way in which incentives and penalties are structured in the system is strongly influenced by the financial processes that support the budget. If the primary allocation process is to devolved agents, such as regional or lower-level authorities, the agent will be responsible for the achievement of the budget and will take the risk if expenditure exceeds the budget. Similarly if the budget is

paid directly to a hospital, it will bear the risk of any overspending on its global budget. If underspending is likely, the simplest way to rectify it is to make an adjustment to the budget in the subsequent year.

Appropriate systems are required for dealing with volume variances (both over- and underactivity) between actual and planned levels. The provider is justified in only recovering the marginal cost; anything over this would generate an excessive surplus. This is because the provider's fixed and semifixed costs are already recovered in the initial contract agreement (see the section, *An Overview of Costing* and figure 3.2, below). Without upward payment adjustments, the provider has a clear incentive for underactivity; equally, continual provider overactivity will create a financial deficit for the purchaser. The global budget should therefore be flexed to allow for some element of variance.

The range of variances will reflect local circumstances and affordability, and must be within a preagreed set of parameters and, possibly, within a fixed global budget that allows flexibility between subbudgets but that does not change the overall budget total. For example, it may be appropriate to move moneys from one specialty to another if demand varies from the planned level.

A clear cap is required on this level of movement if the basic concept of the global budget is to be sustained. There will also have to be clear, preset parameters on how funds are transferred (if allowed). Any model that leads to an increase in the total budget available to providers implies a contingency or reserve held back by the purchaser at the time of initial contract agreement which, while perhaps prudent, could distract from the overall effectiveness of the global budget.

BOX 3.2 THREE CONTRACT CATEGORIES

Conceptually, contracts can be thought of as falling into three broad categories—block, cost and volume, and cost per case—as shown in the following table. (See also the section *Which Contract?* in chapter 4.)

Key contract features

Category	*Key feature*
Block	Fixed-sum payment Defined service access
Cost and volume	Defined service and minimum volume level Fixed-sum payment for minimum volume level Marginal cost for extra volume
Cost per case	Defined service Fee per patient Case-mix base

Actual contracts can be seen to be a continuum in terms of complexity and sensitivity to actual numbers of patients treated and associated costs, represented as follows:

(Box continues on next page)

BOX 3.2 (CONTINUED)

Key contract features

Block	*Cost and volume*	*Cost per case*
Open access to a specified service for a fixed fee	Access to specified volume for a fixed fee	Each case treated and costed/charged for separately

In basic block contracts the volume is described in terms of the amount of access rather than the number of patients treated. A concept of "indicative block contracts" has also developed. These lie somewhere between the block contract and cost and volume contract. Access is guaranteed up to a specified level of activity. If activity exceeds that level, a new agreement is struck. An indicative block contract in effect raises the volume risk of the provider, and the financial risk of both purchaser and provider.

In cost per case contracts the provider has a very strong incentive to undertake and increase activities, and is guaranteed payment for every patient treated. This places a severe financial risk on the purchaser, who will either have to agree on a preset limit to the value of payments or put in place a process of authorization for each patient prior to treatment.

Refinements are required to deal with patients who are treated outside a contract, primarily emergency patients or specialist (tertiary) referrals (see the subsection just below, *Nonresident patients*).

The different contract categories have different dynamics in terms of certainty, risks, incentives, and penalties, schematized in the following table:

Certainty, risks, incentives, and penalties

Category	*Purchaser*	*Provider*
Block	Certainty over costs Control over total spending No efficiency incentive Financial risk shifted to provider	Certainty over income Incentive to be efficient Incentive to minimize volume/reduce quality Takes all financial risks
Cost and volume	Certainty over costs Cap on affordable volumes Incentive to achieve volumes Shared financial risk	Fixed and semifixed costs met Variable costs uncertain Incentive to be efficient/contain costs Shared financial risk
Cost per case	Absolute control over volume/spending Risk of lack of capacity Expensive to administer "Money follows patient" Retains all financial risk	All income at risk Incentive to downsize/minimize risk of excess cost or capacity Expensive to administer Minimal financial risk

The three contract categories demonstrate the potential to shift financial risks around the system, in terms of both in-year surpluses and deficits. There will need to be a year-on-year adjustment process to ensure that some equilibrium over time is maintained, for without this, unplanned withdrawal of services or facilities is a possibility.

Source: Author.

The way any contract mechanism is designed can give incentives for achieving stated targets, but in themselves global budgets may not be able to generate real efficiency gains. There will need to be a specific agreement and, possibly, specific incentives to ensure that efficiency gains are a continuing element of the process. If the moneys released from such gains remain within the health care system, there is a global incentive for efficiency, although if the individual hospital releasing the gains does not benefit the incentive is diluted. If the moneys remain within the hospital (that is, the global budget stays the same but activity volumes are increased), there is a real and direct incentive for the hospital to deliver the efficiency. The redeployment of any such gains should be on new services agreed to between the hospital and purchaser, and should be consistent with any overall strategic or service plan of the purchaser. Purchasers can, therefore, use productivity gains to raise the quality and volume of services and access to them for its responsible population. Providers can retain gains for changing the way in which services are delivered and for helping maintain a stable cost base.

NONBUDGET FUNDING

The global budget is designed to deal with the recurring revenue funding of hospitals. In addition to this are other funds, which are legitimate, but are inappropriate for the global budget because they are either one-time or irregular. There are three broad categories, namely funds from patients, specific-purpose funding, and capital funding. They should still be estimated and planned into the hospital's business process and budgets.

Funds from Patients

Payments made directly by patients can be for a range of services, but are generally for copayments (within the legitimate funding/insurance process), for self-pay (private) patients, and for nonresident patients.

Copayments

Copayments will be to an agreed-on schedule dependent on the service provided. These should be added to the total income of the hospital, and some independent form of verification method should be put in place to ensure that they are accounted for.

Self-pay patients

Within a financial cap and service framework that constrain the availability of care there are invariably additional services that some of the population want and can afford to pay for. Self-pay (or private) access also enables individuals who do not have rights of access under the global budget to be treated.

A decision on how to deal with these groups is an integral part of a global budget system. A ban on a system of payments for these additional services may lead to incentives for "informal" payments. Such a system is, on balance, better to be permitted and regulated, allowing for greater flexibility and accommodating changing preferences of the public. Allowing it will, though, also cause inequalities in access, as the poorer segments of the population will generally be unable to afford these services.

If such services are permitted, they should be regulated so as not to detract from the global budget goals (since the capacity of the system is focused on the global budget and its population). The services should only be performed when there is capacity available above that needed to satisfy the global budget, and access must not compromise the availability of services to patients covered by the global budget. Nor must the global budget subsidize these services: the hospital should be free to set a scale of charges that reflects the true cost for those services, but should recover the variable costs of the treatment, with a contribution to semifixed and, ideally, to fixed costs (see the section, *An Overview of Costing*, below). In this manner, self-pay patients enable the hospital to generate a surplus on the activity and this can be applied to other services. A transparent process of cost allocation and recovery therefore has to be in place. (It may be appropriate for some of the services to be undertaken at marginal cost, however, when genuine spare capacity exists.)

The income collected from copayments and self-pay patients should become the responsibility of the hospital. This income is estimated at the start of the year and a total agreed to with the purchaser. This total is deducted from the forecast operating cost of the hospital and the purchaser sets a global budget that covers the net costs of the hospital. Income collection then becomes a risk (and incentive) to the provider and acts as an incentive to the efficient collection of these moneys.

Nonresident patients

The system must also allow for reimbursement for patients who are part of the overall system's responsibility, but whose purchaser does not have a global budget relationship with the provider. These can be either emergency patients who fall ill when visiting the locality or specialist (tertiary) referrals from one hospital to another. The reimbursement model can be one of purchaser to purchaser, purchaser to provider, or provider to provider.

In a purchaser to purchaser model, purchasers agree to pass funds between themselves that reflect the costs of patients treated by the hospital that had treated the patient. "Host" purchasers set the global budget and add an element to allow for the cost of nonresident patients, and collect this added element from other purchasers. This entails purchasers taking the risk of income collection, and works only if there are established and regular patient flows. A clear advantage of this arrangement is that the hospital has to deal with only one pur-

chaser, and so it is administratively simple and cheap. The host purchaser also collects knowledge on the full extent of the hospital's activity and income, which may be valuable in future budget-setting discussions.

In a purchaser to provider model, the provider may choose to strike a formal contract with the nonhost purchaser. This will be appropriate when volumes of activity are regular and material. In effect a secondary global budget is agreed to with the nonhost purchaser. The agreement may specify a given number or type of patients that are limited within the global budget. If a cost per case process is agreed on then a simple invoice is sent to the purchaser. However, this will increase administrative costs.

In a provider to provider model, the basic arrangement must allow for the host hospital to be funded for all the resident patients, wherever they are treated. To facilitate payment the purchaser must construct a matrix of costed patient flows (based on number of patients by type multiplied by unit costs). A redistribution matrix emerges (table 3.9), which can be costed to give a funds-flow matrix that is then actioned on a hospital to hospital basis.

In order to maintain the integrity and benefits of the global budget system, the number of patients subject to copayment, self-pay, and nonresident payment processes should be small. A general rule would be that another (minor) global budget should be in place if the value of work exceeds 5 percent of total income.

TABLE 3.9 Provider to Provider Reimbursement Model: Redistribution Matrix

	Discharges from				
Discharges to	*Hospital 1*	*Hospital 2*	*Hospital 3*	*Hospital 4*	*Total*
Hospital 1	Own patients treated	Patients from hospital 2, treated at hospital 1			Total treated at hospital 1
Hospital 2	Patients from hospital 1 treated at hospital 2				
Hospital 3					
Hospital 4					
Total	Patients from hospital 1 treated elsewhere				

Source: Author.

There must also be a rigorous system that identifies each patient to the responsible purchaser. A residence code is probably the best and simplest method for this.

Purchasers may want to initiate special programs or initiatives outside the main global budget. These could be targeted actions to deal with a particular problem or political initiative, for example, to equalize access to population elements or to reduce long waiting times. Similarly, pilot studies or clinical trials may be required before a new process is offered for general application. In such cases a one-time agreement could be struck to ensure that variable costs are fully covered.

Provided that the above principles are applied, there is little cause to make any further in-year adjustments to the global budget. The impact of initiatives into future years must be borne in mind when setting that year's budget.

Specific-Purpose Funding

Some further sources of funding are often present in existing processes and need to be woven into the global budget. In financial terms the most significant are medical and professional education, and research and development.

Medical and professional education

Training and development programs are a necessary and desirable part of any health system. Their funding often involves a combination of central funding and fee per trainee. Providers have to identify the existing costs of staff currently within these programs, since they need to recover the costs of such items as salaries, course fees, teaching staff, accommodation, training materials, and administration. The information on this can be collated on a staff group basis (doctors, nurses, or radiographers, for example) to enable both purchasers and providers to understand the full costs of training. It will also provide important data for future human resources planning, because it identifies the extent of current investment and the number of people in training.

If some costs are shared between several staff groups, these costs need to be apportioned appropriately, probably on the basis of student numbers or contact time. The trainees may be making a contribution to service delivery, in which case this element should be charged to the provision of services and funded through the global budget, because if the trainee is unavailable for service delivery, other staff costs are incurred. The provider must aggregate the training-related cost of each staff group. The total cost of this is removed from the provider's aggregate base-level total expenditure.

An agreement between the hospital and the ministry or consortia responsible for the trainees should be made on the number of trainees and the funding process. A second global budget based on numbers of trainees can be made. This gives certainty to providers that costs will be met and to purchasers that there will be a future flow of trained staff. This simple process can be summarized in the following steps, in which the purchaser should clearly:

- Define staff groups and training program
- Quantify numbers of trainees by program
- Cost each program, including overheads
- Establish the service element of the training
- Pass service costs to the hospital budget
- Pass training costs to the purchaser
- Agree on training numbers and the global budget for training.

Modification to the above general model may be required for medical staff training. In this case the time taken by senior staff to train students may lower their productivity in terms of patients they see per clinical session. Such staff may also carry out additional diagnostic tests and procedures to demonstrate issues to students. Together, these will add costs to the overall treatment of patients and should be reflected in the training agreement. One way to establish the extent of these additional costs is to take average costs of similar procedures from teaching and nonteaching institutions. Any additional costs can be ascribed to teaching, and excess costs can then be removed from the global budget and funded from a separate agreement. Alternatively, additional costs can be incorporated into the global budget for training and development.

Research and development

Research and development (R&D) is an active component of health systems. A process similar to that outlined above for training can be used. The principle is that current costs are identified and removed from the global budget for services, and from the cost base of the hospital. The element of R&D funding identified as currently paid for by the purchaser now forms a separate income line, and the purchaser and provider then identify the specific projects for that funding. Such a process requires collaboration between purchasers, providers, and the commercial and academic bodies concerned. It also has to demonstrate that the R&D is funded on merit, and must be transparent in the decision processes.

Commercial funding of R&D may be an area of consideration. Provided that it meets standards of ethical and clinical efficiency, it can be an important supplement to public funds. The commercial funding must be able to cover the fully absorbed costs of the trials or research. This means that the costs of salaried employees, consumables, and overheads that are directed partly to this R&D (as well as partly to the services covered by the global budget) must be clearly identified as R&D. These costs must be recovered if the split of funding by commercial/academic sources as opposed to the use of general global budget funds is to be transparent.

Capital Funding

Capital expenditure is generally funded and accounted for separately from the normal global budget, because of its special nature. It represents the outlay on items with a productive life (that is, the time for which items produce services) beyond one budget year. It may also vary significantly from year to year. (Routine accounting and expenditure plans, the vast bulk of the above discussions, deal with in-year consumption.)

A working definition could be that capital expenditure is spending on goods or facilities (assets) that have a productive life beyond one year; can be a single item, or a group of items that collectively provide a service, but do not stand alone; and, for practical purposes, have a minimum purchaser price (around $10,000 is a general mark).

In practice, capital assets are usually land, buildings, and equipment, which are subject to depreciation (box 3.3). In most economic circumstances, land is rarely depreciated, but it can be revalued from time to time—and in the current climate it may be valued at a lesser sum than estimated.

Capital programs must balance the need to replace any existing equipment and facilities alongside the desire to invest in new and emerging services and technologies. Capital prioritization processes should be put in place that allow for replacement, as well as for undertaking a rational evaluation of the relative benefits of any new investment. Once this is done, the individual hospital capital budget can be constructed.

BOX 3.3 DEPRECIATION

Assets are usually brought into the accounts at their historical purchase cost. Over their lifetime they lose value, and this cost is generally termed depreciation. An asset is depreciated over its expected productive life, which varies for different categories of assets. The annual depreciation charge will need to reflect this. Depreciation is generally charged as an equal amount per given period (that is, on a "straight line" basis) over the asset's life, but generally: (i) land is not depreciated; (ii) buildings and their fittings are depreciated over their expected remaining lifetime; and (iii) equipment is depreciated over its estimated useful life.

Asset lives are set by the hospital, but must be realistic (and there are international standards for this).

Depreciation is not a cash outlay, and it is retained within the organization. It is a revenue charge that is included as a component of the cost of any service. It can be "recycled" within the hospital to help pay for new assets (that is, the charge to a revenue account for depreciation allows the organization to retain and reuse these funds).

The very nature of capital expenditure implies irregularity: significant spending in one year may be followed by little spending the next. This has an impact on the way in which capital is financed because a hospital will not require consistent and regular annual capital funding for major schemes. However, on a systemwide basis it is likely that there will be more or less equal demand for capital each year, which can be met in two main ways: a central, systemwide capital budget that is allocated on the basis of priorities; or individual schemes funded by commercial loans. These two approaches are now discussed, as are the "private finance initiative" (PFI) and block allocation.

Central capital budget

The hospital needs to outline to the central funding body (Ministry of Health, health fund, regional authority, or equivalent) the capital scheme, including the health needs its serves, its costs and benefits (financial and nonfinancial), and its contribution to health gain and policy advances. The funding body would then need to prioritize any other bids from hospitals and plan expenditures over the life of all agreed-to schemes within its funding limit.

This system presents a risk that capital appears to have no direct cost to the hospital, with the result that hospitals may have an incentive to bid for a scheme that is not fully justified. The hospital may also show no discipline in the way in which it uses, maintains, or safeguards the capital assets, as they are in effect free goods. There is, of course, the issue of identifying and funding any additional revenue costs that arise from the investment. Invariably there will be utility and facility costs, as well as the recurring costs of the expanded services.

A central capital budget has the advantage of overall control of total spending, which may be an element of broader socioeconomic policy. It also allows for a transparent and rational, policy- and service-based determination of where capital is invested. Developing-country settings often have the advantage of a level of investment that is based on taxes (or other public funding), and that is not subject to the vagaries of decisions by external agencies (though economic and political instabilities may affect this level). Some sustainable investment at least is therefore usually assured.

Central budget financing may come from taxes (or equivalent revenue), from commercially sourced borrowing by the central funding body, or both. Given the funding body's size and its commercial and political status, commercial lenders are likely to view such loans as less risky than those to individual hospitals. The interest charged is usually less than to individual hospitals, and so the overall cost to the system is commensurately reduced.

Some countries that rely on a centrally funded system for large capital expenditures have introduced a quasi-market system of capital charging. This imposes a charge on the use of capital, in addition to depreciation, which is met by the hospital. It can be in the form of a real cash repayment to the funding body, as if the capital was a commercial loan (that is, repayment of the original capital sum plus nominal interest on outstanding balances). Alternatively it can be a perfor-

mance management measure, such as a target rate of return on capital assets employed. In this case the hospital would have to generate a revenue surplus on its operations that came to a preset percentage of the value of capital employed.

The purpose of these two variants is to demonstrate that capital is not a free good, and that both of them will encourage a more rational set of investment decisions and improve efficiency. They will also cause the hospital to consider and be satisfied that full revenue costs can be met from future revenue flows.

Commercial loans

Hospitals may be allowed to finance their capital spending by obtaining commercial loans. These will be based on the financial status of the hospital, and the view taken by the lender about the risks in the scheme.

Any loan will be justified by the business case for the scheme, and will need to demonstrate how the loan will be financed over the lifetime of the asset. The cost of such loans will consist of repayment of the loan over that lifetime, interest on the amount of the loan outstanding, and depreciation on the value of the asset (as it is used).

The overall cost of capital in a market-based system is unlikely to be less than in a centrally funded one because lenders generally judge individual hospitals to be riskier investments than systemwide funds.

The advantage of a loan-based system is that it allows individual hospitals access to capital that, seemingly, is unrestricted. Investments based on business cases and local needs will be available, and these will be unconstrained by any global budget that is fixed at the funding body. In reality the ability to service the cost of future loans will put a constraint on the total that can be afforded by the health care system, and this will be the same as in a central budget system. There is a risk with a loan-based system that local pressures to develop services could lead to overassumption about future income recovery.

