



JOINT LEARNING NETWORK

For Universal Health Coverage

COSTING OF HEALTH SERVICES FOR PROVIDER PAYMENT

*A Practical Manual Based on
Country Costing Challenges,
Trade-offs, and Solutions*

TEN-STEP PLAN FOR A COSTING EXERCISE

STEP 1. ESTABLISH THE PURPOSE AND OBJECTIVES

- ✓ **FORM** a working group of representatives from all key stakeholder groups to oversee the design and implementation of the costing exercise and the use of results.
- ✓ **CONVENE** a facilitated participatory workshop to reach consensus on the purpose, objectives, and scope of the costing exercise.

STEP 2. DEFINE THE SCOPE

- ✓ **DETERMINE** the costing exercise scope—the perspective, provider types, cost objects, and cost items.
- ✓ **ENSURE** that the scope elements are appropriate for the provider payment system selected, costing exercise objectives, and time horizon of the costing exercise.

STEP 3. SELECT THE COSTING METHODOLOGY

- ✓ **DETERMINE** whether the costing exercise will have a retrospective or prospective orientation.
- ✓ **DECIDE** on the data period for the costing exercise.
- ✓ **UNDERSTAND** the advantages and disadvantages of the bottom-up and top-down costing methodologies and their trade-offs in relation to the objectives of the costing exercise, the availability of data, and the payment system.
- ✓ **SELECT** a bottom-up methodology, a top-down methodology, or a combination of the two.
- ✓ **UNDERSTAND** the techniques for cost measurement and valuation and the cost accounting process used for the selected methodology.

STEP 4. DEVELOP THE DATA MANAGEMENT PLAN

- ✓ **ESTABLISH** clear institutional arrangements, roles, and responsibilities for overseeing and implementing data collection, processing, and analysis.
- ✓ **IDENTIFY** the minimum data set required to obtain valid results, using readily available data sources.
- ✓ **REVIEW** previous costing exercises and consult with providers, health management information system experts, and other technical experts about existing data sources.
- ✓ **VISIT** provider facilities, health offices, health departments, and other locations where data may be stored to document where data are available and understand key characteristics of the data.
- ✓ **DETERMINE** the level of data disaggregation needed for the analysis.
- ✓ **DEVELOP** strategies for dealing with potential data challenges, such as inaccessible, incomplete, or inaccurate data.
- ✓ **EVALUATE** the feasibility of the data management plan given the time and budget constraints.

STEP 5. DEVELOP DATA TOOLS AND TEMPLATES

- ✓ **DEVELOP** costing instruments to guide data collection and verification.
- ✓ **CREATE** data flow diagrams, data entry templates, and dummy tables.
- ✓ **SELECT** and procure the appropriate software, materials, and equipment for data processing and analysis.
- ✓ **CONFIRM** that the data collection instruments and data processing tools provide the necessary data to populate the dummy tables, and make revisions as necessary.
- ✓ **DEVELOP** the cost accounting model for the analysis.
- ✓ **ASSESS** the staff capacity, time, and budgetary needs for data management.
- ✓ **DETERMINE** the profile of the data team, including the number of data management supervisors, enumerators, data processors, data verifiers, and analysts.
- ✓ **DEVELOP** training manuals on the data collection instruments, data entry tools, and associated processes.
- ✓ **HIRE** and train the data team.

(continued on the inside back cover)



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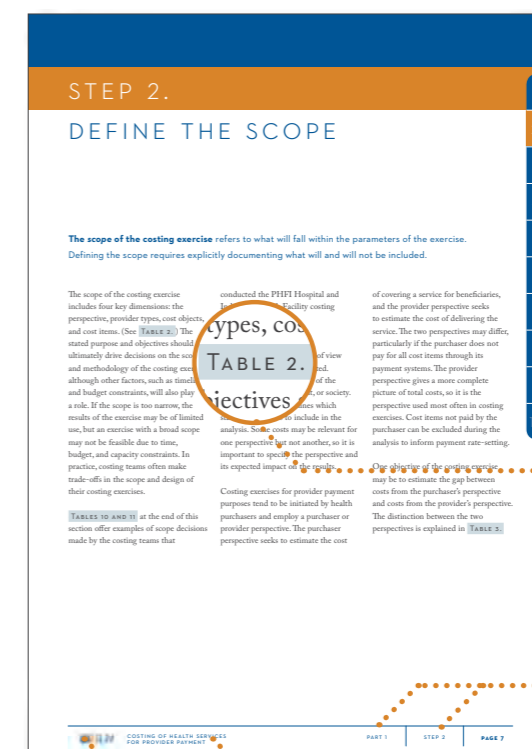
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FOREWORD

THIS IMPORTANT MANUAL represents the deep commitment of participating countries to provide quality, affordable health care to their populations through universal health coverage (UHC). It came about through the collective efforts of a highly motivated group of participants in the Joint Learning Network for Universal Health Coverage (JLN), which the Rockefeller Foundation has been proud to help organize and support since its beginnings in 2009. The JLN is part of the Rockefeller Foundation’s initiative to work with countries and global health leaders to achieve UHC. As this practical manual demonstrates, the JLN brings together an innovative community of practitioners and policymakers from low- and middle-income countries to share knowledge and learning, and to undertake joint problem solving to advance UHC. We believe that this publication is an excellent example of that effort.