Private finance initiative

The PFI model that has emerged in some countries in recent years is essentially a replacement for (or complement to) publicly funded capital. It operates by allowing private organizations to fund, own, part-operate and part-manage facilities that are effectively leased or rented back to the public provider. The public provider then agrees to a long-term contract that repays the full cost of the scheme over the asset's lifetime.

As well as being a means of funding new capital for health care that may not be chargeable to the public sector capital account (depending on the local intepretation of International Accounting Standards), the PFI can give opportunities to incorporate commercial and creative management into health care. These opportunities can lead to improved efficiency, quality, and cost-effectiveness. They can also transfer a significant element of the risks of financing and operating the facility to the private sector, including:

- *Design and construction*—such as cost or time overruns on the actual building and commissioning of a new facility
- *Performance*—if design errors have occurred
- *Operating costs*—revenue costs for maintenance and support services are fixed for the hospital, and managed by the PFI provider
- *Termination*—if PFI parties cannot meet the standards of the initial contract, they risk the loss of the whole contract (and residual capital costs)
- *Technology*—upgrades are often required.

The PFI model has prompted wide debate on its merits as a source of capital in a publicly funded health system (table 3.10). Any PFI project will need rigorous evaluation to ensure that it represents value for money and is affordable.

Block allocations

Block allocations to hospitals should have an amount set aside for each hospital to spend at its own discretion on small schemes of replacement or renewal. A cap on total spending on any one scheme is reasonable, so that the hospital cannot spend a disproportionate amount on large schemes. This process will also protect the smaller replacement schemes necessary to the everyday functioning of the hospital. The total budget should be proportionate to the size of the hospital, and can be measured by turnover. Equally, the individual scheme spending limit can be adjusted by means of prorating it to the base global budget or by scaling it into groups relative to the largest hospital, with a wider degree of discretion the larger the hospital.

Schemes with projected spending that exceeds the hospital's block limit should be subject to a business case. This aims to justify the capital budget and the reason that schemes are included in it, within the overall service framework of the purchaser. A business case entails demands or needs for services; option

TABLE 3.10 Views For and Against the Private Finance Initiative Model

For	*Against*
• Offers access to otherwise limited capital • Projects tend to be completed sooner than under public management • Has a focus on life-cycle cost and allows for lifetime standard of physical facility • Allows hospitals to focus on clinical activity • Transfers risk to the private sector	• Private funding is more costly than public • Control of assets is lost • Specifying contracts and the detailed requirements is costly and complex • Detailed management of PFI contracts is needed • Public provider is still responsible for health care delivery

Sources: Author, derived from NHS Executive (1994) and Centre for Market and Public Organisation (2007).

appraisal on alternative means of supply; impact on other purchasers; financial and nonfinancial costs and benefits; and justification of a preferred option.

Conventional cost-benefit and option-appraisal processes can be used, with a consistent appraisal method to evaluate the relative needs and benefits of the scheme. In a central funding system this process will lead to the prioritization of bids and in turn to that of purchasers' capital budgets.

Revenue costs arise from capital spending, and the provider should meet these when block allocations are used. This gives an incentive to the provider to invest in areas that add to productivity. The provider should agree on costs for major schemes with the purchaser, and these costs should form part of a revised global budget.

AN OVERVIEW OF COSTING

An understanding of the relationships between changes in activity and costs is useful for managers to achieve the full organizational and behavioral benefits from the introduction of global budgeting. To understand the approaches that can be taken to costing the global budget and the contracts that support it, it is essential to define the activity to be costed. (Chapter 4 gives further guidance on contracting.)

The activity can be viewed in terms of the hierarchy of services provided by a hospital, from aggregate hospital at the top to procedure level at the bottom, and associated increases in complexity of costing as one descends the hierarchy. Contracts can be costed at any of these levels dependent on the degree of sophistication of the data captured. But of course the more detailed the level of costing the more expensive are the administrative costs. Experience in the United Kingdom suggests that the available data in many developing and transition countries are adequate and sufficiently accurate for the costing and monitoring of initial global budgets. Detailed patient-based micro costing is not a necessary condition for this (Dredge and Preen 1996).

Costing Theory

To cost an activity, irrespective of its level in the hierarchy of services, the costs need to be categorized and recorded in terms of behavior and type. Conventionally, cost behaviors are categorized as one of the following:

- *Fixed*—are unaffected by changes in activity in a given period (usually the budget year)
- *Semifixed (or step)*—are fixed for a given range of activity (known as the normal operating range), but rise or fall as activity changes beyond these tolerance bands
- *Variable*—show a near proportionate change in cost in direct relationship to activity.

In terms of the setting and management of global budgets, it is probably the behavior of semifixed costs that are of the most interest, both to the hospital and the purchaser (and see box 3.4). Semifixed costs become particularly relevant when the activity associated with the global budget changes outside the normal operating range. In these circumstances the unit price that is justified may differ even if the volume change is the same. Take the following example in figure 3.2:

BOX 3.4 COSTING FOR OVER- AND UNDERACTIVITY

Contracts are established on the basis of planned values of patients' activity volume and of the associated budget costs. The budget covers the full costs of the hospital, allowing for the fixed, semifixed, and variable costs that are consumed in providing the care. Individual specialty or procedure costs will include an element of all three cost types. In very simple terms the hospital seeks to recover its total full planned costs, plus any acceptable surplus required for continuing its activities, from the planned volume of services it seeks to provide in the year. The actual price charged is not necessarily equal to actual costs for every procedure, service, or patient; and where it is not, the practice must be, at the start of the hospital's budget year, that:

Planned total revenue (volume x price) = Planned total costs = Total global budget

This affects the management of the global budget, the hospital budget, and the appropriate price that should be agreed to for any changes to the volume of services purchased during the year. According to this practice, the fixed and semifixed costs of the hospital (which by definition do not change in-year) are factored into the calculation of planned total costs. They are recovered, in full, from the initial baseline global budget. The risks of their not being recovered and thus the hospital not continuing to trade are minimal.

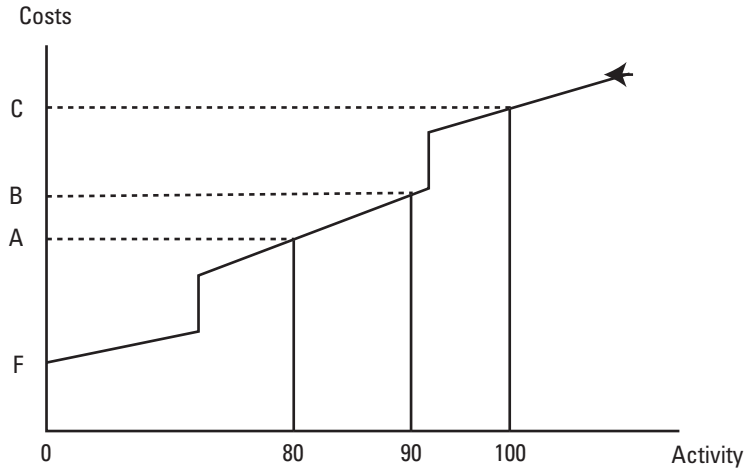
If purchasers want to increase the volume of activity in-year, the provider should supply the extra services at marginal cost only, which for most small increases in volume (that is, up to the next step in costs) is the variable cost (because fixed facilities, plant, and equipment are already in place and their costs are covered in the base costs). Any payment over the marginal cost would generate a surplus for the provider.

The marginal cost could exceed the variable cost if the hospital had to increase its semifixed or fixed costs. In this case the step cost is determined by the size of the volume increase and by the hospital's current position on its cost curve (figure 3.2). Knowledge of this relationship may well be useful in determining the financial consequence of failing to achieve activity volumes.

If volumes do not match planned levels, the contract should allow for the recognition of the marginal costs incurred or saved. Any unplanned excess activity should lead to a deficit for the provider, who is the agent best able to control the volume of activity. In instances of excess activity the contract must be precise and explicit on what and how it is paid for, and where any financial risk lies. The global budget should not be changed to accommodate the excess until there is a clear contract (or agreement) clause, because without one, the fundamental policy goal of a global budget—the containment of costs—is destroyed.

Any underactivity should generate a surplus, which will initially lie with the provider. With a block contract the provider retains it. With a cost and volume contract the variable cost of any underactivity lying outside the agreed activity tolerance bands will generally be returned to the purchaser. For purchasers this demonstrates the financial merits of cost and volume contracts. (In a cost per case payment system no surplus is generated.)

FIGURE 3.2 Total Costs



Source: Dredge 1996.

The cost curve displays the conventional shape of a fixed level of costs (F) irrespective of the number of patients seen. This is the cost of providing facilities and overheads. This level of facility will deal with workload levels up to the first "step" in costs. Beyond that step point, for example, a new ward or operating theater is required to deal with demand. Below and above this point costs rise in a steady linear way, reflecting the variable costs associated with each new patient (such as drugs, disposable medical supplies, and catering).

If the hospital is currently providing 80 treatments a year the cost is "A." If it is asked to move to 90 the cost moves to "B" and the increase is only in costs that are variable, as the increase falls within the normal operating range. The cost for the extra 10 treatments is B minus A. Unit cost per treatment falls and the global budget becomes more efficient.

If a further move of 10 new treatments is required, to 90, costs move to "C," that is, outside the normal operating range. Variable and semivariable costs are incurred. The cost for the extra 10 treatments is C minus B, which is clearly greater than B minus A. The overall efficiency of the global budget may be reduced at this point, as unit costs at "C" are greater than at "B."

Step costs are generated by the limiting factor on the service. Many interdependent facilities are required to make up the patients' treatments and any one of them could be at its own individual step point. A case study for the surgical specialty of orthopedics analyzed cost behavior and demonstrated that at certain activity points wards, theaters, and radiology were the three principal cost centers that triggered independent movements in step costs (Dredge and Preen 1995).

Cost Types

As well as classifying costs by the way in which they respond to changes in activity, costing models generally require that costs be grouped into generic types. The categorization is set around how directly the cost can be allocated to the activity and are normally known as:

- *Direct*—can be attributed directly to the activity or output being measured and can be controlled by the budget holder
- *Indirect*—are shared over multiple facilities and are generally departments shared across the hospital. They are not directly under the control of the end user of the service
- *Overheads*—are incurred by the entire organization, but are not directly related to volume.

Some systems have standardized their classification of costs, which in turn can feed into a standardized approach to the costing and setting of global budgets. This is a particularly powerful approach if inter-hospital comparisons of unit of procedure costs are to be used in any global allocation of budgets. Such an approach should ensure that consistent and comparable costs are available to establish any benchmark for testing relative performance, or for funding at true average cost levels. An example of standardized cost classification in England is given in table 3.11.

TABLE 3.11 Example of Cost Classification in England

	Type	*Behavior*
Staff		
Managers	Fixed	Overhead
Senior doctor	Fixed	Direct
Nurse	Semifixed	Direct
Allied health professional	Semifixed	Indirect
Pathology technician	Semifixed	Indirect
Supplies		
Drugs	Variable	Direct
X-ray film	Variable	Indirect
Maintenance contract	Semifixed	Indirect
Transport	Semifixed	Indirect
Utilities	Semifixed	Overhead
Depreciation	Fixed	Direct
Training and education	Fixed	Overhead
Property tax (rates)	Fixed	Overhead

Source: NHS 2008.

Top-Down Costing

There are many excellent books and papers written on the topic of costing and costing techniques and this section does not attempt to replicate them. However, it is useful to summarize the basic approaches that can be taken to costing, for an understanding of the dynamics of change in activity and the negotiation of global budgets. Such an understanding also assists in linking the pricing of individual procedures to the overall budget.

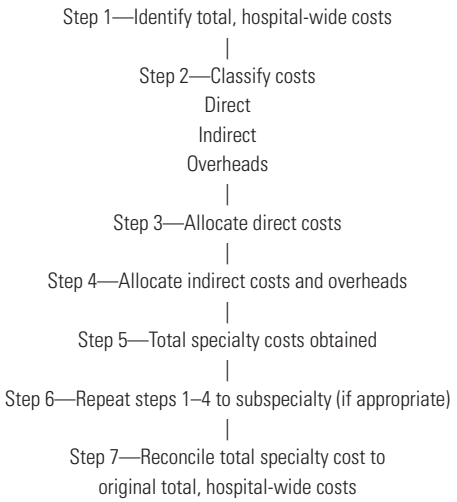
The overriding aim of costing is to ensure that the full cost of the product is allowed for in the calculated cost. This is called "top-down" (or full absorption) costing, which requires simple data and fairly rudimentary technical knowledge. It is highly transferrable to most health care systems in low- and middle-income countries. Encouragingly, there is little evidence that its end results differ significantly from a micro, patient-based approach. It has the virtue of simplicity and cost-effectiveness.

The steps in the top-down approach are to:

1. Identify the total, hospital-wide costs that are expected to be incurred in the year. This is calculated on the basis of resource inputs and utilization, expected levels of outputs, and any agreed surplus/deficits generated in a year (sometimes called the quantum of costs); and
2. Classify costs in a standardized form such that they can be allocated to the service specialties that form the basis of the global budget.

The stages in the process then follow a simple series that take the total cost down to the level of the specialty or subspecialty of the budget. The whole approach would look something like the representation in figure 3.3.

FIGURE 3.3 Basic Top-Down Costing



3. Allocate direct costs to the specialty or department that generated the costs.
4. Allocate the indirect costs and overheads to the departments providing patient treatment services. This is done on a standard basis of apportionment such that similar types of costs are allocated on a consistent and rational driver of costs. For example, the costs of indirect support to staff functions could be allocated according to the number of staff in a department, and utilities according to space.
5. The total specialty costs are now available.
6. If appropriate, costs can be further reallocated to subspecialty activities in a process similar to steps 1–4, beginning with the specialty total on the new quantum of costs.
7. It is crucial that the sum of the specialty costs be reconciled to the total hospital costs. The process of allocation and apportionment may have "lost or added" costs to the total. These must be rectified (or any decision based on the specialty level of costing will lead to inappropriate conclusions).

Bottom-up Costing

At the other end of the spectrum, in terms of approaches to costing, is that of the patient-based micro-costing model, also referred to as "bottom-up" costing. The stages here are to:

1. Identify activity data
2. Establish clinical protocols for procedures or case mix-type group
3. Set the range of procedures to cost
4. Establish a cost profile for each procedure based on average resource consumption
5. Cost the input resources on the profile
6. Reconcile total activity times cost to the hospital quantum.

Bottom-up costing is generally done on a specialty-by-specialty basis, with the specialty quantum of costs as the control total. The hospital information system identifies the activity undertaken (in terms of procedures). Resource utilization profiles for the main procedures can be established. It is important to be clear that not all procedures warrant detailed costing. The Pareto approach, whereby a significant volume of resources is consumed by a relatively small number of procedures, has been shown to hold for most specialties. The user should concentrate on these high total cost activities; the remainder can be costed at average rates with little cost or risk to the budget. This approach is justified not simply in terms of the "cost of costing," but also because any price approach to micro-costing is

flawed in that errors of estimation in apportionment or allocation of costs to small volume activities are bound to be present in the process.

Having decided on the diagnosis-based case group (or diagnosis-related group) to be costed (chapters 1 and 2 have working examples of this approach), a "bill of quantities" of the resource inputs has to be established. If patient-based records exist, these can be used; if not, professional judgment on resource inputs is needed from clinicians. The care profiles can then be costed. Evidence suggests that usually six or so major cost drivers will require detailed examination, and the remainder can be estimated. At the end of this it is again essential to reconcile expected total costs at the diagnosis-based case group level times planned activity to the budgeted total, hospital-wide costs.

Costing and Pricing Relationships

This short section aims to draw attention to the application of costing in the management of global budgets and the dynamics of contracts and budgets. In this context the key relationship is that between cost behavior and budgets, and the expectations that this should give to purchasers when they seek to expand the global budget. A useful example can be taken from the mechanics of the "internal market" that operated in health care in the United Kingdom in 1991–1998. (The basic rules of contracting are still in place although the words used to describe it are now less market orientated.)

The fundamental conditions for costing and pricing are: price = cost; cost = full absorbed average cost; and there is no planned cross-subsidization.

Prices are subject to external audit to verify that these conditions are met. If implemented to the letter this means that any variation in price reflects provider cost efficiency. The rules do not allow one efficient (cheap) service to subsidize or offset an inefficient (expensive) service within a provider. All purchasers pay the same unit price. On this basis the planned total costs of a provider are fully absorbed into its prices, and so at planned activity levels all costs are recovered. The provider should, therefore, break even in financial terms, and the global budget agreed to at the start of the year should suffice to meet its operating costs.

In the context of the United Kingdom, where the government through its various agents is the only significant purchaser, no profit or surplus is made and thus the full moneys voted by Parliament for health care are in fact spent on health care. Any inter-hospital competition and comparison are on a true cost basis.

These rules apply to the setting of annual global budgets supported by contracts. The total planned hospital costs will be contained in the activity and funding contracts of the global budgets. If a purchaser wants to buy extra activity in-year, then knowledge of the cost behavior of the hospital becomes crucial. Any extra new activity can only be justified at marginal cost rates, because the fixed costs have been absorbed into the annual contracts. Marginal costs may be only variable costs dependent on the position on the normal operating range (see figure 3.2 above). The unit price will definitely be lower than that obtained

in the annual contract. This therefore gives a very clear incentive to purchasers to "hold back" and purchase later in the year. Such perverse incentives need to be regulated.

MANAGING THE NEW GLOBAL BUDGET

In most financial reform projects the introduction of global budgets is a radical change. Alongside it are even more radical changes in the movement from centralist to decentralized processes for managing health care. In most instances global budgets will replace centrally imposed line-item budgets for specific expenditure headings and resource inputs.

During the transition from line-item to global budgets there may be a need for some retained central direction for their application, mainly because the providers (and purchasers) need time to adjust to the concepts and mechanics involved. These bodies will need a technical and managerial capacity-building program. This must involve both the development of technical tools and aids to assist in introducing and running the budget, as well as management training in budgeting techniques and practices. Appropriate monitoring and control processes for the new budgets will also need to be built, tested, and run.

Global budgets will operate successfully only if the hospitals—and, in turn, their managers—have a degree of autonomy, authority, and responsibility. The managers must be free to manage the resources paid for by the global budget, and must organize them in the manner they best see fit to deliver the quality, volume, and cost targets established by the budget and detailed in any contract. They should be given the revenue global budget, clear targets, and an understanding of the incentives and penalties within the system. Purchasers can demonstrate appropriate responsibility and accountability by monitoring the budget and intervening when this indicates that plans and agreements are not being achieved. Their ultimate sanction is to withdraw the contract.

Providers, in spending the global budget, must be able to show that they have met the service targets agreed to with the purchasers (and observed, for example, minimum legal requirements in pay and other areas), and have applied the budget only for the specific purposes agreed to by the purchasers. They must be able to account for all the budget and demonstrate that all expenditure is legal and appropriate to the provision of health care. They must, of course, also keep within the total budget. In managing and allocating the budget, the funding agent and purchaser must take account of the likely behavioral responses of the provider. Some are described in box 3.5.