The group initially articulated the need for, and the absence of, a shared understanding of how to gather, analyze, and update health services costing information within their countries for the specific purpose of health provider payment. While the theoretical principles of collecting and analyzing costing data are understood, much less information is available on the “how-to” of doing costing analysis in more challenging settings. We are very pleased to see this manual not only highlight the challenges many countries have faced but also offer ways to improve costing data so it is more accurate, updated, and complete—providing an important resource for countries when they undertake provider payment reforms. From developing shared objectives and a roadmap of activities to conducting individual costing studies in their countries, jointly

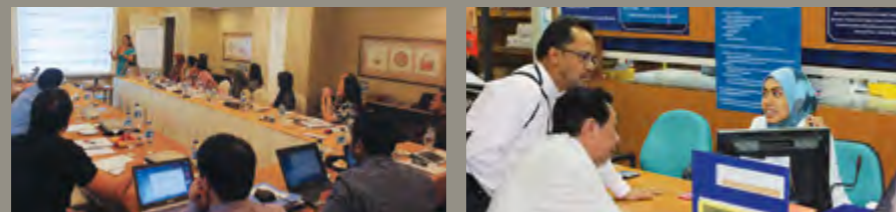
drafting the manual, and co-developing common solutions, these efforts have led to a compendium of high-quality work that can be adapted and used within many individual countries.

A number of clear lessons emerged in the process of developing this publication. First, the formation of a lateral peer-to-peer learning network is relevant to addressing the future challenges of achieving UHC in much of the world. UHC is based on national health systems reform that requires domestic policy leadership to create the appropriate institutional architecture. To support these efforts, countries can collaboratively learn from each other’s experiences to help achieve reform in a quicker, more efficient manner. Second, donors are seeing that the cost of providing even a very basic package of health benefits far exceeds what the

donors can offer in most countries. This manual provides another avenue through which donors can contribute—by facilitating joint analytical processes that lead to concrete, high-value outputs. Finally, while most low- and middle-income countries have changed dramatically over the past 60 years in terms of skills, accomplishments, and per capita income, the basic architecture for international donor assistance has changed relatively little during that time. The JLN and this costing manual reflect an effort to address this gap and move toward a model that better reflects the new realities and to leverage the embedded knowledge and experience across a wide range of countries.

STEFAN NACHUK
Associate Director
The Rockefeller Foundation

PREFACE



Photos: Joint Learning Network / Kyle Beaulieu

THE JOINT LEARNING NETWORK FOR UNIVERSAL HEALTH COVERAGE has hosted a **Collaborative on Costing of Health Services for Provider Payment (JLN Costing Collaborative)** since 2012 to provide an opportunity for countries to share experiences and solve common challenges related to costing for provider payment. Initially a modest endeavor, the forum led countries to identify a need for a resource that would bridge theory and practical experience in using costing for provider payment policy and rate-setting. To address this knowledge gap, the JLN Costing Collaborative convened a group of JLN country costing experts and international facilitators to synthesize the rich experience of JLN member countries and jointly develop a manual to document the main costing methodologies, share examples of tools and templates, and use case examples to illustrate costing efforts in low- and middle-income countries.

This manual was developed through virtual and in-person sessions over the course of 18 months. During the content development sessions, the group members shared their past and ongoing experiences in carrying out costing exercises. Through this process, they were able to draw common lessons to illustrate how options are selected, trade-offs are made, and creative solutions are found to carry out costing for provider payment policy when conditions are not ideal. Even when compromises have to be made, having

imperfect cost information to inform provider payment policy is better than the alternative, which often is having no cost information at all.

This manual goes beyond traditional guidelines on cost analysis by providing practical options to overcome real-life challenges associated with costing in low- and middle-income countries. These challenges include resource limitations, data constraints, the differing concerns of public and private providers, and weak cross-institutional

collaboration. The manual also includes tools and templates used by the authors that practitioners from other countries can adapt to their own unique contexts.

This manual is a public resource that the authors hope countries can draw on as they move toward more efficient and effective health systems. It is meant to serve as both a guide and a capacity-building tool to improve costing information and the provider payment rate-setting process.

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OTHER PARTNERS CONTRIBUTED VALUABLE TECHNICAL EXPERTISE

and created opportunities for global exchange that greatly enriched the content of the manual.

In particular, the World Bank contributed technical expertise throughout the process through its Global Practice on Health, Nutrition, and Population. The World Health Organization hosted a global forum that provided a valuable opportunity to discuss the practical lessons included in this manual in the context of current global best practices for costing of health services.

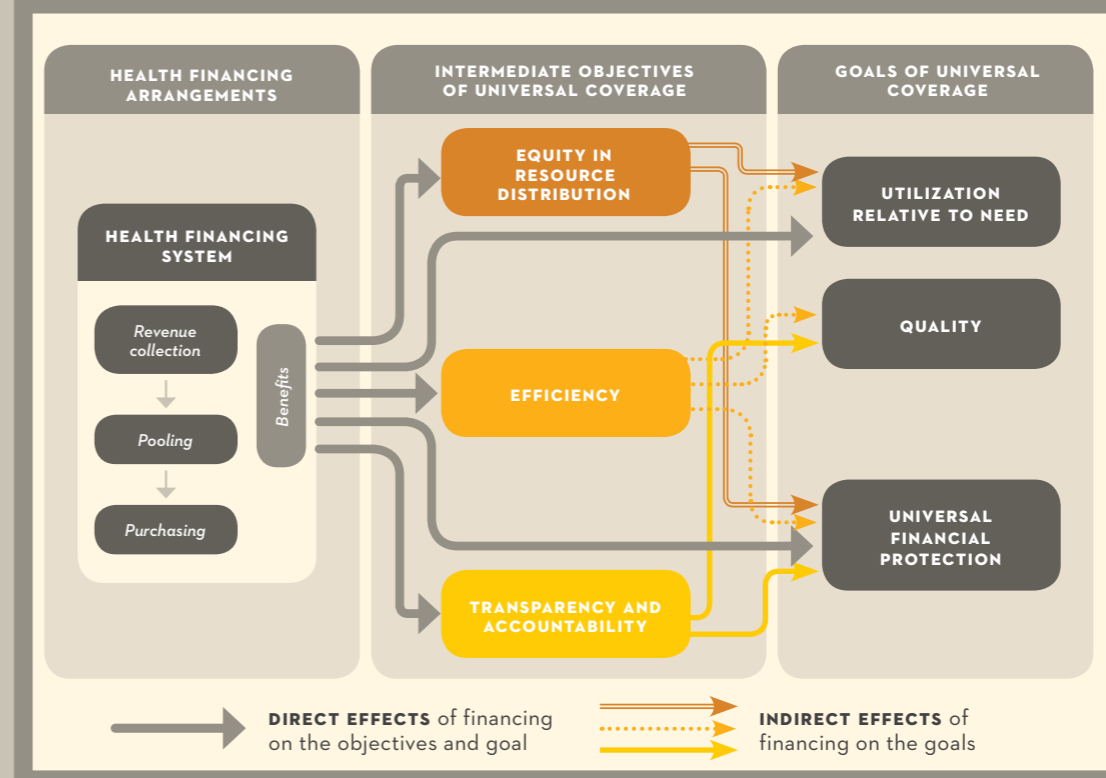
The authors wish to acknowledge many individuals from JLN countries and international partner organizations who made specific contributions during the development of the manual, including participating in content development sessions, drafting specific content on technical topics or details for country examples, and providing technical reviews of earlier drafts. (See the accompanying list of contributors.)

Finally, the authors wish to acknowledge the many policymakers, costing practitioners, and health care providers in the case example countries who conceived of and carried out the costing work that formed the basis for this manual. Their experiences and creative solutions for overcoming the many challenges of costing of health services in low- and middle-income countries have contributed to the body of practical knowledge and available tools. Better costing information for health care provider payment policy and rate-setting ultimately can help countries make better use of available resources to achieve their universal health coverage goals.

INTRODUCTION

Achieving universal health coverage—ensuring access to basic health services for an entire population without risk of financial hardship or impoverishment—is a challenge that confronts many low- and middle-income countries. To achieve and sustain universal health coverage, governments must generate resources for expanding coverage, distribute the resources equitably, and use them efficiently to achieve the most benefit in terms of meeting health care needs, ensuring quality of care, and protecting users from financial hardship due to out-of-pocket expenses. (See [FIGURE 1.](#))

FIGURE 1. Effects of Health Financing Arrangements on Universal Health Coverage



Source: Kutzin, 2013

Many countries initially focus on generating sufficient funds to achieve universal coverage, but as coverage expands, issues of financial sustainability, efficiency, and quality of care quickly emerge. Strategic health purchasing is critical to getting the most value for limited health funds. The way health purchasers (e.g., health ministries, social insurance funds, or private insurance funds) pay health care provider institutions to deliver covered services is a critical element of strategic health purchasing. These *provider payment systems* consist of payment methods and all supporting systems, such as contracting and reporting mechanisms. Implementing strategic provider payment systems is a policy priority of nearly every country that is working toward universal coverage.

In designing provider payment systems, countries face the challenge of establishing a cost basis for the rates they pay to health care providers for various services and packages of services. Many countries find that their existing health financing systems have not generated the data needed to make use of many well-established costing methodologies. Countries often turn to costing studies for this information, but most of those studies are not designed to inform provider payment policy and rates. This manual was created to fill the gap by providing step-by-step guidance on collecting and using cost information to inform provider payment policy and calculate provider payment rates.