ANNUAL ADJUSTMENTS

The value of the global budget must be maintained. After an allowance has been made for improvements in efficiency that may result from an agreed-on and

BOX 3.5 RESPONSE TO A GLOBAL BUDGET

There are a range of possible responses to a global budget system. Broadly they cover the following:

- Rate setting with volume standards
- Individual provider budgets.

Rate setting with volume standards
The budget can be allocated directly to providers. It can be set using a fee-for-service or cost of facility basis to reflect the expected volume of services to be provided. Providers, therefore, have a fixed rate of payment that reflects their historical cost patterns and their activity profiles. Adjustments may be agreed on, on the basis of movements in costs or volume (or a combination) beyond the levels agreed on in the budget.

In this model is the obvious risk to providers. Because payment is prospective and fixed, providers have to manage the total costs of services within the total global budget. The incentive is, therefore, to control unit costs and volumes, such that purchasers will need assurances that services are not being denied to patients solely to contain total costs.

A further risk is that annual changes in the budget will be affected by any differential pattern of distribution of the total global budget across sectors or institutions. This could be balanced by a decision to maintain the share of the budget to the sector. However, this would preclude any ability to respond to appropriate shifts in patient demand, epidemiology, or technical advances. In many instances it is exactly these behaviors that financing reforms wish to stimulate (such as reducing lengthy inpatient episodes and shifting to ambulatory care). Consequently, a "pace of change" model should be agreed on that allows for change, but that protects institutions from short-term significant shifts in resources.

Individual provider budgets
Budgets are allocated from the funding body directly to the hospital. The budget can be established on the basis of historical cost, and over time sectoral or other changes can be made by the reallocation of the budget between institutions. There may be a case for developing payment mechanisms that reflect any change in the type and/or variety of patients being treated, and some models use detailed prospective rates for services on the basis of clinical categories of activities (diagnosis-based case groups or the local derivative). The risk for providers is that their unit costs exceed the payment rate, or that overall payments may be capped if the total global budget is at risk of being exceeded. Again, hospital cost control is a strong incentive in this system and the quality aspects a concern for purchasers.

Where hospitals receive a true global budget to provide a range of services—with no case-mix measurement or compensation—overall agreements on activity levels, quality indicators and monitoring, and patient mix are necessary to protect purchasers, providers, and patients.

explicit reduction in the budget, other parameters need to be considered, including inflation (the cost of changes in input prices as they impact the health care system) and economic growth (to sustain the share of GDP that is spent on health). These parameters can be incorporated into some of the formula calculations that drive the global budget. Expert opinion may be needed to determine factors where objective data or policy-related decisions are needed. These changes must be agreed to by both purchaser and provider.

Inflation

Inflation is the measure of the change in input costs (excluding any relative gains from productivity or efficiency). It reflects the increase in, for example, the unit labor cost per hour of work or the purchase price of a component or service. It is likely to be the most volatile element in any adjustment process. The choice of measure is crucial. In most countries health care input costs tend to rise faster than general prices (or than GDP). This is particularly true for nonpay costs where the influence of new technologies (and, possibly, exchange rates) is a factor. The substitution effect of new for old technologies also has an impact.

Measuring health care inflation on the basis of general prices has severe limitations. However, if there is no capacity to build a hospital-specific (or even overall health) index, it may be the only possible starting point. If so, the measure should be adjusted for actual wage changes in the health sector, and any non-health-related spending areas such as housing should be removed.

Inflation can be measured practically in many ways. The key decision is the level of detail that is analyzed, and the refinement of the measurement tool. The more complex these become the harder and costlier they are to maintain. The input profile of health costs can be seen by input line item disaggregation of total costs. These generally fall into two broad categories—pay and nonpay—and these at least should be kept separate because the rates of change in their unit costs are generally very different. These two broad categories should be further divided so that different staff groups and nonpay product lines can be identified. This is only useful if data on the prices for the components are readily and regularly available. For pay components this should be the case; nonpay components may be more difficult.

If input costs can be analyzed into generic groups, the best way to measure inflation is to collect data specific to each of the input categories. Pay increases can be obtained easily from providers or from a national pay structure. The weighted average of pay increases can be calculated from each group's individual increase. This total can then be fed into the overall inflation calculation.

Nonpay data can be obtained from a sample of input prices based on one year's unit cost compared to the next. This sample must give sufficient coverage to the range of products that make up nonpay costs. These data can be obtained through purchase ledger systems, if in place; manual records; or a shared process between providers in which each hospital agrees to monitor a certain product range.

The next step is to agree on a procedure whereby the annual increase can be incorporated into the funding process. There are many ways to do this, but essentially they are variants on prospective assessment or de facto actual measurement. Prospective assessment requires confidence in the model and method of assessment. With such confidence, the increase can be added to base budgets. Inflation will be assessed from trends in pay and nonpay expenditure items from the data available in the building of any health spending-related indexes. Any constraining factors that impact on health care costs in particular can be allowed for.

If national or regional wage bargaining has not been concluded before the prospective adjustment is agreed on, two complicating factors are introduced into any negotiation on pay. The first is that staff, and their trade unions, will become aware of the level of increase assumed, implying a level of affordability that hospitals will find hard to deny. The second is a balance to the first, in that this awareness also sets an upper limit on affordability, for any increase in excess of it will have to be met from elsewhere in the global budget.

A related issue concerns the time when purchasers release the cash funds needed to compensate for inflation. If inflation is built into a prospective budget and the provider receives these funds all in one payment at the start of the year, the provider receives a cash-flow benefit (that is, it receives moneys before it has to pay them out). With low inflation, a single increase can be applied to the global budget, with an end-of-year adjustment to take the true payments from the estimate to actual. With high inflation, periodic (at least half-yearly and possibly quarterly) adjustments may be appropriate to protect providers' cash flow. Again there must be an end-of-year adjustment to bring final payments into line with actual costs.

Economic Growth

If the share of GDP that is spent on health is to be maintained, this share must be increased by at least the level of growth of the economy as a whole. Effective use of this increase should be a policy aim of purchasers. Providers, too, can respond, by planning how best to use any increase. These moves are crucial, because health systems will readily consume any increase on technological advances and demographic changes.

Technological advances

As health care becomes more technologically complex and as these techniques migrate from country to country, the cost impact cannot be ignored. Although new technology may give real gains in terms of diagnosis and outcomes, it is rarely cheaper than what it replaces. Its adoption needs to be controlled and planned.

In a global budget the revenue available to support such adoption is contained within the capped total. The process of capital rationing controls somewhat the cost of new technology as much of it will rely on new capital

investment. An overall global budget system has two broad models of funding the cost of technology (and other developments). These are:

- Recognizing the explicit cost of these developments and funding the provider for them. This will entail some form of central reserve or priority fund that is "top sliced" from the total available to the purchasers (and subsequently unavailable for general distribution)
- Placing the risk on the provider to ensure that it has sufficient income to cover its operating base and the costs of these developments. This could be funded by a general growth in income to all budgets or by requiring efficiency gains from providers.

The first model gives an assurance of funding and sustained service. It is a centralized process and so can also be used to further any macro policy aims. However, it gives no incentives to providers to be prudent in their bids and could encourage inappropriate developments. The second places all risks on providers and could discourage developments in services.

Demographic changes

The impact of changes in the age-sex distribution—more the age element—is well documented. Health care costs per person may vary by up to 10 times, depending on the age of the individual. The very young and the very old consume by far the greater share of resources. If there is any significant shift in population composition, or variations between regions or districts, this must be recognized in the global budget formula. Drifts or transfers of populations between areas must be recognized and the formula be adjusted to allow for this, especially in postconflict countries.

While an aging population tends to affect high-income more than low-income countries, it needs to be considered in any global budget. Equally, the impact of changes in a young population and fecundity also needs to be recognized.

The cost of these shifts in population can be qualified in broad terms, although the direct effect on individual services is less measurable. For the most part these costs rise slowly, and should be contained within general growth in health spending under the global budget.

In addition, access problems can arise if the global budget does not increase in line with demand for services. In most systems, current funding is inadequate to meet the aspirations of patients and clinical stakeholders. However, in high-income countries that have a global budget system, access and waiting are established instruments for rationing services and managing the budget, and can make very explicit the extent to which access is denied through lack of funding.

REFERENCES

Centre for Market and Public Organisation. 2007. "Can Public-Private Partnerships Deliver Better Services?" *Research in Public Policy*. Summer. Bristol Institute of Public Affairs, United Kingdom.

Dredge, R. 1996. "Costing Medical HRGs." National Casemix Office Occasional Paper.

Dredge, R., and R. Preen. 1995. "Understanding Semi-Fixed Costs." National Health Service Executive, West Midlands, United Kingdom.

———. 1996. "Dependency-related HRGs: A Microcosting Approach." National Casemix Office Occasional Paper.

Gottret, P., and G. Schreiber. 2006. *Health Financing Revised*, 2–20. Washington, DC: World Bank.

Ham, C. 2003. "Autonomization and Centralization of UK Hospitals." In *Innovations in Health Service Delivery*, ed. A. Preker and A. Harding. Washington, DC: World Bank.

NHS (National Health Service). 2008. "NHS Costing Manual 2007/08." Department of Health, London.

NHS Executive. 1994. "Private Finance Guide." Department of Health, London.

Wiley, M. 2004. "Experience with DRG-Based Hospital Funding in Western Europe." In *Activity-Based Funding for Hospitals*, ed. J. Sussex and A. Street. London: Office of Health Economics.

CHAPTER 4

A Primer on Contracting

Robert Dredge

INTRODUCTION

Contracts are the written formalization of the process of agreements reached between purchasers and providers. They define very clearly the:

- Purchaser and the provider
- Scope, definition, and volume of services to be purchased and provided
- Price to be paid
- Minimum quality of services acceptable
- Administrative arrangements that enable the contract to be satisfied.

The processes by which the contract is implemented, managed, and monitored constitute the key to success and can be fundamental to the delivery of the benefits of a global budget or other type of payment agreement. The effective and efficient distribution and allocation of health care resources depend on this process working well. The contract, and the terms written into it, must therefore reflect the strategic aims of the purchaser and provider.

The process will be most successful when the relationship is not one of commercial gain or of maximizing the risk transferred to the other party. Experience from the United Kingdom[1] suggests that maximum benefits are obtained when:

- Purchaser objectives are clearly stated, both in terms of broad vision of health gain and, as importantly, in specific plans and targets for action and improvement
- Providers demonstrate clearly both how they can supply services that meet purchaser objectives and that the exact nature and volume of services offered are understood by the purchaser
- Purchasers make a transparent and rational choice in placing contracts
- Contract negotiations and agreements are not undertaken in a legalistic framework.

Appropriate information and management capacity is required to successfully complete these tasks. Because systems are often constrained in these two key areas, contracting systems have the tendency to concentrate on changes at the margin, rather than to review the entire activity and cost base of the service. A periodic review of the base, with a rebasing of service configuration if needed, is desirable. This review may be incorporated into the annual review of contracts, or into the continuing review of any " rolling" (longer than one year) contracts.

WHICH CONTRACT?

Many variants of the simple threefold categorization of contracts outlined in box 3.2, *Three Contract Categories*, in chapter 3 are in use. In practice any practical combination of the available models may be appropriate. (The principles outlined in this chapter can be applied equally to both hospital care, and to primary and outpatient care.)

Block Contracts

These contracts commit the purchaser to pay a fixed sum for access to services (irrespective of volume) by its responsible population. Providers are guaranteed income. These contracts are most often used in a high-volume/low-cost setting and often in a host purchaser/provider relationship. They are useful where access must be guaranteed in areas such as accident and emergency treatment and maternity services.

Such contracts can be extended to take account of more than one service or specialty. In effect the individual specialty blocks are aggregated into a hospital-wide contract (with monitoring subsets at specialty level). An extension is to include an indicative activity level around the block payment. This will give a monitoring base for activity related to the contract and will be useful in discussion on future years' contracts. Failure to achieve the indicative activity level will not be penalized (nor activity above it rewarded) with the most simple block contracts.

Cost and Volume Contracts

Cost and volume contracts specify a guaranteed level of funding conditional on provision of a baseline level of activity. These can be set in many ways and depend on the degree of complexity required and specification in the information available. They could cover multispecialty aggregation of patients treated, or they could be specialty- or even procedure-specific. The base volume is the minimum level of services to be achieved. Any extra patients will be treated at an agreed marginal price. There will be tolerance bands around the activity volume to protect both purchasers and providers. The purchaser will need to be

assured that the minimum activity is achieved and that extra work can be capped to a total that is containable within the global budget. Tolerances of 2 percent to 5 percent are usual; beyond this a new agreement is needed to extend commitment to payment. This also gives the provider an assurance of payment and cost recovery.

The size of the tolerance band should reflect the size of the baseline volume and the potential for case-mix shifts. A specific contract for expensive procedures such as bone marrow transplants may have a zero tolerance band; a contract for general outpatients with low marginal cost a 5 percent tolerance band. The tolerance bands will, if breached, give rise to payments to recognize actual volumes. These will be at preagreed marginal cost rates and can flow either way between the purchaser and provider. Generally their "triggers" are put in place to protect purchasers and to contain total expenditure to the global budget.

Cost per Case Contracts

In these contracts the money flow is retrospective, and an invoice is issued after treatment. Procedures should be in place to ensure that treatment is given and payment is underwritten. There is not necessarily a single invoice for each patient: bills can be aggregated into one periodic invoice to each purchaser. To further simplify administrative processes, a "pay on account" system can be used in which the purchaser pays an agreed monthly sum to the provider and periodic (often quarterly) reconciliations and adjustments to the actual payment due are made.

The range of contract details paid by cost per case contracts are:

- Agreement is in place on standards and cost (by specialty or procedure). Purchasers agree to pay a per case price when patients present. The total number of cases may be capped in the contract period; within this total the provider does not need further agreement to treat, and the purchaser accepts the invoice
- Each new referral requires a specific agreement to pay from the purchaser, based on the price for the procedure. The transaction costs here are, clearly, very high.

VOLUMES

In cases other than those where simple access is required, such as accident services, contracts benefit from the clear specification of the volume of activity to be purchased. The crucial factor now becomes the determination of the volume of services that are to be counted or measured. This must be appropriate to the service being purchased, clearly defined, and measurable by both parties to the

contract. It will then be linked directly to the payment made under the contract. Once the level of activity that the contract purchases has been determined, there is some sense in allowing for a degree of flexibility around the absolute volume provided. The actual volume of activities delivered will rarely match the absolute and precise number prescribed in the contract. Because of this, a tolerance band should be allowed. Providers can then attempt to manage the overall volume and value of activity delivered within the global total. There will, therefore, need to be a clear understanding on both the level of activity that is allowed before further action is taken, that is, the percentage tolerance band; and the price to be paid or refunded for any activity that falls outside the tolerance band.

As contracts are refined, the activity measurement can be developed to allow for changes that are subtler than absolute numbers of patients. Case-mix adjusters for global budgets, for example, by using some form of cost or resource utilization weightings, may be appropriate. This is because the global budget, being fixed, may legitimately be applied to fewer, more complex cases (or vice versa).

A number of fairly simple measures of volume are in place in health care systems. They include:

- *Number of discharges (and deaths)*—a simple count of the patients treated. It is a universally applicable and available indicator of total activity, but gives no indication of the success or outcome of the treatment
- *Number of episodes of care/courses of treatment*—a refinement of using discharges. This will cost each episode under the care of a specialist, and in some cases multiple episodes that can make up the single discharge. Resource utilization tends to be concentrated in the early part of an episode, and so this measure may better reflect this. If used alone, however, there is evidence that inappropriate internal transfers can be generated to inflate the true volume of activity
- *Procedures undertaken*—appropriate mainly for surgical interventions and may not directly link to conventional case-mix measurement
- *Number of referrals*—can be used to demonstrate demand for services and to measure the breadth of case load. It is appropriate for community-type treatments, such as dietetic or chiropody
- *Number of contacts*—where treatment is more linked to the time spent with the patient and the contact may be more of a consultation than a clinical intervention. However, contacts can be variable in terms of time (and resources)
- *Direct contact time*—actual time spent in contact with patients (but needs a reliable recording system)
- *Number of occupied bed days*—an obvious direct link to resource consumption and use of the budget, but if this is the only contract, the incentive for providers is to maximize it, irrespective of clinical needs

- *Number of available beds*—useful when access needs to be guaranteed
- *Input measures*—such as staff numbers that need to be available, or that the purchaser determines need to be available. In themselves, though, such measures will not guarantee efficient use of the input. They are generally inconsistent with the main incentives that global budgets should give to improve efficiency.

Contracts must be written to reflect the best drivers for local improvement and rational resource use. They can include any number of the above measures, but must avoid overelaboration or any incentives that operate against the overriding principles of the global budget.

WHICH CONTRACT WHEN?

It is rare for there to be a single and simple one-to-one contract relationship in which one purchaser and one provider operate in a closed system of health care. This might be seen in a region-based model with only a hospital and no other significant provider of health care. In most instances, though, hospitals attract patients from outside their administrative area. However, the geographic proximity of patient flows is not the best determinator of the contract type that best serves the purchaser's and provider's objectives. The contract will also have to allow for the possibility of a provider becoming the purchaser of services for patients referred for specialist (tertiary) treatment from an out-of-area hospital.

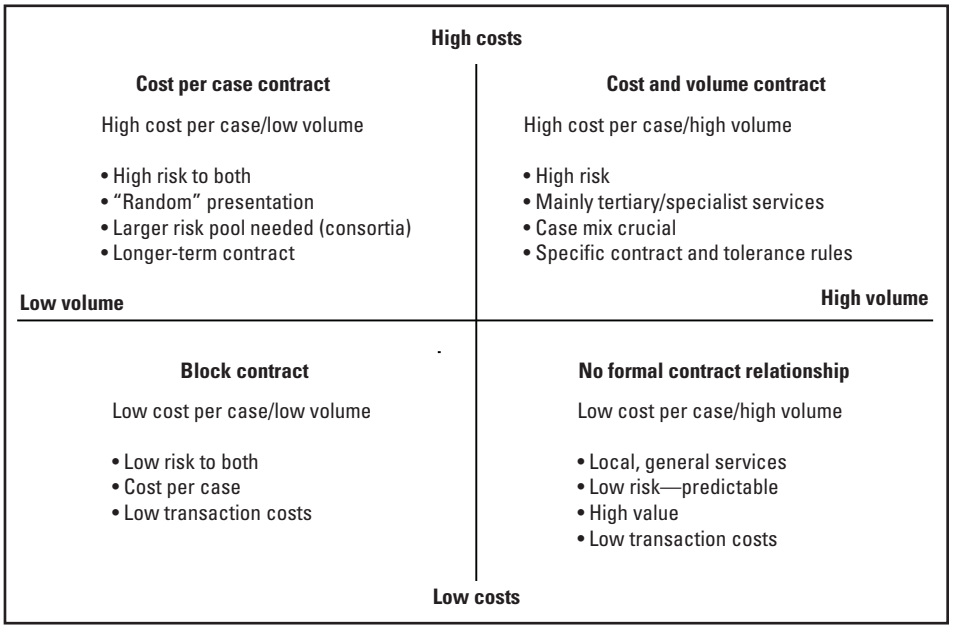
A categorization that leads to a rational model for determining which contract to apply in different circumstances can be built around the volume of patient activity, taking account of the per case and total cost of the service.