THE PURPOSE OF THIS MANUAL

This manual is intended to equip policymakers, policy analysts, and costing practitioners in low- and middle-income countries with technical guidance and practical examples for planning and implementing a costing exercise for provider payment. It provides step-by-step instructions for designing a costing exercise, developing data collection tools, collecting and analyzing cost data, and using the results to shape provider payment policy and set payment rates.

This manual differs from other available costing resources in a few key ways:

- Many resources provide methodological guidance on costing health services, but few specifically address costing for provider payment, as this manual does.
- This manual was developed by a group of policymakers, policy analysts, and costing practitioners from seven low- and middle-income countries. Examples from their firsthand experience in costing for provider payment appear throughout the manual to illustrate how they selected options, made trade-offs, and found creative solutions in the face of real-life constraints.
- The manual's companion flash drive provides tools and templates developed and used by the authors that costing teams can tailor to their specific data collection and analysis

needs. This toolkit includes sample terms of reference for commissioning a costing exercise, sample costing instruments and models, training manuals, simulation analyses, and other resources.

This manual is not designed for research purposes or for other policy-related purposes such as cost-effectiveness analysis or costing of health benefits packages or health sector strategies.

AN OVERVIEW OF COSTING FOR PROVIDER PAYMENT

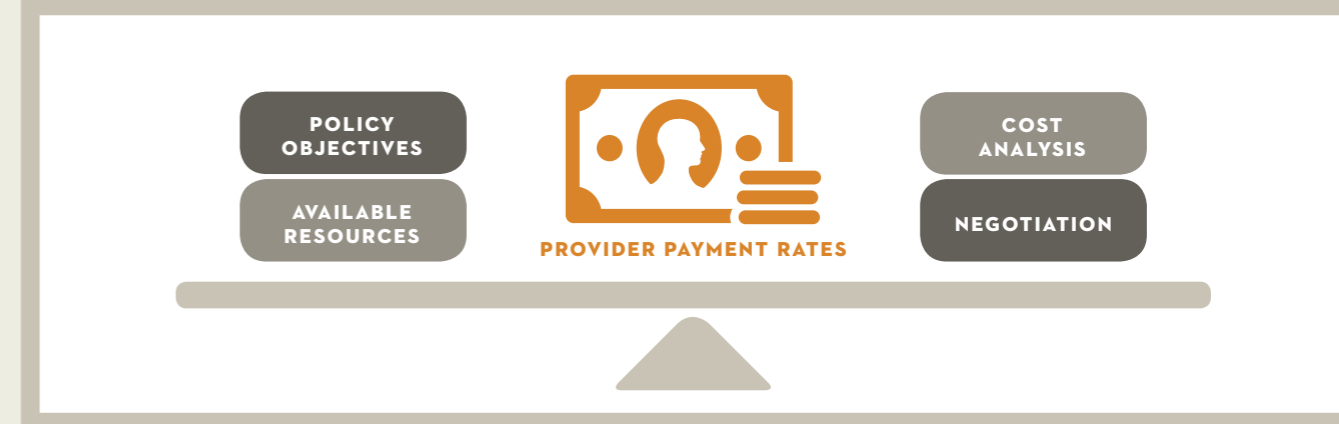
Setting provider payment rates is a balancing act for the health purchaser. The purchaser has three primary goals:

- Keeping total payments to providers within available resources
- Paying providers enough to keep them satisfied and providing good-quality services
- Creating incentives that lead providers to improve efficiency, quality, and responsiveness to patients

Payment rates depend on a mix of factors, but they are ultimately a policy decision. As illustrated in [FIGURE 11](#), payment rates are influenced by four considerations: policy objectives, available resources, the cost of delivering services, and negotiation with providers.

The methods by which providers are paid and the rates they are paid both influence provider behavior. They create economic signals, or incentives, that

FIGURE 11. Considerations in Setting Provider Payment Rates



affect provider decisions about the services they deliver, how they deliver those services, and the mix of inputs they use (such as personnel, medicines, and equipment). The right incentives can direct provider behavior toward achieving health system goals such as improving quality of care, expanding access to priority services, being more responsive to patients, and using resources more efficiently. Policymakers should therefore adopt payment methods and set payment rates so the incentives align with the key objectives of the health system.

A payment method's defining characteristic is the *unit of payment*—per service, per visit, per case, per bed-day, or per person per year.¹ Whatever the unit of payment, providers have an incentive to increase the number of units they are paid for while decreasing their

cost per unit, so they can make a profit or generate a surplus. Fee-for-service payment methods, for example, create incentives for providers to deliver more services while reducing the cost per service. Capitation methods, which pay the provider a set amount per enrollee for a defined set of services, create incentives for providers to enroll more patients while reducing their total cost per patient.

The payment rates for different services create incentives mainly through *relative prices*. Providers typically deliver more services that bring them a relatively higher profit margin—that is, services that are paid higher rates relative to the cost of delivering them.