To both purchaser and provider, the nature of the interaction between cost and activity volume will lead to the emergence of the most rational model of contract that balances the relative risk to both. Figure 4.1 attempts to show, in a summary and simplified way, the likely positions that will be reached. It considers this relationship between cost and volume and, depending on the permutation of relative costs or volumes, suggests an optimal contract for the service being delivered.

In the top left-hand box, a cost per case contract is appropriate because it will give some guarantee of access to purchasers for when their responsible population will need it, even if this is not an annual event. The best model will be for purchasers to join a consortium (see next section) to increase the size of the risk pool. By paying annual costs based on their relative population sizes they will, in the long run, be contributing to and receiving a fair share of the activity and its costs.

Relationships described in the top right-hand box lend themselves to cost and volume contracts, with detailed and well-defined tolerance bands. The "cost" element of the contract will ensure access to services, and that fixed and semifixed costs are covered. The volume element will deal with the variable and/or marginal cost of activity beyond any agreed baseline level of activity. Refinement around case mix within specialties will be a useful sophistication in these circumstances.

FIGURE 4.1 Cost and Volume Trade-Off



Source: Author.

Activity and volume relationships in the lower left-hand box suggest that a block contract may be the best approach. The activity flows and associated costs are fairly predictable. Activity outside the projected range will be relatively low cost and so the financial risk to both parties is small. Transaction costs will be relatively low.

In the lower right-hand box, the volume of patients does not warrant the transaction costs associated with a formal contract relationship. A published price tariff for case-mix or specialty type, linked to verification of treatment, will be sufficient to generate an invoice for payment.

In reality the purchaser will have limited capacity to negotiate and manage its multiple relationships with providers. It will tend to concentrate on the contracts that represent a significant element of its commitments. In these cases it will actively determine the following: contract total values; volume measurement; case-mix issues; standards of services; and a mechanism for managing and monitoring the contract.

The provider's major purchasers will in effect determine its quality standards. If it agrees on different quality standards for different purchasers, it must recognize that there will be differences in access and quality of services for the subgroups of the population served.

CONSORTIA

Individual purchasers may come together to enable them either to increase their purchasing capacity (and hence their influence as providers) or to form a larger risk pool for their responsible populations (and hence give themselves greater protection). Consortia also enable the individual purchaser to make better use of management capacity and to benefit from economies of scale, both financial and intellectual.

One purchaser usually emerges as the lead agent for the consortium. This is often the purchaser with the closest working relationship to that provider and may be because of geographic proximity or because it is the major user of the services.

Some of the factors driving purchasers together to form consortia include:

- Services they wish to purchase are the same
- They wish to receive services from the same provider
- The type of contract to which they are content to agree is similar
- The risk pool is extended to deal with high-cost/low-volume cases and services
- Increasing the purchasing volume leads to lower unit prices (costs)
- Shared contributions can lead to new or better services beyond the affordability of one purchaser
- Transaction costs can be reduced.

If the requirements of individual purchasers or their contract specifications differ, consortia rarely work.

The consortium needs to offset any of the economic gains of coming together against the cost of managing it. One issue that must be addressed is the decision-making powers of the lead agent and the level of delegated authority it has. For the consortium to be successful this authority must be considerable, well defined, and controlled within a formal process of governance established by the consortium.

Providers may be driven to form a consortium by the desire or need to respond to purchasers by better coordinating services or by extending their range of services. A good example is the provision of an entire episode of care that spans more than one provider or location. This is especially relevant to models of clinical networks and care pathways.

While one contract will exist between the consortium and the purchasers, its subelements can be complex. Each subelement taken separately and the contract in its entirety will need to define, for each provider in the chain, the levels of service to be delivered; the standards of care; the exact responsibilities of each provider; the mechanism for transferring patients; and the administrative

arrangements to cover the payment processes, communication, and processes for resolving disputes. The responsibility of each provider and the point of transfer to another provider has to be exactly defined. An approach to minimizing uncertainty in this regard is to have agreed-on and well-defined protocols that map the patient's journey, and clarify the role of each provider in it.

DURATION OF CONTRACT

Contracts tend to be set for a single year. This is to link to the cycle of funding of most systems. One advantage is that neither party is locked into rigid agreements. However, single-year contracts present some uncertainty to providers and may represent a risk to the continuity of services.

For this reason a move toward a longer period for contracts may be advisable. If a longer period is appropriate, the usual model is for three years (and is often termed a "rolling contract"). In this model the main elements of the contract are guaranteed for the period, but year-on-year marginal variations are accommodated within the overall contract framework. These variations also allow purchasers to give notice of change of service purchasing, and allow providers time to adjust their service configuration and costs before the change is made.

NOTE

1. Recent guidance from England is summarized in this note.

The English NHS has published, and now has in use, a standard form of contract for use between all of the purchasers and providers both public and independent. It incorporated all of the detailed positions outline d above and is available on the Department of Health Web site.

These documents represent Annex D to the "NHS Operating Framework for 2009-10" and should be read in conjunction with "The NHS in England: The Operating Framework for 2008/09, Annex D—Principles and Rules for Co-operation and Competition, December 2007."

The NHS standard contracts will cover agreements between PCTs and providers for the delivery of NHS-funded services. The contract will apply to agreements from 2009-10 for:

- NHS Trusts, Foundation Trusts and FTs whose existing contracts have expired
- New agreements between PCTs and independent sector providers
- New agreements between PCTs and third sector providers

The mental health and learning disability services contract is published initially on a one-year interim basis and with a degree of flexibility. The details of this will be set out in the mental health and learning disability services contract guidance.

Guidance on the contracts was published on December 16, 2008, together with a model consortium agreement and associated guidance. It includes:

- Standard NHS contract (multilateral) for acute services
- Guidance on the standard NHS acute services contract
- NHS standard multilateral contract for mental health and learning disability services

CHAPTER 5

Health Management Information Systems: Linking Purchasers and Providers

Dennis J. Streveler and Sheila M. Sherlock

BACKGROUND

The purpose of this chapter is to give guidance and advice relating to the selection of the appropriate health management information system (HMIS) for implementing strategic health purchasing arrangements and health insurance reforms in low- and middle-income economies. The choice of HMIS is crucial, since these systems play a fundamental role in organizing and streamlining the business processes of health care and in providing the vital communication link between purchasers and providers through which business transactions can flow. The ever-decreasing cost of computer technology and telecommunications offers an opportunity to employ these systems in ways previously only possible in higher-income countries. A new HMIS offers the opportunity to replace aging health-related information systems (manual or somewhat automated), while efficiently accommodating reengineered health provision and health financing processes.

This chapter attempts to propose a general framework for HMIS that is applicable to many settings, even though differing sociocultural and economic situations will no doubt result in varying approaches and solutions.

An ever-present danger is that the relentless pace of technology change could lead to "instant obsolescence" of certain concepts and applications outlined here. We therefore concentrate on those underlying principles that are likely to remain largely unperturbed for the foreseeable future.

More and more health managers in low- and middle-income economies are being required to exert greater managerial control over health care efficiency and quality by forging new strategic purchasing relationships between purchasers and providers. Building these new arrangements requires a combination of improved management capacity; strengthened budgetary controls (via the introduction of national health accounts and other vehicles); and, last but not least, the installation, use, and optimization of HMIS.

New strategic purchasing arrangements are being introduced or enhanced because, while advances in health during the past few decades have been impres-

sive, global spending on health has also risen significantly. When countries are faced with severe budgetary constraints, health care expenditures are often the first victim. In recent decades, health care costs have increased far faster than national wealth in most high-income as well as low- and middle-income countries. This has exacerbated the strain on the overall economy and stimulates the need to find new and better solutions to providing appropriate health care services to the population.

Advances in health are also the result of a better understanding of the causes, prevention, and treatment of diseases, and of efforts to improve the performance of the organizations and institutions that are used to purchase and deliver care. International experience indicates that the underlying causes of the health problems of the world's 1.3 billion poor are well known, and that, for the most part, effective and affordable drugs, surgeries, and other interventions are available. But because of weakness in the core functions of health systems and non-strategic purchasing arrangements, potentially effective policies and programs often fail to reach needy populations.

Today, the three core functions of health systems cover financing, resource (or input) generation, and service delivery; government stewardship oversight is related to them. The financing function includes the collection and pooling of revenues, and the use of these revenues through purchasing arrangements with service providers. The resource generation function includes the production, import, export, distribution, and retail sale of human resources, knowledge, pharmaceuticals, medical equipment, and other consumables (and capital where feasible). The service delivery function consists of both population-based and personal ("one-on-one") clinical services provided by the public and private sectors, governments through their stewardship oversight function, and the population through political processes. Demand and markets influence these three core functions. Stewardship oversight involves management and monitoring to ensure that implementation meets strategic objectives.

The combined effect of these four factors leads either to good or to poor performance in health outcomes, financial protection, and responsiveness to consumer expectations. Given the complex interplay between these factors, "the success of reforms in RAP [resource allocation and purchasing] arrangements will be highly dependent upon parallel reforms and changes in other parts of the health system" (Preker et al. 2000).

The RAP concept involves the following core policy, organizational, and institutional considerations that must be addressed during development of any HMIS-related design effort to support RAP (Preker et al. 2000):

Policy considerations include:

- *Demand*—for whom to buy health care services?
- *Supply*—what health care to buy, in which form, and what services to exclude?

- *Prices and incentive regime*—at what price and how to pay?

Organizational considerations touch on:

- *Organizational forms*—what is the economy of scale and scope, and contractual relationships within the health care system, "as is" and "to be"?[1]
- *Incentive regime*—what is the degree of decision rights, market exposure, financial responsibility, accountability, and coverage of social functions in health care, "as is" and "to be"?
- *Linkages*—what is the degree of vertical and horizontal fragmentation or integration in the health care system, "as is" and "to be"?

Institutional considerations relate to:

- *Stewardship*—who makes strategic and operational decisions?
- *Governance*—what are the ownership and oversight arrangements?
- *Insurance markets*—what are the rules regarding revenue collection, risk pooling, and transfer of funds?
- *Factor and product markets*—what does one buy from whom? At what price? And how much to buy?

It is highly recommended that the "as is" and "to be" states for these three sets of core considerations be documented in order to track progress and success.

Finally, HMIS must always be looked at in the context of the bigger picture. The aim of a properly implemented HMIS should be to provide health care that is (IOM 2001):

- *Safe*—avoiding injuries to patients from the care that is intended to help them
- *Effective*—providing services based on scientific knowledge to all who could benefit and refraining from providing services to those unlikely to benefit (avoiding underuse and overuse, respectively)
- *Patient-centered*—providing care that is respectful of and responsive to individual patient preferences, needs, and values, and ensuring that patient values guide all clinical decisions
- *Timely*—reducing waiting and sometimes harmful delays both for those who receive and for those who give care
- *Efficient*—avoiding waste, including waste of equipment, supplies, ideas, and energy
- *Equitable*—providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location, and socioeconomic status.

Health services should be evaluated on the basis of how well they succeed in producing equitably distributed health outcomes, protecting citizens against impoverishing health expenditures, and helping the poor build self-reliance and break out of social exclusion (World Bank 2004). However, they are characterized by a variety of market failures, such as externalities associated with disease, asymmetric information between professional providers and patients, and the failure of insurance markets.

Why Is HMIS Important in Modern Health Care Settings?

The principal goal of any health system is to optimize the health of individual patients and of the population as a whole in an equitable and cost-efficient manner that is acceptable to patients, providers, and administrators. This is easier said than done. There are no information technology "magic bullets" (Markus and Benjamin 1997; Southon, Sauer, and Grant 1997) to accomplish this. Information systems will not single-handedly precipitate overarching reforms of service delivery or finance; rather, improvement from the implementation of the HMIS will result in incremental changes at all levels of the health system. It is an evolutionary, iterative, change process that is contingent on systematic measurement of health system performance, in conjunction with evidentiary decision-making processes. Broad measures of population health are confounded by unmanageable factors within the health care system, and by composite indexes of system-specific performance, which are by nature imprecise. To drive change within the system, one must develop accurate and reliable micro- and macro-level health indicators. To avoid information overload, these indicators are usually aligned with some combination of expensive, complex, and high-priority services, especially those unevenly delivered.

Determining the needs and perspectives of all health system stakeholders—patients, providers, administrators, and policy makers—is essential to the development of effective HMIS. The establishment of continuous, audience-specific reporting systems is imperative. Additionally, informed consumer choice is not completely effective in driving change at the procedure- or provider-specific level, but may be effective at a macro level in an environment of competing health plans. Supply-side drivers of change include regulatory frameworks and the alignment of funding with performance (the latter concept is now referred to as "pay for performance" in some countries). Reforms ultimately depend on collaborative action by professionals and administrators aimed at identifying and implementing best practices. With a well-implemented HMIS, the use of health system performance information will ensure that health services reflect best policies and practices, in addition to community contexts and values (OECD 2002).

Implementing data standards that are applied uniformly across the HMIS is also crucial. Creating these standards involves compromises in infrastructure, social morays, and sociotechnical interaction. The struggle is to balance trade-offs between changes in clinical outcomes and implementation of globalized

standards of care. To achieve any specific standard of care, there is an associated cost. Accomplishing the correct level of health care improvement within budget and maximizing the health care improvement per unit of money spent is the goal.

One of the most significant issues for health care managers when making decisions is the cost of care, including project funds that support care. In order to correctly explore efficient modalities, including HMIS, to improve care, it is vital for these managers to understand and anticipate the cost-of-care consequences. The strategic power of information systems lies in their ability to transform the way that work is performed. HMIS and the Internet are potentially vital enablers in making a qualitative shift in the ability to deliver better care at reduced cost (Weaver and Spense 2000). The combination of computer and Internet represents a potent new tool for linking the purchaser and provider by offering a new powerful set of business transactions. As banking once discovered "inter-banking" and as airlines once discovered "inter-lining," technology now offers the ability to transact health-related business among disparate actors.

The purpose of designing a national HMIS is to provide access to information so that all stakeholders can monitor and evaluate their health services performance overall, collect baseline information on the health status of the population served, and then, over time, analyze health outcome trends of the population. This then allows decision makers to make changes to program initiatives and to evaluate the effects of those program changes.

Given the heterogeneity of health care stakeholders, the greatest challenge in designing such a "dashboard" for monitoring performance is to create a set of agreed-on health indicators. Different entities collect and require different pieces of information,[2] tracking is variable, and security and confidentiality concerns add further complexity to the process. The selection of health indicators, identification of potential data sources, and gaps in those sources (which vary widely) determine, to some extent, the overall design of the HMIS.

A good health system improves attainable average life expectancy and reduces the inequities within the system among groups and individuals (WHO 2000). HMIS can play an important role in all this. But it is essential for information technology professionals to realize that information technology will not necessarily improve the average level of care, and that HMISs have the potential to *increase* inequality in health care provision if one is not careful. HMIS must be implemented with a proper understanding of the health care system generally as well as individual purchaser and provider needs to realize potential benefits. While it may be expensive to implement HMIS, in terms of both capital and running costs, these costs may well be warranted where they are integrated into better managerial and medical practice (though this is not assured). The main goals of an HMIS are given in box 5.1.

Initial HMIS benefits are vast for low-income countries (for more discussion on potential gains, see annex 5.1). Although Weisbrod (1991) argues that technology increases health care costs (his studies focus on OECD countries and on extremely advanced interventions), his findings support the contention that the

BOX 5.1 GOALS OF A HEALTH MANAGEMENT INFORMATION SYSTEM

- Improved availability of appropriate information for decision making
- Improved accessibility for all people
- Improved productivity of all health workers
- Improved cost-efficiency
- Improved appropriate utilization of health care resources
- Improved quality of care

higher costs are offset by better outcomes. Certainly if his view was correct then, it must be true even more so today, given the proliferation and increased adoption of technology.

Within the OECD countries, the marginal cost to the patient has generally been low, given that most of the cost has been borne by providers and insurers, with the presumption that the cost would be offset by increases in productivity. There is however a general lack of agreement as to how to determine whether new technology provides significant enough benefits to warrant the sizable investment required, and further deliberate study of how best to apply cost-benefit analysis techniques to this domain are sorely needed.

The main advantage of computing technologies is their ability to systematize and, hopefully, streamline the processes of RAP, as well as to provide transparency of calculations and report generation. If implemented properly, information technology can allow all stakeholders to see how resources are purchased and allocated, thus engendering an openness and trust among the stakeholders.

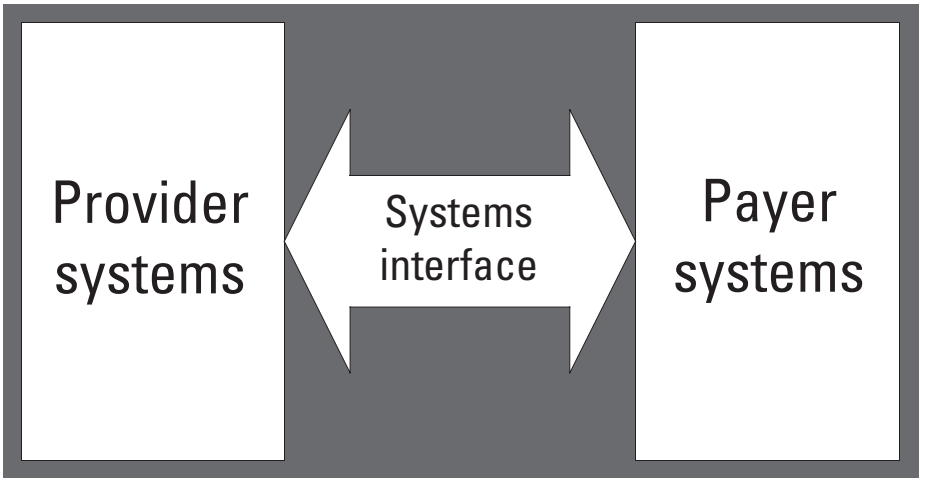
Computerization will need to be introduced in both the larger provider environments and in the larger purchaser environments as well (it may remain too costly for the smallest provider and purchaser environments for some time, but one day even the smallest environments will no doubt be computerized). In addition, an interface (a communication link) between these two environments is required so that information can pass easily between the two (figure 5.1).

The next three sections—*Implementing Appropriate Provider Systems*, *Implementing Appropriate Purchaser Systems*, and *Implementing an Appropriate Link between Purchaser and Provider Systems*—deal with these three crucial components.

IMPLEMENTING APPROPRIATE PROVIDER SYSTEMS

Provider systems exist in a variety of clinical venues, including hospitals, clinics, and polyclinics,[3] all the way down to small general practitioner offices. The priorities of provider systems are to improve operational efficiency within the clinical venue and to interface with purchaser systems. Of course, to transact the

FIGURE 5.1 Linking Purchasers and Providers: The Three HMIS Components



business of strategic purchasing, interoperability between provider and purchaser systems is mandatory—they must "talk to" each other.

Unfortunately, such interoperability is difficult because most of today's provider systems are self-contained, stand-alone systems, limited to the venue itself. If low-income countries have them at all, they are likely to be old and to have outlived their usefulness. Designed decades ago, when priorities in health care focused on much simpler tasks (perhaps collecting some simple statistics for retrospective analysis), many of today's "legacy" systems are remnants of a bygone era, offering few applications in the area of financing and resourcing—perhaps some simple billing or accounting. In all areas, more data visibility, authentication, and planning are required.

Recent versions of advanced provider systems emphasize electronic medical records, which attempt to replace the paper-based medical record with its electronic equivalent. The exact effect of electronic medical records is still far from clear. Provider systems with this capability are often still far too expensive and invasive. Instead, systems that have some ability to house "clinical summaries" of certain crucial clinical data are likely to be more appropriate for low- and middle-income countries.

Several other modern requirements of provider systems are noteworthy, such as the ability to support budget control with an increasing emphasis on outcomes and performance; strengthened capacity for financial management, reporting, and accountability; enhanced practice marketing capabilities in a quest for new sources of funding; and a greater capability to enhance local financial control and management of business units (such as cardiology or the laboratory).

A superior provider system will offer all these, and while it might not be possible to afford this whole array of functionality at the beginning, these elements should be considered as potential future additions during the design of any HMIS.

Box 5.2 presents an overview of these objectives and functions, which are now discussed in greater detail.

Types of Providers

Providers may be classified according to their clinical function (providers operating in, for example, primary health clinics, polyclinics, employer-based clinics, school-based clinics, and hospitals). They may also include certain institutions (for example, the hospital, community pharmacy, or reference laboratory) that have contracts with the purchaser. Alternately, providers may be classified by their non-profit/for-profit market orientation (box 5.3), by their manner of ownership (individual/group, mission/charitable organization, employer-provided clinic), or by a combination of the two.

BOX 5.2 PROVIDER INFORMATION SYSTEMS CONSIDERATIONS

Objectives
- Increase operational efficiency (reduce costs)
- Interface with purchaser system

Functions
- Production of unit-level information (for inpatient stays and for outpatient visits)
- Patient registration and rostering
- Eligibility checking
- Appointment scheduling
- Claims/encounter creation and submission
- Receiving and posting payments
- Contract monitoring and negotiating aids
- Business-unit management
- Inventory management
- Clinical functions

Advanced functions
- Lifelong electronic patient records
- Health passports
- Clinical practice guidelines
- Telemedicine and teleconsultation

BOX 5.3 MARKET ORIENTATION OF PROVIDERS

Non-profit providers include government-salaried providers, religious mission hospitals, health centers, clinics and dispensaries, family planning clinics, community health facilities, community pharmacies, and other nongovernmental organization health care facilities.

For-profit providers include individual- and group-run clinics and hospitals, privately owned nursing homes, employer-provided clinics and pharmacies, and individual pharmacies or chemists, clinic laboratories, stores, shops, and traditional practitioners.

The exact organizational structure of providers and provider groups can vary widely, even among neighboring countries. Consider the situation in Africa, where health care services are sometimes in the public sector and sometimes in the private sector. In Zambia, for example, the copper mining and other industries which own and operate their own health facilities are mostly government owned, although their health services often function independently of the government. In Kenya however, such employer-based services are most often found in the private sector.

The requirements of HMIS for each of these provider types are somewhat different depending on the specific implementation scenario, but not substantially. These requirements also vary somewhat according to the size of the clinical venue. Perhaps the most significant determinant of the requirements is the complexity of the contract that a provider has entered into with a purchaser. Some contracts require that very detailed information be transmitted to the purchaser, while others (such as those involving global capitation) require only very highly summarized information to be passed between the provider and purchaser. However, whether information provided is procedural (clinical), diagnostic, or "fee-for," similar functions are required (as outlined in the next section).

Functions of Provider Systems

Just as the principal objective of a health system is to improve people's health, the chief objective of the information system is to aid in the delivery of health care services by improving both clinical and operational efficiency.

Provider systems should offer both business and clinical functions. Business functions include eligibility checking, claims/encounter creation and submission, appointment scheduling, payment processing, contract monitoring, and business-unit management capabilities. Additional provider business solutions potentially are central budgetary control, improved financial management, and the creation of specific management tools fashioned for the specific type of clinical venue in which the system is implemented.

The rest of this section discusses the overall functions of a modern provider system, placing particular emphasis on the needs of strategic purchasing arrangements.

Production of unit-level information

The first (and perhaps the most important) element of a provider system is standardized "unit-level" information (ULI) for *each* service provided. It cannot be stressed too often that standardization is vital if one is to be able to analyze the data later. Information should be consistently coded and it is imperative that appropriate information be captured. Two elements must be balanced: on the one hand, information collection has an associated cost; on the other, the cost of collecting data later (if needed) may well be far higher than if all the needed data had been collected in the one pass.

Collecting the ULI is key when implementing HMIS since the ULI records become the core of communication between provider and purchaser. The ULI should include the following at a minimum:

For an inpatient stay. For each stay, the ULI is accumulated in a "stay abstract" (sometimes also referred to as a "discharge abstract" or "discharge summary"). Here services performed are enumerated (at some level of roll-up) along with admitting and discharge diagnoses, procedures, and stay information (such as length of stay, admitting department, medical service of stay, and disposition of the stay). For advanced implementations, the DRG (diagnostic-related group) is also included. If there's no listing in the abbreviations in the front matter, please add.

For an outpatient (hospital or clinic) visit. For each patient visit, an "encounter record" (or simply "encounter") is the ULI that enumerates the event of a particular patient visiting a particular provider on a particular day. The outpatient ULI should include procedure codes as well as primary and secondary diagnosis codes (see box 5.10, *Types of Data Standards*, below). An encounter record can contain other data items including referral information, return-to-clinic designators, diagnostic tests ordered, and the like.

Patient registration

Of course, at the heart of a provider system is the ability to uniquely enumerate the patients seen in the practice. Patients can be entered as individual patients, or as families, depending on the nature of the practice (primary care clinics tend to care for "families" while specialist clinics tend to care for individual patients). Besides being the "key" to which the ULIs above are tied, the resultant patient list can serve as the practice's roster of active patients and for whom capitation payments are due.

Eligibility checking

Eligibility checking is the ability of the HMIS to verify an individual patient's benefits and coverage. It can be as simple as verifying coverage ("yes" or "no");

or as complex as noting the amount of coverage, type of coverage, the specific benefits offered, covered services, excluded services, copayments required, applicable deductibles (totals and remaining balances), and additional forms of insurance (coinsurance coverage).

With the introduction of an HMIS, eligibility checking becomes simplified for the provider. An adequate eligibility checking HMIS allows a provider to foresee and resolve issues with coverage *before* services are rendered. Costs related to non-covered services and individuals, many of which go unrecouped, can be avoided. Thus eligibility checking yields savings not only for providers, but also to the health system as a whole. Obviously, the provider wants to be assured of reimbursement and the HMIS can provide some reassurance that the eventual claim will be paid.

There are three main ways in which eligibility can be checked.

Option 1. The first, and most obvious, is through a direct online transaction between the provider system and the purchaser system. This requires good communication links, and is today usually done via the Internet. It is, however, still rather expensive in countries with limited Internet service or where telecommunications costs are high, but it is usually the best way since it provides the most accurate, up-to-date coverage information. With this method, any change in coverage is immediately known.

Option 2. The purchaser provides periodic (monthly or possibly even daily) lists of eligible patients and their coverage. These can then be downloaded into the provider system and referenced by the provider system's applications. This is usually less expensive but in this case, of course, the eligibility information is only current as of the time of the last download. (As a technical aside, these data between purchaser and provider can frequently be synchronized by employing "database replication" techniques.)

Option 3. The system "assumes" that the patient is covered up to a threshold amount (on the basis of presentation of an identity card) after which a phone call, a fax, or perhaps a secure e-mail message is required to the purchaser to provide assurance of further benefits. This is the cheapest and the simplest method to start with, but the costs of the manual intervention required can be high.

Of course, the whole usefulness of the result of the eligibility check depends on the underlying correctness of the patient identification process, since the services for that patient depend on his or her eligibility. Thus it is important to mount an effort to minimize patient identification errors. Box 5.4 provides an example of how one hospital deals with this issue.

Appointment scheduling

Automatic appointment scheduling saves money and streamlines the patient flow. It greatly improves patient convenience (especially reduced waiting times), eliminates peaks and valleys from the workload of physicians, and provides the early entry point for information to be entered in the ULI, such as the patient's chief complaint. It can reduce front-office costs by reducing manual processes

BOX 5.4 PATIENT IDENTIFICATION IN THE ELIGIBILITY CHECKING PROCESS

Each of the three mains ways for checking eligibility requires patient identification. In the implementation of a health management information system (HMIS) at the Lyndon B. Johnson Tropical Medical Center (LBJ TMC) in American Samoa, by employing "forced registration," the number of nonresidents registering in the system increased from 1.6 percent to 26 percent. LBJ TMC's tariff structure at the time was $5 for residents and $10 for nonresidents. With 167,000 visits in 2002 the improved charge-capture added significantly to revenue.

The ability to prevent "identity fraud" and to later implement differential charges as opposed to a flat rate provided opportunities to improve charge capture and increase revenue. By eliminating the widespread practice of using other people's hospital identity cards, the LBJ TMC HMIS improved the accuracy of hospital records. Previously, the medical records of a nonresident posing as a resident would be mixed up with those of the resident, posing a safety risk—among other outcomes, incorrect medications might be prescribed. Improved record keeping was a major benefit of the system. Prior to HMIS implementation, records were "loose-leaf" and medications were often missing from the patient chart.

Source: http://www.pacifichui.org/.

and streamlining scheduling, thus enhancing profitability. In addition, by streamlining and regulating the workflow, it can enhance provider satisfaction by decreasing work overloads and minimizing workload turbulence.

There are many methods and systems used for appointment scheduling, including "wave scheduling" and "bulk scheduling" (sometimes called "grouping"), and their extensive variants. The algorithms can be easily located.[4] A sophisticated patient scheduling system accounts for average appointment times for various visit categories, such as new patients, established patients, follow-ups, emergent visits, referrals, and consultations. The many benefits of an automated system include the ability to view several days and weeks at a time using specific screening criteria and the ability to "block" and designate certain appointment types and times. These features often increase the scheduling staff's accuracy and efficiency.

Appointment scheduling, coupled with eligibility checking, is important because, for new patients, the kernel of the new patient record originates here. The demographic information contained here is crucial because it will be carried forward, and any corruption in these data will be amplified many times over. Also, checking payments against the appointment schedule might minimize the chance that the submission of any claims is overlooked.

Claims encounter creation and submission

Within a health care system, every hospital discharge (resulting from a confinement in hospital) and patient encounter (patient visit involving one patient and

one health care provider on one date) should be documented. This succinct record can replace many (sometimes all) of the registries frequently found in manual systems for vertical programs (such as family planning or disease-specific registries).

Encounter documentation provides an ongoing brief proxy for the patient's medical history. It may also serve to document the health care provider's work or time record and thus be a proxy for provider productivity as well. The documentation provided for claims submission may be a subset of the clinical patient record created as a result of the encounter.

A "claim form" may be used to pass (on paper or, preferably, electronically) all (or part of) the encounter information to the purchaser. This claim form then becomes a demand for payment (in the case of fee-for-service models) or a record of utilization (in the case of prepaid or capitation arrangements). (See box 5.5.)

With HMIS technologies, claim/encounter creation can be automated. Potentially, the health care provider can create an electronic encounter record during (or immediately after) the patient visit. Whether concurrent or retrospective, once the encounter information is in the HMIS, it may be submitted electroni-

BOX 5.5 A BRIEF PRIMER ON THE TRADE-OFFS OF FEE-FOR-SERVICE VERSUS CAPITATION PAYMENTS

Fee-for-service and capitation refer to different (and to some extent, competing) provider reimbursement approaches used in payment schemes of health insurance plans. There are many possible variants.

Fee-for-service

In fee-for-service schemes the health care provider is paid an amount based on the services it renders. It is reimbursed a share of medical bills incurred by the patient (who pays the fee for the service, subject to benefit limitations). The patient is responsible for any deductibles (also called the excess, that is, the amount that must be paid before the insurer begins to pay benefits), copayments (a set price paid for each medical benefit), or coinsurance (a shared percentage of the cost of medical care). After the patient has paid these, the purchaser pays for the rest up to a cap. There are sometimes two caps—a yearly cap and a lifetime cap. Normally, purchasers reduce the amount due by comparing the amount billed to the "usual, reasonable, and customary" charge for a certain procedure or diagnosis in a geographic area. The purchaser may choose not to pay more than this amount for a procedure. In the United States, the policyholder's share is based on the reduced amount. In the Canadian system, fees are negotiated between the purchaser (provincial government) and the provider "union;" there is a set fee for each service, with little or no variation. European systems tend to have rate-setting mechanisms similar to Canada's.

(Box continues on next page)

BOX 5.5 (CONTINUED)

Usual, reasonable, and customary repricing provides some safeguard against physicians who may overcharge for procedures. With fee-for-service, providers are reimbursed for every eligible procedure they perform. In certain instances fee-for-service has been associated with health care providers rendering services which at times are excessive and unneeded, subjecting patients to unnecessary risks and raising the cost of medical care but favoring the provider financially. Additionally with fee-for-service, less attention has sometimes been given to determining which treatments produce better outcomes relative to the costs involved. Societal issues, such as concern for the utilization of scarce resources, have also been infrequently evaluated.

Capitation

In capitation (or per capita) schemes the provider is paid a certain amount of money each month for each of its patients (sometimes called "rostered" patients) regardless of the volume of care delivered or the specific services performed. The amount paid per member may vary depending on the member's age, sex, or other factors. Additional incentive payments may also be included to encourage physicians to provide services to certain populations, or to locate in certain areas. As the provider's "pool" of members grows, capitation may become a better deal for the provider as the law of averages begins to take effect, as risk can be shared over a wider population base. Yet with a capitation plan, a provider may end up providing care beyond that covered by the capitation rate. For this reason certain "caps" may be placed on what the physician performs, and any additional services might yield additional payments from the purchaser.

Like fee-for-service, capitation can also be abused, since the system can inadvertently reward *under*treatment. An ethical argument against this approach is that it rewards providers for providing less care and therefore may lead to a management philosophy that works against the best interests of the patient but financially favors the providers. It can also result in *over*referral patterns, as providers attempt to "dump" their costlier patients on other risk bearers.

Managed care, a form of health care delivery system that covers health care costs in return for a premium, often employs a hybrid of fee-for-service and capitation. Each plan has its own network of providers and a single purchaser (the managed care entity). Premium costs and copayments for services vary between plans and are normally dependent on the situation (coverage, disease state, etc.) of the enrollee.

cally or printed and submitted manually to the health care purchaser. It is best if the claim/encounter information flows directly from the provision of the service, and is "fed back" to the provider (or providers) who supplied the care. This feedback loop assures that the supplier of the information has some stake in the accuracy of the information being provided, and thus will likely be far more

attentive to creating accurate information. (An example of what not to do can be found in box 5.6.) For example, when the patient is actually admitted, the same patient admission record in the hospital serves as the source of "date of admission," "admitting diagnosis," etc. If such information is created later, inaccuracies are bound to be introduced.

Automation within the claim/encounter creation and submission process streamlines provider systems. In manual, outdated systems, the steps for claim/encounter data input and submission may be laborious—or worse, they may be separated completely from the health care delivery process, with forms being created separately. This promotes transposition errors and other inaccuracies in the claims themselves.

In brief, claims must be standardized, must address the requirements of the purchaser, and must be submitted in a timely fashion. The HMIS must provide visibility and accountability throughout the payment process so that claims cannot become "lost" or "altered" along the way.

Receiving and posting payments

Claims processing results in the receipt of payments for either individual services (in a fee-for-service scheme) or a utilization credit against a standard capitation amount. Payments and payment types can vary greatly.

Fee-for-service. In fee-for-service, claims are generated for services performed and reported using a combination of procedure and diagnosis codes. Procedure codes allow payment for specific services rendered, such as a physician visit, laboratory examination (for example, X-ray or blood test), or other diagnostic test. Diagnosis codes allow for charges to be related to a patient's illness. One poten-

BOX 5.6 AN EXAMPLE REGARDING ACCURACY OF DIAGNOSTIC CODING

The authors were asked to look at a startling statistic in one country. Data showed that the malaria rate had increased alarmingly. This was all more strange given that the country in question was not a tropical country and thus the population of malaria-bearing mosquitoes was likely nil.

After a fair amount of analysis, it was determined that a new "diagnosis code quick sheet" had been implemented giving providers an easy way to check off the appropriate diagnosis so as to avoid the laborious and daunting diagnosis coding task.

In the creation of these check-off boxes, it happened that "Malaria" was placed at the top of the list. So, the easiest action of the provider was merely to check off the first box on the sheet, and thus the incidence of malaria jumped.

If a feedback loop had been in place to the provider "Did you know that a high percentage of your patients were diagnosed with malaria last month?" certainly the anomaly would have been caught much sooner and the problem rectified.

tial pitfall with diagnosis code declaration is that there may be several illnesses, related or nonrelated, given the presence of comorbidities or contributing conditions. Which one is (or which ones are) coded and thus billed for? This is not always easy to answer. Additionally, the physician may not establish a final, definitive diagnosis until examination results have been reviewed, after several patient visits, etc. So which "provisional" diagnosis codes should be declared?

Capitation payments. In this approach, claims are generated on a per encounter basis, but do not usually need to be as detailed as they are in fee-for-service billing because the actual payment does not directly relate to the specific services performed. Capitation implies that a payment, usually of a fixed amount, is sent to the provider each month (or perhaps each quarter) which may have little or no bearing on the services that were actually performed. While capitation billing is simpler than that for fee-for-service, many of the nuances of clinical information may be lost. Thus it may be difficult later to analyze the health status of the population using this stream of input.

Regardless of the nature of the strategic purchasing contract (fee-for-service, capitation, or some hybrid), accurately reconciling payment data as it is received from the purchaser is an important role of provider systems. These data can be entered as a line item against a patient's account balance ("closed-item" billing) or as a payment against a specific service to a patient ("open-item" billing). Electronic payment processing can save even more money by reducing person-hours required for manual entry methods, reducing reject rates, and increasing cash flow (through reduced accounts receivable and decreased days-in-receivable). In many countries it is now a relatively simple matter to channel payments through an electronic payment clearinghouse directly to the provider's bank account. This streamlined method may lead to fewer resubmissions and quicker processing time, which will reduce the number of claims in suspension (also known as provider accounts receivable). Resubmissions are particularly onerous, with the cost of resubmission frequently costing 10 times the original submission since it often requires significant staff time to research the problem, and manual intervention to resubmit the claim once the problem is "fixed."