The choice of payment method often can change the average cost of delivering services. For example, if providers are

paid a fixed rate per hospital case, they often will change their behavior to reduce their costs below the payment rate and thereby generate some profit or surplus. They will use fewer inputs per case—by reducing unnecessary tests, for example. As long as the inputs are not reduced to the point of compromising quality of care, efficiency improves. When hospitals deliver care more efficiently, the average cost per case decreases.

The objective in setting provider payment rates is therefore not simply to cover current provider costs. The cost of delivering services is not a single point that can be measured—rather, it is a function of decisions made by providers, which may result in inefficiencies. In other words, despite how the terms are often used by providers and others, there is no such thing as “real cost” or “true cost.” The cost of delivering health

¹The concept of unit of service can also apply to the input-based line-item budget payment method, in which the unit of service is the provider facility, but the term is more applicable to output-based payment methods, which are the main focus of this manual.

services does not exist in a vacuum and is affected by ongoing, real-world factors and decisions, some of which promote efficiency and some of which do not. If the purchaser uses average costs to inform payment rates, rates will reflect the current clinical practices in the health system without rewarding inefficient behavior on the part of individual providers. Providers who are able to deliver services at below-average costs may be able to benefit from being more efficient.

But sometimes the purchaser may want to set payment rates above the cost of delivering the service. For example, if increasing primary care and preventive services is a policy objective, setting payment rates above costs for those services will encourage providers to provide them more often.

TABLE I summarizes the main health provider payment methods, the incentives they create, and when the methods may be useful. For more information on how to design, build, and operate new provider payment systems, see *Design, Build, and Operate New Provider Payment Systems: How-To Manuals* (Langenbrunner, Cashin, and O'Dougherty, 2009), which discusses the advantages and disadvantages of various payment methods and includes case studies about countries that have implemented new methods.

Why Conduct a Costing Exercise for Provider Payment?

To set realistic payment rates and create the right incentives, policymakers need to understand current cost structures.

The objective of provider payment rate-setting is to establish payment rates that are adequate to cover the cost of services delivered by efficient providers, create the right incentives, and are sustainable within the health purchaser's total resource envelope.

Provider costs are not the only factor in provider rate-setting, but understanding the cost to providers of delivering various services can help ensure that they are paid adequately for priority services and are motivated to deliver them.

A costing exercise for provider payment can generate the following:

- Estimated average unit costs across providers of delivering covered services
- Relative costs to get incentives right
- Insights into cost drivers and where efficiency gains might be possible

Note that costing exercises for research have a different goal, which is to obtain accurate point estimates (or interval estimates) of unit costs. They therefore have different design considerations and typically use a slightly different approach.

A costing exercise yields calculations of unit costs—the average cost per unit of service provided. Unit costs are used to

inform base calculations of payment rates, which are then modified based on other factors (policy considerations, resource constraints, and negotiations). The unit costs are estimated based on average costs across providers.

TABLE II lists the data needed for base calculations and unit costs in the main provider payment systems used in low- and middle-income countries. We have omitted line-item budget payment systems because they are based on input costs rather than output costs.

TEN STEPS TO PLANNING AND IMPLEMENTING A COSTING EXERCISE

To ensure that a costing exercise generates the needed information, it is important to follow a clear plan. This manual describes the 10 essential steps to planning and implementing a costing exercise for provider payment. (See FIGURE III.)

Although we present the steps sequentially, in practice the process is dynamic and iterative and might look more like the one depicted in FIGURE IV, with a few linear steps followed by repeated and concurrent steps before the final step.

CASE EXAMPLES IN THIS MANUAL

This manual uses case examples from several countries to illustrate technical concepts and highlight recommendations, challenges, and lessons learned. The contributing countries are listed in TABLE III along with background information on their costing exercises.