In general, electronic claim processing can also decrease billing errors and underpayments (that is, payments of a smaller amount than the amount due). Box 5.7 gives an example of what may be accomplished. Systems in low-income countries will likely not require the degree of complexity seen in the box, at least in the early years of implementing RAP schemes. But, as said earlier, planning now to have a two-way interchange between provider and purchaser is highly recommended.

Contract monitoring and negotiating

A strategic purchasing arrangement is, after all, a contract. The success of the contracting process will depend on how well both sides can negotiate a favorable contract, and how committed they are to abiding by its terms throughout the period of the contract. (See also chapter 4.) Both sides benefit if the provider

BOX 5.7 ELECTRONIC CLAIM PROCESSING IN ACTION

A good example of electronic claim processing is the Consolidated Copayment Processing Center Lockbox of the U.S. Department of Veterans Affairs (VA). According to the Web site of the VA Payment Processing Center, this system is "a secure way to automate medical payment processing." Using a Web browser interface, the department can manage all billings and payments for medical services, make deposits, access online databases, and produce up-to-date reports.

The VA's electronic claim processing system contains many features that should be included in basic health management information systems, including automated entering of payments in patient accounts; centralized payment collection; automated deposit processing; point-and-click navigation; an easy-to-use graphic interface; and dynamic report generation.

Source: VA Payment Processing Center, http://www.aac.va.gov/ccpc.htm (accessed May 2008).

remains financially viable and wants to take part in the insurance scheme. Without participating providers, the health care system does not work. The idea of health insurance is to purchase it at the lowest possible price, but not to endanger the survivability of providers who are providing cost-effective and quality care.

The need for transparency in the contract monitoring and negotiation process is crucial. If either side feels that it is at a disadvantage in the negotiation, the environment will be filled with stress and difficulty and, potentially, animosity. It is imperative that each side can monitor how the agreed-on contract is performing. To do this, each side must have information on how well the contract has performed. Of course the more complex the terms of the contract, the more difficult its performance will be to monitor. This is one more reason that developing straightforward, simple contracts is an advantage.

In addition, the provider must know that the contract is fair, and that it is being applied consistently, while the purchaser must be assured that the information submitted is correct, and that mechanisms are in place to prevent fraudulent and irregular behavior, as well as accidental overbilling or double billing.

Providers need some way to determine whether the current contract terms are favorable to them, and whether there are reasons to attempt to renegotiate part of (or all) the contract at the time renegotiation falls due. At renegotiation, changes may range from changing the contract content, to revising the contract (with additions or exclusions), adjusting maximum risk levels (if financial-risk contracts are involved), and changing various other facets. Yet another option is that one party decides not to renew the contract at all, and withdraws from the strategic purchasing arrangement.

This information on what to renegotiate is important. International experience indicates that a provider who has poor data on costs and overheads in a

new insurance environment can easily become financially unstable, or even fail, through lack of knowledge about the performance of its major contracts. This is another reason that HMIS, as a purveyor of timely information about the performance of these contracts, can be so crucial to the ultimate success of a new strategic purchasing scheme.

Business-unit management

HMIS must support management of resources at the business-unit level (such as cardiology or the laboratory). It is not a matter only of understanding the finances of the provider organization as a whole but rather being able to manage each of its units, or services. In a hospital this might mean knowing specifically how well the laboratory is performing, or knowing specifically how well a medical service is performing. In a clinic, it might mean knowing how well an individual physician is performing or how well a health care team is functioning together in meeting the terms of the strategic purchasing contract.

Inventory management

Health goods inventories must always be viewed as scarce resources. They must not be wasted, allowed to expire, or pilfered. Sophisticated inventory control tools are vital to tracking supplies, pharmaceuticals, and durable medical equipment (such as crutches, braces, and wheelchairs). Minimal functions for an HMIS in this regard are as follows (Government of Bahrain 2001):

- Tracking the issuance of costly supply items—from the "central store" to the specific patients who received them
- Tracking the specific provider who ordered an item—allowing the profiling of provider ordering patterns and to flag potential overuse/misuse. This provides some degree of quality control, and allows for the monitoring of compliance with guidelines and protocols for item use
- Supporting a highly competitive tendering process, in which the purchase of supplies, pharmaceuticals, and durable medical equipment is accomplished at the most competitive prices. (The frequent issuance of mini-requests for proposals will help stimulate a competitive bidding process.)
- Supporting accountability of items as they move through multilevel "stores" (that is, any holding place for a significant quantity of items)—from the central store, to multistores at the medical complex, stores at the business-unit level, and caches within a ward.

Clinical functions

The degree to which the provider's HMIS will support clinical functions will depend, to a great extent, on the complexity and sophistication of the venue. It is generally a good idea to implement both financial and clinical functions

together, and not wait many years before beginning to think about the clinical functions themselves.

Where to begin? Often the first clinical functions to be automated provide a way to place "orders" (or "requisitions") for diagnostic services (laboratory, radiology) or for therapeutics (prescription systems, therapies, requests for surgical theater time, etc.) Besides placing "orders," it is possible to automate the return of some diagnostic "results" as well, particularly those from the clinical laboratory.

Another area that has significant potential for automation is patient referrals (or "patient transfers"). Poorly performed in most countries, their cost represents a huge concern to any Ministry of Health. Providing some way to initiate referrals, and then to track them, is an important step. A serious problem with referrals is "losing" patients to higher-cost venues and never finding a way for the patients to return to lower-cost venues once their acute episode has been resolved. For example, it is possible for a cardiology patient to be retained by the cardiology department, when his or her return to the primary care physician for follow-up and long-term monitoring might be far more effective in terms of both cost and quality.

Advanced functions

Provider systems can become very sophisticated. High-income countries have spent decades working on them, but even today much more needs to be accomplished. The following paragraphs present some of the future applications that are being contemplated, or in the early stages of development in high-income countries, and will likely become appropriate for low-income countries in the years to come.

Lifelong electronic patient records. Today's electronic patient records attempt to totally eliminate the paper medical record; all data are digitized and made readily accessible in electronic form. The lifelong record, the next step, is considerably more comprehensive and challenging. Most current electronic patient records are housed in a single medical institution and therefore are in some sense captive to that institution. The lifelong electronic patient records of tomorrow will ideally track a patient from birth to death, across providers and across institutions. These are still largely a dream, but will certainly be realized one day (Pager, Streveler, and Quiroga 2007). The single biggest obstacle to reaching this dream is appointing a trusted information broker who can manage these comprehensive data and preserve the confidentiality and incorporate the required security. (For a historical perspective, showing efforts from 1956, see Collen 1995.)

Health passports. Some progress is being made in creating a "health passport," sometimes using an optically or magnetically encoded card, or a card with embedded integrated circuits (the "smart card"). This passport (for example, Government of Bahrain 2001) is a simplified concept that contains some practical subsets of the electronic patient record, including patient demographic information; significant allergies; health problems; current medications; recent encounters; hospitalizations; and significant operative and special procedures.

However, the health passport involves considerable issues of security (what if the card is lost?) and patient confidentiality (what if it is accessed by someone who is not authorized?) Proper use involves legislating appropriate safeguards and penalties regarding inappropriate, inadvertent, miscreant, and criminal use of patient data. When treating a patient, the physician should be able to easily retrieve relevant information from the health passport, such as health problems, medications, and recent encounters in order to provide appropriate care to the patient. Clinical practice guidelines (see just below) can then suggest appropriate treatments by the physician.

Health passports provide the physician with more complete, accurate, and up-to-date information, allowing for the provision of greater continuity of care given the ease with which information can be conveyed between venues. Additionally, providers have access to certain patient medical information, regardless of the availability of traditional paper charts and online telecommunications links. Medical providers and support staff also, potentially, have the ability to update the patient information that is contained in the health passport after the visit.

Clinical practice guidelines and practice profiling. Clinical practice guidelines help standardize treatment and minimize variation in treatment as new medical research evidence becomes available. (This concept is often referred to as practicing "evidence-based medicine.") In order for these guidelines to be effective they need to be published throughout the medical care system. They can be distributed freely via the Web, or physicians can have access to them during treatment of a patient via their provider system. One way to encourage compliance with clinical practice guidelines is to periodically issue "report cards" to providers showing each provider how well their practice complies with approved treatment practices—often referred to as "practice profiling."

Telemedicine and teleconsultation. Telemedicine is "distance medicine." It comes in many forms and modalities from simple asynchronous "store-and-forward" techniques (such as teleradiology applications in which images are sent to the reader via e-mail) to sophisticated real-time synchronous teleconsultation (for example, allowing the local physician to consult with a distant specialist via videoconferencing).

Telemedicine is becoming more common and widespread, as more countries attempt to rationalize their medical workforce over a greater distance and offer new services. The growth of telemedicine largely depends on two factors: the availability of cheap, reliable, high-speed telecommunications; and collaboration and cooperation as the social norm within the medical service. While technology can bring two caregivers together "virtually," success of course also hangs on their willingness to be brought together professionally in dealing with the shared responsibility for the care of a patient.

Notes on Costs and Likely Implementation Times

How much should a provider system cost to acquire and implement? This is, of course, a question with few reliable answers. The answer is often "It depends…"

But despite this unsatisfying, if true, answer, the following provides some guidance that is typical of the world's experience.

Hospital information systems

The capital costs of hospital information systems, as a rule of thumb, are about $1,000 per bed for software and hardware—so roughly $100,000 for a 100-bed hospital, and possibly $1 million for a 1,000-bed hospital. In addition to these capital costs are the operating expenses, which may well be somewhere between 10 percent and 20 percent of the capital costs per year. They include standard maintenance and technology refreshing costs, as well as ongoing training costs.

Of course these are imprecise estimates, but they may provide some idea of likely expenditures. They are given for 2008. Technology costs are likely to continue decreasing, while "people costs" may well increase, though in general the future trend of overall costs should be downward. So this simple formula will need to be recalibrated as time marches on.

It generally takes 12–18 months to install a full hospital information system. It can take less time, but it frequently takes a little (or even much) longer. Of course the world is also riddled with examples of failed implementations—usually caused by unreasonable expectations, lack of support by "champions" of the automation, or simply running out of money because of an unreasonable estimate of costs at the start of the project. The better managed and better organized a hospital is before it attempts to install a hospital information system, the easier it will be and the less time it will take.

Clinic information systems

Clinic information systems should cost somewhere between $40,000 (for a simple clinic of four physicians) and $150,000 (for an advanced polyclinic with radiology, laboratory, and other services). Clinic information systems projects generally take six to nine months to install.

IMPLEMENTING APPROPRIATE PURCHASER SYSTEMS

Introduction to Health Insurance

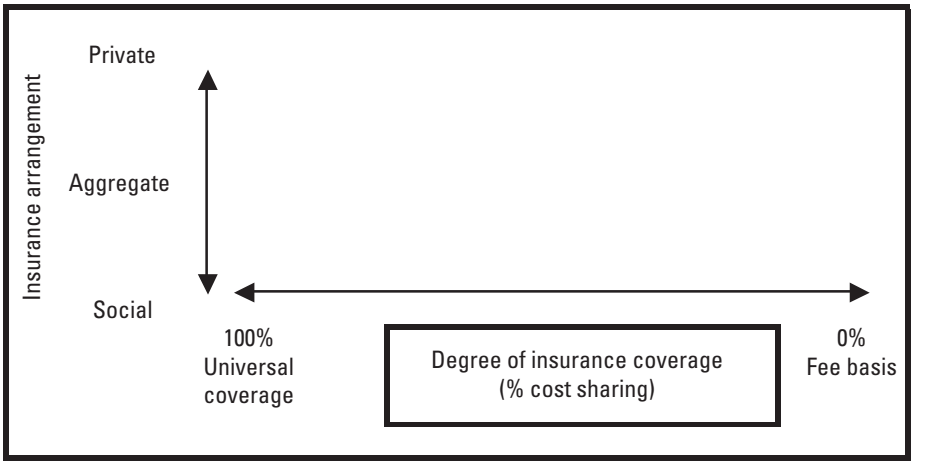
The budgeting and funding of health care services have a plethora of institutional approaches.

Health insurance types and organizational structures

There are few, if any, countries in the world today in which health care can be entirely self-funding. Rapidly increasing health care costs have forced a broad rethinking of how health care can be financed.

Health insurance has emerged as the typical vehicle to fund health care. Health insurance schemes may be categorized by type of insurance arrangement

FIGURE 5.2 Categorizing Health Insurance Schemes

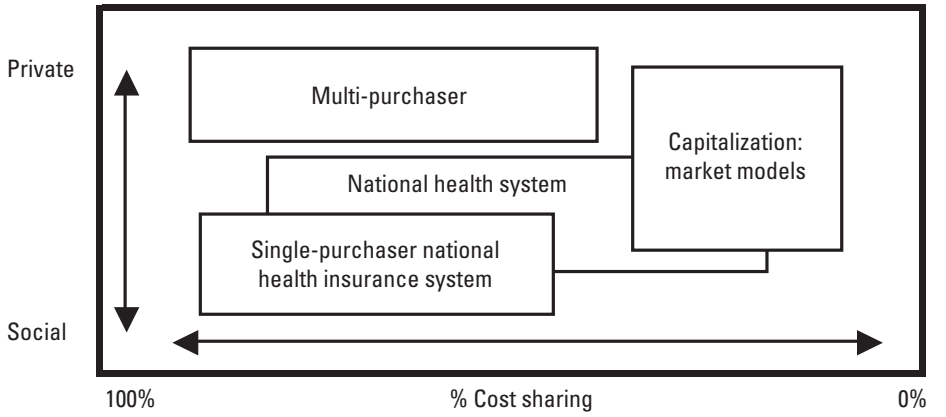


(private, social, and tax-based or aggregate) and by degree of insurance coverage (with consideration for population coverage and cost sharing). These may be put into the following matrix, which defines the health insurance schemes of most countries (figure 5.2).

OECD defines three types of health insurance schemes:[5]

- *Single-purchaser national health insurance systems (SPNHISs) that are publicly administered.* Most physicians are in private practice and hospitals are generally either publicly owned (through county councils or municipalities in the case of the Scandinavian countries), or non-profit enterprises, although the model itself does not preclude private ownership of health facilities. These systems provide universal service for all. OECD countries using this model include Canada, Denmark, Norway, and Sweden.
- *National health systems (NHSs)* are systems in which salaried physicians work in predominantly publicly owned and operated hospitals. NHSs consist of publicly owned and accountable hospital and community services funded from central taxation. Hospital doctors and nurses are salaried, and employed according to national terms and conditions of service. NHSs provide universal services for all. OECD countries with this model include Spain and the United Kingdom.
- *Multi-purchaser health insurance systems* (highly regulated, universal, multi-purchaser health insurance systems, or "all-purchaser" systems) have universal health insurance via sickness funds, which pay physicians and hospitals uniform rates that are negotiated annually. OECD countries that have this model include France and Germany.

FIGURE 5.3 Categorizing Types of Purchasers



In addition, there are market models that allow more commercial forces within the health care system (figure 5.3).

Whatever the type of purchaser chosen, there must be a strict division of duties and accountabilities between the purchaser and provider. For this reason, where to house the purchaser is frequently a major organizational and political question. The following are some choices.

Ministry of Health. This is usually a very poor choice, since it immediately violates the separation-of-duties principle—it is usually impossible for the ministry to be an effective advocate and manager of both the purchasing functions and the provider functions. In the early stages of implementing a strategic purchasing arrangement, it is probably acceptable for the health insurance agency to be housed here until more advanced institutions can be developed.

Ministry of Social Welfare. For many of the same reasons, this organizational arrangement is also problematic. Health insurance governance often becomes a minor duty in this ministry and does not get the attention it requires.

As an autonomous government agency. This appears to be a better choice, but results in an agency that can be very difficult to control politically. While the agency may be free of control of individual ministries, it may have little accountability to the legislative body or to the people.

As a semi-autonomous government agency. This is better yet. The agency has some autonomy to manage its affairs, separate from direct interference from (often) battling stakeholders, while still providing political accountability to the people. In this structure, the head of the agency is usually appointed (and can be fired) either by the prime minister or by the Minister of Health, but otherwise the agency enjoys considerable autonomy in managing its funds and resources.

As a private agency. Private health insurance is a success in some countries, and a disaster in others. Privatization of all, or part of, the health insurance scheme

should be made in a deliberate fashion as it can dramatically change the complexion of future health care services and spending. In private health insurance schemes, the coverage can be compulsory and universal, or optional and discretionary. In the latter case, private health insurance companies in some countries have been able to "cherry pick" the healthiest (and usually wealthiest) patients while allowing the sickest (and usually poorest) patients to remain on public rolls. (This concept is sometimes referred to as "adverse selection.") Such cherry picking can dramatically increase the government's burden unless this practice is carefully regulated.

Functions of Purchaser Systems

The information technology needs of purchasers are generally more complex than those of providers, and certainly more costly. Systems maintenance cost is also high since these systems are subject to constant updates reflecting legislative and regulatory, clinical, and organizational changes, as well as management information system (MIS) technical changes.

Box 5.8 presents an overview of purchaser system considerations. The system's functions are now discussed in greater detail.

BOX 5.8 PURCHASER INFORMATION SYSTEMS CONSIDERATIONS

Health insurance types
- Type of insurance arrangement
  - Private
  - Social
  - Tax-based
- Degree of insurance coverage
  - Population coverage
  - Cost sharing
  - Capitation
  - Fee-for-service

Health insurance systems
- Single-purchaser national health insurance systems
- National health systems
- Multi-purchaser health insurance systems

Functions
- Registration and eligibility
- Premium collection
- Contracting and contract management
- Claims adjudication
- Support for provider payments
- Utilization management
- Quality assurance

The main functions of purchaser systems are: registration and eligibility, premium collection, contracting and contract management, claims adjudication, support for provider payments, utilization management, and quality assurance.

Registration and eligibility

Purchasers must maintain accurate records of their subscribers and provide accurate registration and eligibility data to providers serving their beneficiaries. This is not easy, because insurance rolls are extremely dynamic and constantly changing.

The registration and eligibility databases must be up-to-date, accurate, and open to participating providers. Essential data items within these databases include demographic information (name, age, sex, address); the benefit plan with specific coverage, copayments, limits, caps, and options; start date and end date of eligibility; referral network(s) to which the patient has access; information about unpaid deductibles; and premium rate and premium payment information (depending on the type of system, this may be a set amount per month based on family size and coverage, or an income-based calculation).

If there is more than one purchaser, it is highly desirable to design a common system and demographic database that supports registration and eligibility for all purchasers. This enormously simplifies both the provider systems and the workload of providers, since providers have to access only one site that acts as the point of reference for essential eligibility information in a region.