FIGURE III. Ten-Step Plan for a Costing Exercise

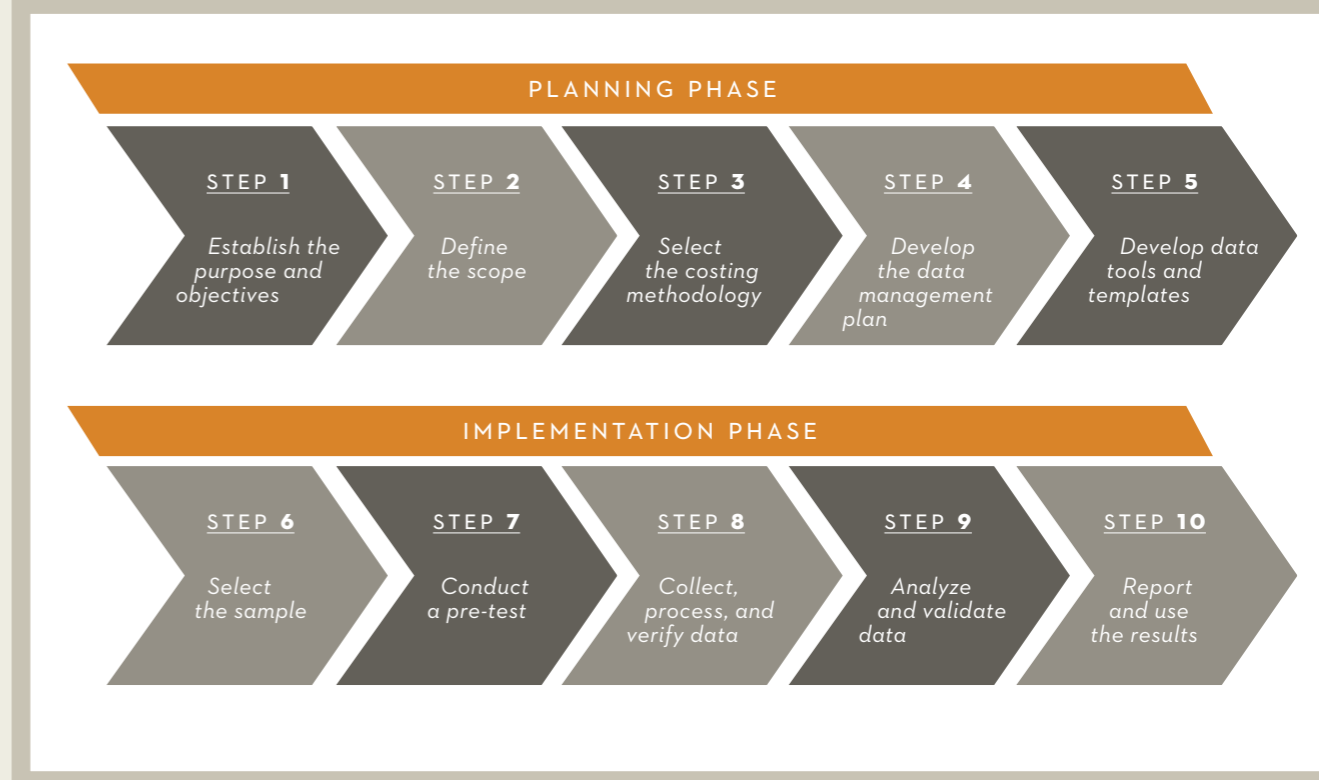


FIGURE IV. Sequence of a Typical Costing Exercise

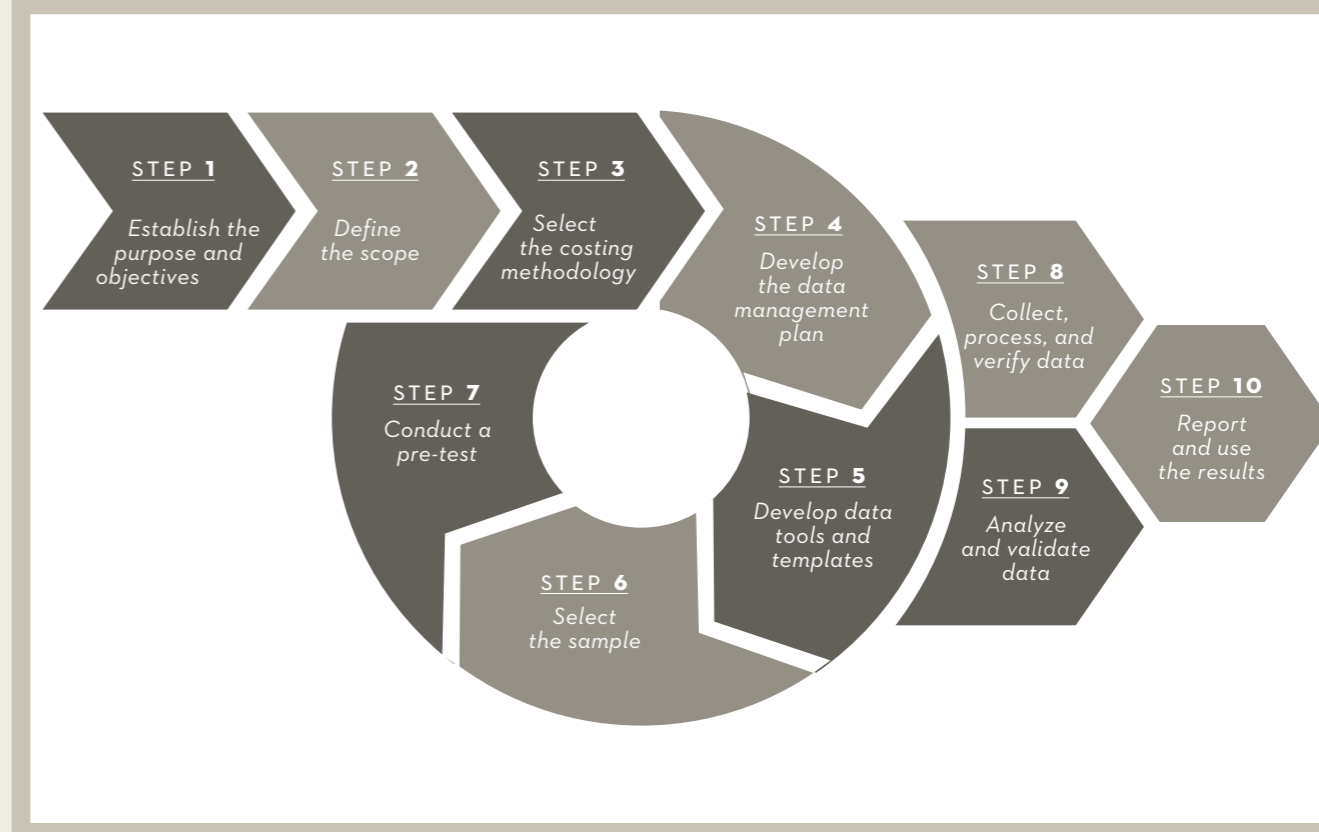


TABLE I. Provider Payment Methods and the Incentives They Create

PAYMENT METHOD	DEFINITION		INCENTIVES FOR PROVIDERS	WHEN THE METHOD MAY BE USEFUL
<i>Line-item budget</i>	Providers receive a fixed amount for a specified period to cover specific input expenses (e.g., personnel, medicines, utilities).		Under-provide services, increase referrals to other providers, increase inputs, spend all remaining funds by the end of the budget year; no incentive or mechanism to improve efficiency.	Management capacity of the purchaser and providers is low; cost control is a top priority.
<i>Global budget</i>	Providers receive a fixed amount for a specified period to cover aggregate expenditures to provide an agreed-upon set of services. Budget is flexible and not tied to line items.		Increase referrals to other providers, spend all remaining funds by the end of the budget year; mechanism exists to improve efficiency but may need to be combined with other incentives.	Management capacity of the purchaser and providers is at least moderate; competition among providers is not possible or not an objective; cost control is a top priority.
<i>Per diem</i>	Hospitals are paid a fixed amount per day for each admitted patient. The per diem rate may vary by department, patient, clinical characteristics, or other factors.		Increase the number of bed-days, which may lead to excessive admissions and lengths of hospital stays; reduce inputs per bed-day, which may improve the efficiency of the input mix.	Management capacity of the purchaser and providers is moderate; improving efficiency and increasing bed occupancy are priorities; the purchaser wants to move to output-based payment; cost control is a moderate priority.