Premium collection

Once beneficiaries are enumerated, either on a per-person or per-family basis, the purchaser's principal responsibility is to collect the premiums for the insurance coverage from patients, (sometimes) employers, and (sometimes) social welfare agencies (of governments that pay the premium for those who cannot afford it).

The premium collection function of a modern purchaser system resembles that of any large enterprise's accounts receivable system—it must bill, collect, and post revenues. It must track delinquencies (and "turn off" eligibility when appropriate). It must also report on its revenue production as part of its accountability to stakeholders.

Premium collection is not an easy function, and carrying it out can be extremely costly. This is because of the dynamic nature of insurance enrollment. For example: How many employees does a given employer have today? When was a baby born? Did a previously eligible teenager become ineligible on reaching a certain age? Cost of premium collection is also high because premiums can be collected at a variety of points, including lockboxes at banks, and satellite collection centers.

Besides the financial factors, there is always difficulty in deciding when beneficiaries are so delinquent that their health care benefits must be suspended. This can be an enormously contested decision—without health insurance where can a sick person go for treatment?

Contracting and contract management

The three major types of health care insurance contracts found in the European Union (EU), as an example, are, in order of increasing complexity:

- *Block contracts*—generally outline expectations and agreements between provider and purchaser
- *Cost and volume contracts*—specify broad volumes targets, types of case mix, and general payment levels
- *Cost per care contracts*—specify payment levels and processes for specific types of care and cases. (This method is also called case-mix reimbursement in some countries.) Specific coding systems for denoting cases have also been devised. The method adopted in many countries uses diagnosis-based case groups or diagnosis-related groups (DRGs).

Contracting must be orderly, accountable, and transparent to ensure an appropriate insurance scheme. It is highly recommended that one avoids the tendency toward ever-increasing contract complexity because it can create conflict and greatly increase administrative and legal costs. However, suitable safeguards should be included to prevent providers claiming reimbursement for services that are more expensive or complex than are appropriate. For example, rules are often set to determine when a general practitioner can bill a more expensive consultation, rather than a less costly office visit.

Contract templates should be created that are simple to use and can be replicated among providers. Information systems should be used to track and archive contracts and other information such as due dates and deliverables. Ideally, a contract could be negotiated between a provider and purchaser by merely "filling in the blanks" of a predesigned template. Any further complexity, exclusions, and inclusions can add enormously to the cost of adjudicating a contract.

Standards for contracting must be agreed on, including the contract template itself, the claim form(s), if any, that are to be used, the rules for submitting claims and other information, and the agreed-on time that the purchaser has to adjudicate the typical claim.

Finally, the contracting function should track these contracts, and provide easily retrievable information about their terms to both purchasers and providers. It should also provide a reminder as to when the contract is due to be renegotiated.

Claims adjudication

Some means of adjudicating incoming claims for services against the corresponding contract must be provided and is really the central duty of the purchaser's system. Adjudication simply means deciding whether the claim is valid, and what the reimbursement should be for the claim. Adjudication systems can be relatively simple, doing little more than "counting" utilization, or they can be

enormously complex affairs with rule-based engines that perform highly sophisticated scanning of each incoming claim for appropriateness and then deciding on a settlement based on the terms of the applicable contract(s). Adjudication can rarely be fully automated, so some small percentage of claims may have to be determined manually, even in the most advanced systems. The goal is to usually get the majority of small, simple claims paid as quickly (and cheaply) as possible so as to allow the purchaser to concentrate on complex, large, and more suspect claims.

To simplify adjudication, it is important to have a standard claim form for all claims to be submitted. It is usual to have one standard form for claims involving "institutional" fees (for hospitals and other institutions), and another for professional fees (for doctors and other health care professionals). The specifications of the information contained on the forms are crucial—they must be rich enough to include the information needed to run the adjudication process, but must not be so burdensome to the providers as to be overly costly to produce. (Providers often complain that they spend more time creating the form than they did delivering the associated health care!) Thus it is a delicate balancing act to develop such forms, whether they are paper-based or electronic.

Even in the case of providers being paid on a capitation basis, many systems require activity reports to be filed, both for financial management and quality assurance purposes. The content of these reports can vary from simple daily logs to individual submissions for each patient encounter. The approach chosen obviously has an impact on both provider and purchaser hardware and software requirements.

Finally, the use of major diagnostic categories and disease classification systems for provider payments generates additional issues. Major diagnostic categories include DRG-type systems for inpatients and ambulatory patient group-type systems for outpatients. Because the level of compensation is based on clinical factors, there is often a long delay between the provision of the service and the submission of the claim. Of course there is the normal time lag, resulting from the fact that claims are usually submitted only after patient discharge. In addition, the process of determining the appropriate disease classification code—such as the DRG and International Classification of Diseases (ICD)—and translating it into a suitable service, procedure, treatment, equipment, or billing code, current procedural terminology,[6] or other code, takes time and requires clinical input, coding expertise, and sophisticated information systems.

Once the claim is received, equally sophisticated systems and expertise are needed for the purchaser to ensure that the coding is clinically consistent and to guard against "DRG creep" or "upcoding." These two terms refer to the tendency of providers to use the coding system to claim more complex (and expensive) DRGs, even for relatively simple and straightforward procedures or cases. Without appropriate counterbalance, "gaming" can lead to deficits or even insolvency of the fund.

Support for provider payments

Timely and reconcilable payments to providers must contain readily identifiable information about the services (fee-for-service) or periods (capitation), so that the provider can verify that correct payments were received. The payments must flow in a timely manner, as specified by regulation or law. Payments can be provided via paper checks, or via electronic fund transfers. In either case, certain supporting documents that allow the provider to reconcile the payments in their accounting systems are important.

Utilization management

The purchaser must have a way of testing the appropriateness of services given, their adherence to any quality standards and guidelines, and, perhaps, concurrently intervene in the care of the patient. The last function, sometimes known as case management, is usually reserved for the most complex (and costly) cases. Purchasers also use their information systems to review patterns of practice across multiple providers (all general practitioners in a particular geographic area, for example) to identify outliers or those whose billing patterns or practices may be suspect. Where purchasers cover all inhabitants of a particular geographic area, they have the potential for developing population-based and small-area analyses to determine variations in factors such as surgical interventions, hospitalization rates, and complication and death rates. These analyses can then be used in direct discussions with providers, or as an input to future contract negotiations.

Quality assurance

This is the most difficult and challenging function. It is most desirable to find ways for the computer system to help assure quality. Unfortunately, the world has not ventured far in this area, partly due to inherent difficulty and partly due to political sensitivity.

Some countries are more tolerant on whether a physician who does not practice according to accepted standards is being artful or simply a bad physician. Few quality measures are universally agreed on. Those that are (that children should be vaccinated, that pregnant women should be given proper prenatal care, that certain screenings should be performed) account for only a small part of the health care services menu.

As low-income countries develop and refine accepted quality standards, based on clinical guidelines and protocols, it is the duty of HMIS professionals to incorporate them in the HMIS as much as possible, for only a computer will likely be able to track compliance with these standards adequately.

Notes on Costs and Likely Implementation Times

Purchaser-side systems are expensive. Even a modest one will cost upward of $1 million. These costs are high because such systems are often one of a kind, or

nearly so, and they must incorporate many specific and unique requirements. (Provider systems in contrast are far more standard and can often be bought "off the shelf.")

In settings with long experience of implementing purchaser-side systems, such as certain provinces of Canada, the overall investment has been in the tens of millions of (Canadian) dollars over several decades. Now it must be hoped that some of these settings' experiences can be leapfrogged, and that low- and middle-income countries might benefit from the current state of the art without having to reinvent it. Thus it might be expected that costs will decline as purchaser systems become better known and there are fewer conceptual models from which to choose. The tendency has been for each purchaser to devise its own scheme, which therefore requires a specific information system solution to be designed. The distant future may, though, bring more standardization, thus allowing import and export of systems.

It is because of a lack of standard conceptual models[7] that the technical capacity needed to design and develop purchaser-side systems is so high relative to that required for provider systems. (This means that the skill level required of the technical team to create purchaser systems is usually commensurately higher.) As noted above, the complexity of the reimbursement and contracting systems, as well as the desired degree of control and level of safeguards, will significantly affect the complexity and cost of the management information systems needed to support them. So it is important to consider these factors in the choice of the strategic purchasing scheme itself. A cost-benefit analysis is needed to determine if the extra investments will pay off in terms of increased effectiveness, control of health expenditures, or both.

Like provider-side systems, purchaser-side systems also have running costs of typically 10 percent to 20 percent of the capital investment cost per year. It often takes two or three years to design and build a moderately complex purchaser system and another one or two years to install it. It is hoped that these long development times will decrease in the future, because the cost and time required are serious barriers to the adoption of strategic purchasing arrangements in many countries, especially low-income countries where the need is often greatest.

IMPLEMENTING AN APPROPRIATE LINK BETWEEN PURCHASER AND PROVIDER SYSTEMS

The true art of the HMIS professional is to fashion an appropriate link between the provider and purchaser systems, such as they were described earlier in this chapter. It is possible to have the best provider and purchaser systems in the world, but if they do not communicate in a reasonable way business costs will skyrocket and dissatisfaction with the systems, on the part of both provider and purchaser, will mount.

The skill here is to create an interface that allows easy transmission of data between the two sides, without upsetting the delicate balance of power that

exists between them. Both sides need to be assured that the other cannot pry into its systems or otherwise have access to data that is going to give it an unfair advantage in future negotiations. This arms-length principle is at the heart of efforts to assure success of any strategic purchasing scheme and thus it must be fully reflected in the nature of the information systems that service the scheme.

The world offers many precedents for such collaboration in other industries, such as common clearing systems for transactions among highly competitive banking institutions, and common reservations systems among airlines that share services. But such mutually rewarding collaboration is rarely achieved in the health care industry. There is no consensus why this should be so—some observers stress the often imperious nature of both providers and purchasers, others point to the lack of business acumen and management capacity often present on both sides, while still others emphasize the depth of mutual distrust (given their different fiduciary responsibilities) between the parties. Whatever the reason, the HMIS professional must be aware of the sensitivity of this work.

Box 5.9 presents an overview of the link between purchaser and provider systems. The system functions are now discussed in greater detail.

Functionalities

At a minimum, an appropriately robust interface will allow for:

- Sharing of patient eligibility data and rosters
- Transmission of claims to the purchaser from the provider in a standard format on a timely schedule
- Transmission back of anomalies and errors found in the claims ("edit errors")
- Transmission of payments from the provider to the purchaser
- Transmission of quality assurance data between provider and purchaser.

BOX 5.9 THE LINK BETWEEN PURCHASER AND PROVIDER SYSTEMS

Functionalities

Sharing of patient eligibility and rosters
Transmission of claims to the purchaser
Transmission back of anomalies and errors
Transmission of payments from the provider to the purchaser
Transmission of quality assurance data between provider and purchaser

Implementation

Data mapping
Networking and telecommunications
Standards
Clearinghouse

Notes on Implementation

The implementation of an appropriate interface requires a combination of data mapping skills as well as networking and telecommunications skills.

Data mapping

In an ideal world, each country would create a national health data dictionary that clearly defines the format (syntax) and meaning (semantics) of each data item relating to the insurance process. Ideally, all interchange formats would be completely standardized and thus no data mapping would be required. Unfortunately, this is not the case. Countries still struggle to create their national health data dictionary. One day perhaps, data mapping will no longer be needed, but that day is still some years (if not decades) away. Even the simplest fields may need some mapping. For example, patient names may be stored in different ways (last name first vs first name first), dates may be stored in different ways (mm/dd/yy, dd/mm/yy, or dd/mm/yyyy). Given these simple examples one can imagine the more complex ones—how secondary diagnoses are recorded or how disposition codes are noted. These can require highly complicated, and often still inaccurate, mapping techniques.

Standards in the United States such as HL-7 (Health Level 7), and those in the EU such as the HISA (Health Information Systems Architecture) might help create some standardization (see box 5.10). But even these international standards are far from clear, offering various often-conflicting interpretations. So data mapping tools, as well as interface engines and "middleware" (translation software), are frequently required.

A national standardization body may also be needed to take existing international standards and determine which ones are going to be applied nationally, and how. This body could be an independent organization, a branch of the Ministry of Health, or something in between. It is often useful to have representation of health care providers, the Ministry of Health, insurers, and HMIS suppliers on such a body, to ensure that the resulting standards are acceptable to all parties. Once standards are agreed on and widely accepted, only those systems compliant with the standards should be used.

In Canada some provinces certify systems to be compliant with their data standards and these systems can therefore be "plugged into" the insurance network. By allowing different (compliant) systems to be marketed, this approach promotes competition among HMIS suppliers, and relieves the Ministry of Health and the insurers (or both) of the responsibility for specifying or providing a unitary solution for health care providers. It thus ensures that provider and purchaser systems can talk to each other.

Networking and telecommunications

The exact communications protocols to be used (electronic data interchange, Web-based transactions, offline media) will depend largely on the availability and cost of each. With the ubiquity of the Internet today, a data communica-

tions protocol using XML (extensible markup language) might be the best choice in most cases, since it is cheap, reliable, and increasingly well understood among the world's technologists. However, since electronic data interchange is still the most common means of moving financial and bank-related data around the world, it is also well known and quite secure. In the most remote of locations, mailing diskettes (with a copy made before mailing, since diskettes can be notoriously unreliable) or other media (such as memory sticks or CDs) may be the only practical and affordable method in low-income countries.

BOX 5.10 TYPES OF DATA STANDARDS

Data exchange involves many layers of standards. Broadly, health management information systems should meet technical, medical, administrative, and policy standards. The choice is normally dictated by the needs of the system and, to some extent, politics. There may be de facto standards for various communities, or officially recognized national or international standards. There are, especially globally, many different and competing standards. This of course leads to confusion, fragmentation, obsolescence, and duplication of effort.

Technical standards. There is a plethora of technical architecture standards, protocol standards, and other mechanisms necessary for exchanging information, internetworking, portability, and reusability. From the technical standpoint, the main bodies concerned in one way or another with computing standards are the IAB, ISO, ANSI, ECMA, IEEE, OSF, and W3C.[a] Electronic data interchange (EDI), extensible markup language (XML), Health Level 7 (HL-7), and Health Information Systems Architecture (HISA) are other terms to be aware of, while specific standards for medical equipment (ISO, IEEE) should be peripherally considered when HMIS is developed.

Medical standards (external quality assessment). While many quality assessment protocols exist, few are as comprehensive and well organized as those in Canada. The Canada Medical Act (1952) establishes five principles of public health insurance: universality, accessibility, portability, comprehensiveness, and public administration. It addresses health care performance indicators of timeliness, quality, sustainability, health status, and wellness. Within quality indicators, the Canada Medical Act refers to the measurement of quality of health care services across the country, including patient safety, patient satisfaction, and health outcomes. In the United States, whose history of health care accreditation is often used as a model around the world, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) establishes medical standards.[b] JCAHO standards represent U.S. consensus on quality patient care that reflects changing health care practices and health care delivery trends.

(Box continues on next page)

BOX 5.10 (CONTINUED)

Administrative standards. When implementing a health management information system, there is information to be exchanged between systems that is more "administrative" than clinical in focus, although one might clearly argue that this distinction is far from clear. Such information mainly relates to diagnosis codes and procedure codes. Major diagnostic categories codify the appropriate disease classification code and translate it into a suitable service, procedure, treatment, equipment, and/or billing code(s), such as current procedural terminology or other code. Major diagnostic categories include disease classification systems, for example, diagnosis-related group-type systems and the International Classification of Diseases (ICD-10)[c] for inpatients, and ambulatory payment classification for outpatients. These are internationally defined standards. There is more than one classification system from which to choose.

Policy standards. Health care policy, such as national considerations on the amount of privacy and confidentiality a patient has as they relate to public health considerations, has been passed into law in most high-income countries. In the United States, this legislation is known as the United States Health Insurance Portability and Accountability Act of 1996 (HIPAA). HIPAA can serve as a potential guideline for countries wishing to provide electronic communications with regard to delivery and payment of health care services and to the security and confidentiality of individually identifiable, protected health information. HIPAA is intended to provide improved portability and continuity of coverage, as well as administrative simplification (reducing costs and inefficiencies through standardization and EDI). The exact impact of HIPAA in the United States is not totally clear. Some say the law has led to an increase in paranoia (fearing severe punishment) and thus has a detrimental effect in promoting electronic communications between purchaser and providers, while others forcefully argue that the law does not go far enough in plugging all the leaks that could potentially compromise the confidentiality of patient-identified health data.

Alternatively, such countries as Australia,[d] Canada,[e] and New Zealand have such standards, and may also serve as the basis for developing a standard.

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a. Many of the technical terms in this section, as well as the acronyms and abbreviations, are listed in the Free On-line Dictionary of Computing (FOLDOC) at http://foldoc.org.

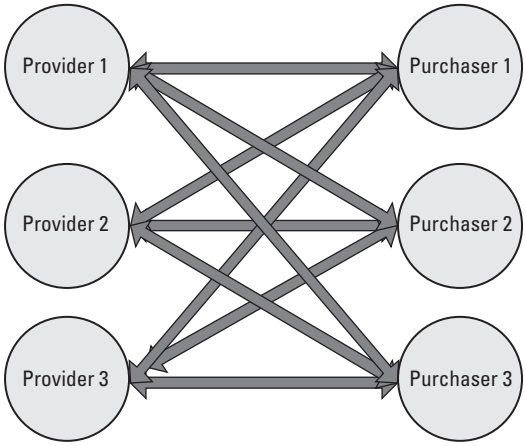
b.For more information see http://www.jcaho.org.

c. The International Classification of Diseases (current version ICD-10, with 2007 updates) classifies diseases and injuries. Conditions are grouped in a way felt to be most suitable for general epidemiological purposes and the evaluation of health care. ICD is a system developed collaboratively between the World Health Organization (WHO) and 10 international centers so that medical terms can be grouped together for statistical purposes. The aim of the ICD and of WHO sponsorship is to promote international comparability in the collection, classification, processing, and presentation of mortality statistics. These codes are available online at: www.who.int/classifications/apps/icd/icd10online/.

d. The Australian equivalents to HIPAA are the Information Privacy Act (2000) and the Health Records Act (2001).

e. The Canadian HIPAA equivalents are the Privacy Act, which governs the personal information practices of Canadian (federal) government institutions, and the Personal Information Protection and Electronic Documents Act, which applies to the Canadian private sector.

FIGURE 5.4 Point-to-Point Transmission of Data



Source: Authors.

A Health Insurance Clearinghouse?

The question remains *how* the data are going to be moved between provider and purchaser, and whether there needs to be a way-station (a "clearinghouse") between the two.