<i>Case-based (e.g., diagnosis-related groups)</i>	Hospitals are paid a fixed amount per admission or discharge depending on the patient and clinical characteristics, which may include department of admission, diagnosis, and other factors.		Increase admissions, including to excessive levels; reduce inputs per case, which may improve the efficiency of the input mix; reduce lengths of hospital stays; shift rehabilitation care to the outpatient setting.	Management capacity of the purchaser is moderate to advanced; there is excess hospital capacity and/or use; improving efficiency is a priority; cost control is a moderate priority.
<i>Fee-for-service (fixed fee schedule)</i>	Providers are paid for each individual service provided. Fees are fixed in advance for each service or group of services.		Increase the number of services, including above the necessary level; reduce inputs per service, which may improve the efficiency of the input mix.	Increased productivity, service supply, and access are top priorities; there is a need to retain or attract more providers; cost control is a low priority.
<i>Per capita (capitation)</i>	Providers are paid a fixed amount in advance to provide a defined set of services for each enrolled individual for a fixed period of time.		Improve efficiency of the input mix, attract additional enrollees, decrease inputs, under-provide services, increase referrals to other providers, improve the output mix (focus on less expensive health promotion and prevention), attempt to select healthier (less costly) enrollees.	Management capacity of the purchaser is moderate to advanced; choice and competition are possible; strengthening primary care and cost control are top priorities; a broader strategy is in place to increase health promotion.