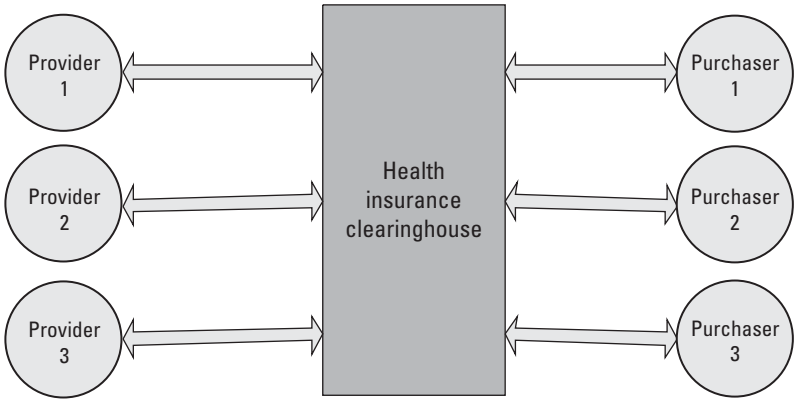
Rather than using point-to-point transmission of data between providers and purchasers, which requires many costly connections between the two sides (figure 5.4), it might be more effective to implement a "star network" where all communications flow to, and are routed from, a single point (figure 5.5). Such a clearinghouse can potentially save considerable communications costs since each party needs to communicate only with a single point.

If the data are stored at a central point, this becomes a central data repository, and the information can become an enormous asset, since it allows the analysis of health data collected from the insurance process in a single format and accessible at a single site.

While in theory this is a good idea, political unease over such centralized data access can cause some discomfort among stakeholders. The success of such a scheme depends largely on the willingness of parties to collaborate while maintaining their own proprietary interests at arm's length from one another.

If agreements about data storage are too difficult to reach, the data need not be stored at the central site, but merely cached and routed (via a switch) in which case the political hurdles are somewhat lower. But this simplified approach can still cause some concern among competing interests because even here there can be mistrust if parties perceive an opportunity for abuse and mis-

FIGURE 5.5 Central Clearinghouse



Source: Authors.

use of the data as they flow through the single point. Therefore, when setting out to implement a star network, it is important not only to look at its technical feasibility (it almost always is) but also at the political realities of the myriad stakeholders involved. Clearinghouses are worth pursuing, despite the difficulties, because considerable streamlining and cost savings can be achieved. For this reason information portals using star networks will likely become more common in the future.

CONCLUDING REMARKS

An HMIS offers to strategic purchasing arrangements in particular, and health insurance schemes in general, the ability to streamline business processes related to operations and finance, to standardize the quality of care provided, and to monitor clinical practice guidelines for evaluation and diagnosis. In designing, launching, operating, and maintaining any HMIS project, the following factors may affect the ability to realize the maximum potential gain. They present inherent risks, and require proactive managerial attention.

Disparate systems. Using disparate computer systems running different operating systems, database engines, and programming languages can cause and exacerbate interoperability and incompatibility issues and result in a project of greater size and complexity than needed. A larger systems perspective is required to analyze and resolve these issues as they occur.

Ease of access. An HMIS enables easy access to clinical history and other important information. It can enhance the coordination of patient care, but creates issues of user support and security, as well as patient confidentiality.

End-user acceptance. Not all systems have been able to meet end-user criteria and many have resulted in less than optimal usage, for various systems, organizational, and individual variations. The fact that a system "works" in one place is no guarantee that it will in another. The key to assure end-user acceptance appears to be that the HMIS professionals involved have an understanding of how the system will fit into the professional lives and duties of the users. Do users imagine the system as a help or as a hindrance? Do they view it as an opportunity to streamline their work or does it create "double-work" for them? Do they believe the system will enhance their professional standing and help them do a better job or does the system seem to "fight" them at every turn? The key is to ensure that, to the extent possible, data collection is integrated into clinical processes and workflows, and that it provides added value to each step of their (clinical and administrative) decision-making processes.

Knowledge base. HMIS should provide increased contact between specialists and multidisciplinary experts that should directly result in increased knowledge. As the human knowledge base exponentially grows, issues of support will also surely grow.

Management overconfidence. Management should be aware of the tendency to overstate or overemphasize achievements while understating problems. It is, however, equally detrimental to view the system too pessimistically and make purely financial decisions without considering qualitative benefits. It is important to present unbiased objective costs and benefits, both quantitative and qualitative.

Security and confidentiality issues. Transmission of patient data over the Internet and storage on computers accessible from the Internet have inherent security risks. Encryption and other techniques can lower that risk. Patient confidentiality is emerging as a significant issue around the world. For example, how does one make patient data available to appropriate providers without sacrificing the human desire for confidentiality and privacy? While many laws have been passed to address this issue (see box 5.10 above), this important issue remains largely unresolved. The balance between providing easy accessibility of information yet safeguarding patient privacy remains a vexing challenge.

Systems reliability. When people adopt a technology, they must accept the fact that no system is completely failsafe. Occasionally, what a user experiences as a lack of system reliability is, in fact, a result of human error. Computer downtime can hit users' confidence in the system, just as power outages can be frustrating. When designing an HMIS, one must always remember that it is being designed for the health care environment, which can only tolerate only the most minimum downtime.

Sustainability. Finally, the single biggest threat to success in implementing HMIS is a lack of planning for long-term sustainability. Many systems efforts have failed for lack of proper planning. Systems are, in some sense, living ideas that need constant attention, and HMIS projects are never really finished. HMIS capital costs are never fully amortized, and running costs must be appropriately

managed and budgeted for. HMIS capacity-building and retraining efforts must continue indefinitely.

Even with all these caveats and warnings, HMIS is worth building. In fact, using HMIS is really the only way to implement a modern strategic purchasing protocol. Just as one cannot run a modern airline, bank, or other commercial enterprise without computerization, so is it impossible to implement a modern health care system without it. HMIS is an integral part of today's health care environment.

ANNEX 5.1: A PRIMER ON HEALTH MANAGEMENT INFORMATION SYSTEMS

While the focus of this chapter has been the relationship between health insurance, resource allocation and purchasing, strategic purchasing, and health management information systems (HMISs), it is important to understand HMIS in a wider strategic context. A long-term perspective will be helpful in optimizing investments in HMIS and focusing on those benefits that are particularly important in a specific environment.[8]

An HMIS consists of applications in seven areas (table A5.1). These can be further categorized into systems that are related to clinical processes, financial processes, and processes improving and assuring high levels of quality.

While this discussion is necessarily brief, it does point out the richness of opportunities for implementing HMIS overall.

The health insurance and resource allocation and purchasing applications discussed in this chapter represent a small subset of systems that can help the modern health environment streamline its clinical and financial processes.

TABLE A5.1 Seven Areas of HMIS Application

	Clinically related systems
1. Patient care management	Systems that aid the clinical care management of individual patients: - Hospital information systems - Clinic information systems - Laboratory information systems - Radiology information systems - Pharmacy information systems - Electronic medical records - Computerized physician order entry - Telemedicine, teleconsultation
2. Population management	Systems that concern themselves with the clinical care of the population as a whole: - Routine surveillance systems - Signal and emergency surveillance systems - Vital statistics - Environmental control - Health indicators tracking - Health information and health education aids - Retrospective data analysis and epidemiology - Annual health statistical reporting
3. Disease state management	Systems that aid the clinical management of subpopulations of patients who are diagnosed with a particular disease and/or disease state: - Patient registries (such as cancer, diabetes, cardiovascular) - Intervention tracking systems (for example, when is the patient due for her hemoglobin A1C test?) - Case management

	Finance-related systems
4. Scarce resource management	Systems that plan, procure, and track precious health resources: - Health human resource systems (track personnel and skills) - Facilities management systems (track buildings and venues) - Biomedical equipment inventory tracking (equipment, supplies, maintenance, calibration) - Pharmaceutical inventory control systems - Central supplies inventory control - Health planning systems (such as new venues and new services)
5. Utilization management	Systems that monitor patterns in health service utilization: - Inpatient bed tracking and occupancy reporting - Outpatient visit utilization - Utilization rates (such as physicians, services, facilities)
6. Financial management	Systems that track finances: - Budgeting systems - Accounting systems (general ledger, national health accounts, payables, receivables) - Cost-accounting systems - Financial analysis systems - Health insurance finance systems
	Quality-related systems
7. Quality management	Systems that track quality indicators and concern themselves with improvement in quality of health service delivery: - Clinical guideline and protocol management - Infection control - Medical error incidence reporting - Biomedical equipment inventory tracking (equipment, supplies, maintenance, calibration) - Health outcomes measures - Patient satisfaction survey analysis - Physician profiling and report cards

What Are the Benefits from an Investment in HMIS?

Is it reasonable to expect a return on investment from these systems?

While performing cost-benefit analysis is well known in the business world, its application to issues of health is fraught with difficulties, and as a result the health industry shies away from attempting to apply reasonable care in examining these questions. These difficulties arise largely because of the difficulty of monetizing so many of the concepts in health care delivery: How much is saving a life worth? How much does preventing a post-operative infection save the purchaser (and the patient)? Other industries have been far more proactive in attempting these important, if macabre, calculations.

Benefits from implementing HMIS accrue most significantly through an identification of operational areas where efficiency has been improved. Health delivery today is still a very inefficient enterprise. It has not yet benefited from the huge productivity improvements that other industries have enjoyed as they computerized. In a positive light, this means that the industry still has the

opportunity to save huge amounts of money—and to answer the above question, cost savings can more than offset the substantial cost of the HMIS itself.

Some examples of where operational efficiency can be gleaned are:

- Reduction in waste due to mismanaged, lost, or expired pharmaceuticals
- Reduction in unnecessary, repeated, or otherwise improperly timed diagnostic testing
- Underutilization of hospital beds in some locations
- Underutilization of expensive equipment, operating theater time, etc.
- Poor scheduling of health events (such as diagnostic tests or surgery) so as to minimize the length of the overall hospital stay
- Improved health care staffing models, including better use of staff hours with less need to spend time on paperwork
- Less dependence on paper, potentially resulting in savings.

Many more such examples abound. These few simply aim to target the mind to look at operational efficiency more critically, and thus to open the opportunity to find huge cost savings in all environments. In a world where every health care dollar, yen, euro, peso, and riyal must be marshaled to provide the most efficient care possible, HMIS can be a crucial ally.

Examining the "softer" cost savings (those more difficult to quantify) that can accrue is a challenge, but it is possible. Basic improvements to the clinical environment include: integration among health care providers (or decrease in fragmentation among health care providers); software applications to aid in the clinical decision-making process; shortcuts that, with proper security, provide access to essential health data, eligibility data, and disease surveillance data; epidemiological profiling; and ad hoc reporting for clinical research purposes.

Examples of softer cost savings are:

- Improvements in patient identification—Who is the patient? Is it the correct patient?
- Reduction of medical errors—Can HMIS minimize drug-drug adverse effects?
- Reduction in medical practice variation—Physicians are far more likely to follow clinical practice guidelines if they are made available to them at the moment of clinical decision making
- Improvements in chronic care management—Did the patient follow the appropriate follow-up regimen and thus avoid an expensive intervention later?
- Improvements in referral efficiency—Can a patient be moved from one venue to another more appropriately?
- Reduction in fraud—Can "game playing" patterns be identified?

TABLE A5.2 Four Axes of Health Care Improvement

1. Access	How can access to health information, health venues, and health services be improved?
2. Equity	Is health care provision equitable? Are services available to the "right" people at the "right" time?
3. Efficiency	Where is waste? How can it be eliminated or minimized?
4. Quality	Where do procedural failures lead to reductions in quality? How can they be monitored? How can caregivers be sensitized to the negative impacts of these imperfect procedures on outcomes and costs?

This list of course addresses only some possible soft cost savings. Creating estimates of these savings can be tricky but surely cannot be ignored since soft cost savings can represent far more than one half of the potential total savings.

Besides looking at hard and soft savings in this way, another approach can help identify areas where HMIS might be most profitably applied, along four axes of health care improvement (table A5.2).

Critical Success Factors for HMIS Projects

This annex ends with a discussion of issues whose resolution, by the HMIS manager and/or the HMIS developer, is key to the success of any HMIS project. Sadly, many HMIS projects fail. Failure can often be spectacular, resulting in substantial loss of investment and time as well as dashed expectations.

The following seven key tips may help assure a project's success:

Plan for sustainability. It is not enough to budget for system procurement (or development) and for implementation costs. HMIS must be nurtured over the long term. Ongoing training will be needed as personnel enter and exit the health workforce. Hardware will need attention, including maintenance, cleaning, and upgrades. Software will constantly be upgraded as well, with virus protection, operating system fixes, and so forth.

Identify the champions. Health care's social fabric is notoriously resistant to change, but it is inevitable that HMIS will precipitate significant change. Without the identification of champions who can shepherd others, change itself can become a serious risk. Users must willingly embrace change. It cannot be forced on them, and authoritarianism is rarely successful. The users themselves must realize that the change is needed, and that it will benefit them.

Open a help desk. Another way to allay fear of change is to build a responsive help-desk facility, which can respond to the panic call "What do I do now?" If users know that there is someone who will answer their questions quickly, and non-judgmentally, they will feel more adventurous and comfortable.

Solicit users' opinions and suggestions. It is the user who has the most experience using the system. With proper probing, users often are reservoirs of good ideas and suggestions for improvement. They also know what irritates them, or what does not fit their "mental model" of the process they are performing.

Consider how best to implement HMIS—build or buy? Outsourcing is now common. Since most health agencies have little technical capacity in HMIS, it is often wise to turn over the building of the HMIS to a firm that specializes in this work, or to buy the HMIS off the shelf and then perhaps modify it. But even if the work is outsourced, it is not a good idea to delegate the oversight of the project to an outside body. An HMIS is critical, sensitive, and costly, requiring active oversight and governance.

Understand that all HMISs are not created equal. There are good ones and there are poor ones. Their attributes, such as quality, reliability, comprehensiveness, upgradability, and maintainability, vary hugely. Even good ones may not fit a given environment: that they work in one place is no assurance that they will work in another. In addition, there is not necessarily a correlation between how much an HMIS costs and how good it is. Sometimes the cheaper HMIS will be far better, given its simplicity and ease of maintenance. It is the HMIS manager's responsibility to examine the options carefully and to be assured that the HMIS is appropriate for the environment, goals, and budget.

Create an HMIS master plan. Where to start? The world is now beginning to seriously focus on the arduous process of automating its health services. HMIS projects are large and complex. Like any large construction project, a plan is needed to oversee how the whole "puzzle" will fit together. Work will no doubt span many years, different administrations, and changing priorities. It is important to have a master plan for orchestrating the HMIS-related pieces and maximizing the synergy between them.

NOTES

1. "As is" documents the current state of the system and "to be" documents the desired end-states as determined by the key stakeholders.
2. Variables are often counted and aggregated differently within a health care system, and different parts of the system are often unwilling or unable to share data.
3. A polyclinic offers expert medical treatment both general and specialized as well as possibly psychiatric, dental, and other "nonmedical" specialties.
4. Vermeulen et al. (2007) presents one example.
5. http://www.pnhp.org/facts/international_health_systems.php.
6. Current procedural terminology (CPT) is a uniform coding system for health care procedures that was developed and is copyrighted by the American Medical Association. Third-party payers have adopted the coding system that is used when submitting claims for health care. The most recently published codes are in CPT 2006. See www.ama.org.
7. It is hoped that this chapter constitutes a small step in the direction of a standardized approach.
8. This annex is a summary of a full taxonomy taken from Streveler et al. (2006). The full taxonomy is available from the lead author of this chapter.

REFERENCES

Collen, M. 1995. *A History of Medical Informatics in the United States*. American Medical Informatics Association.

FOLDOC (Free On-line Dictionary of Computing). http://foldoc.org, accessed May 2008.

Government of Bahrain. 2001. "Implementing Private Health Insurance." Chapter 5. Ministry of Health, December.

IOM (Institute of Medicine). 2001. *Crossing the Quality Chasm: A New Health System for the 21st Century.* Washington, DC.

Kohn, L. T., J. M. Corrigan, and M. S. Donaldson, ed. 2000. "To Err Is Human: Building a Safer Health Care System." Committee on Quality Healthcare in America, Institute of Medicine. National Academy Press, Washington, DC.

Leapfrog Group. 2000. "Leapfrog Patient Standards: The Potential Benefit of Universal Adoption." http://www.leapfroggroup.org, accessed July 12, 2001.

Markus, M. L., and R. Benjamin. 1997. "The Magic Bullet Theory in IT-Enabled Transformation." *Sloan Management Review* (Winter): 55–68.

O'Carroll, P. 2003. *Public Health Informatics and Information Systems*. New York: Springer-Verlag.

OECD (Organisation for Economic Co-operation and Development). 2002. *Measuring Up: Improving Health Systems Performance in OECD Countries*. Paris: OECD Publishing.

Pager, D., D. Streveler, and L. Quiroga. 2007. "The Impact of Direct Data Entry by Sensory Devices on EMR Systems, HCI2007." Paper presented at the 12th International Conference on Human-Computer Interaction, July, Beijing, China.

Preker, A., and J. Langenbrunner, ed. 2005. *Spending Wisely: Buying Health Services for the Poor*. Washington, DC: World Bank.

Preker, A., C. Baeza, M. Jakab, and J. Langenbrunner. 2000. "Resource Allocation and Purchasing (RAP): Arrangements that Benefit the Poor and Excluded Groups." RAP Concept Note. World Bank/ILO/WHO RAP Project. November.

Shortliffe, E. ed. 2006. *Biomedical Informatics: Computer Applications in Health Care and Biomedicine*. Third edition. New York: Springer-Verlag.

Southon, F., C. Sauer, and C. N. Grant. 1997. "Information Technology in Complex Health Services: Organizational Impediments to Successful Technology Transfer and Diffusion." *Journal of the American Medical Informatics Association* 4 (2): 112–24.

Streveler, D., D. Haazen, and M. Skeik. 2006. "A Taxonomy of HMIS Systems." Revision 4.

United States Department of Health and Human Services. "Summary of the HIPAA Privacy Rule." http://www.hhs.gov/ocr/privacysummary.pdf, accessed May 2008.

Vermeulen, I. et al. 2007. "Multi-agent Pareto Appointment Exchanging in Hospital Patient Scheduling." *Service Oriented Computing and Applications* 1 (3).

Weaver, L., and D. Spense. 2000. "Application of Business Case Analysis in Planning a Province-wide Telehealth Network in Alberta." *Journal of Telemedicine and Telecare* 6 (1): 87–9.

Weisbrod, B. 1991. "The Healthcare Quadrilemma: An Essay on Technological Change, Insurance, Quality of Care, and Cost Containment." *Journal of Economic Literature* 29 (2): 523–552.

World Bank. 1993. *World Development Report: Investing in Health*. Washington, DC.

———. 2004. *World Development Report: Making Services Work for Poor People*. Washington, DC.

———. 2007. "Sector Strategy for HNP." http://web.worldbankorg/hnp.

WHO (World Health Organization). 2000. *The World Health Report 2000. Health Systems: Improving Performance*. Geneva.

———. 2007. *The World Health Report 2007. A Safer Future: Global Public Health Security in the 21st Century*. Geneva.

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