Source: Adapted from Langenbrunner et al., 2009

TABLE II. Calculating Payment Rates for Various Provider Payment Methods

PAYMENT METHOD	BASIS FOR PAYMENT		BASE CALCULATION	UNIT COST	DATA NEEDED TO CALCULATE PAYMENT RATES
Global budget	Fixed payment for an estimated or historical volume of services (discharges or outpatient visits)		<p>HEALTH FACILITY BUDGET = average cost per discharge x total discharges per year (for inpatient services)</p> <p>HEALTH FACILITY BUDGET = average cost per outpatient visit x total visits per year (for outpatient services)</p>	<ul style="list-style-type: none"> Average cost per discharge Average cost per outpatient visit 	<ul style="list-style-type: none"> Unit cost per discharge Unit cost per outpatient visit Total discharges per year Total outpatient visits per year
	Fixed payment for an estimated or historical volume of services, adjusted for case mix (inpatient only)		<p>HEALTH FACILITY BUDGET = average cost per discharge in each diagnosis group x total discharges in each diagnosis group per year</p> <p>(Average cost per discharge in the diagnosis group = average cost per bed-day in the department of discharge x average length of stay for the diagnosis group)</p>	<ul style="list-style-type: none"> Average cost per bed-day in each department 	<ul style="list-style-type: none"> Unit cost per bed-day in each department Typical department of discharge for each diagnosis group Average length of stay for cases in each diagnosis group Total discharges in each diagnosis group
Per diem	Variable payment per case based on length of stay for the case		<p>PAYMENT PER CASE = average cost per bed-day x length of stay for the case</p>	<ul style="list-style-type: none"> Average cost per bed-day 	<ul style="list-style-type: none"> Unit cost per bed-day
	Variable payment per case based on length of stay and department of discharge for the case		<p>PAYMENT PER CASE = average cost per bed-day in the department of discharge x length of stay for the case</p>	<ul style="list-style-type: none"> Average cost per bed-day in each department 	<ul style="list-style-type: none"> Unit cost per bed-day in each department
Case-based	Fixed payment per case in a department		<p>PAYMENT PER CASE = average cost per discharge in the department</p>	<ul style="list-style-type: none"> Average cost per discharge in each department 	<ul style="list-style-type: none"> Unit cost per discharge in each department
	Fixed payment per case in a diagnosis group		<p>PAYMENT PER CASE = average cost per discharge in the diagnosis group</p> <p>(Average cost per discharge in the diagnosis group = average cost per bed-day in the department of discharge x average length of stay for the diagnosis group)</p>	<ul style="list-style-type: none"> Average cost per bed-day in each department 	<ul style="list-style-type: none"> Unit cost per bed-day in each department Average length of stay for cases in each diagnosis group
Fee-for-service	Fixed payment for each individual service		<p>AVERAGE COST PER SERVICE</p>	<ul style="list-style-type: none"> Average cost per service 	<ul style="list-style-type: none"> Unit cost of each service on the fee schedule
	Fixed payment for a bundle of services		<p>SUM OF THE AVERAGE COST PER SERVICE for each service in the bundle of services</p>	<ul style="list-style-type: none"> Average cost per service in the bundle 	<ul style="list-style-type: none"> Unit cost of each service in each bundle of services
Per capita (capitation)	Fixed payment per enrollee per year for all services in the defined package		<p>AVERAGE COST PER ENROLLEE PER YEAR</p>	<ul style="list-style-type: none"> Average cost per service in the package 	<ul style="list-style-type: none"> Unit cost of each service in the package Utilization of each service in the package per enrollee per year

TABLE III. Case Examples Used in This Manual

	CASE EXAMPLE REFERENCE NAME	CASE EXAMPLE FULL NAME	COMMISSIONING ORGANIZATION	IMPLEMENTING ORGANIZATION	PURPOSE	OBJECTIVES	DATES	HOW THE RESULTS WERE USED
Ghana	Ghana G-DRG	Ghana G-DRG Costing	National Health Insurance Authority (NHIA)	NHIA and consultant team	To review the fee-for-service tariff system and to develop a new tariff for the National Health Insurance System (NHIS) based on diagnosis-related grouping that would be acceptable to all stakeholders.	To estimate the total costs of services irrespective of the payer (e.g., NHIA, Ministry of Health, patient, or other) or the form of ownership of the health facility to inform tariffs for each principal diagnosis that reflect the average length of stay, costs of investigations, average indirect costs, etc., based on national guidelines and protocols for management of diseases.	2007	To develop tariffs for the NHIA's G-DRG provider payment system.
India	Aarogyasri Hospital	Aarogyasri Hospital Services and Benefit Packages Costing	Aarogyasri Health Care Trust under the aegis of the Indian Ministry of Health	Costing of Services Team of Aarogyasri Health Care Trust and the School of Management Studies at Hyderabad Central University	To understand and provide evidence-based information for restructuring, repricing, budget allocation, and rationalization of payment systems for 938 Aarogyasri benefit packages.	To estimate and understand the unit costs of services and high-volume / high-value procedures in small, medium, and large hospital settings. Also to build capacity and knowledge to empower the payer (Aarogyasri) in provider payment negotiation.	2011-2012	Unit costs were used for benchmarking during provider payment negotiations. The results created awareness among policymakers about cost drivers, cost and price of services, and variances. A standard methodology was created to streamline the provider payment mechanism, including tools and templates.
	PHFI Hospital	Public Health Foundation of India Hospital Costing	Public Health Foundation of India	Public Health Foundation of India	To understand hospital costs and contribute to a general understanding of hospital cost information.	To estimate unit costs of hospital visits and discharges, procedures in the operating room, and the most frequently performed surgical procedures.	2010	To disseminate results to participating hospitals and the MOH.
Indonesia	Indonesia Casemix	Indonesia Casemix Costing	Indonesian Ministry of Health	National Casemix Center, Ministry of Health	To develop weights for diagnosis-related group (DRG) payments to hospitals first for services provided to Jamkesmas (insurance scheme for the poor) patients in 2008 and then for rollout to BPJS (scheme for the poor, civil servants, and private sector) patients in 2014.	To estimate hospital costs in order to develop the Indonesian Case Based Group (INA-CBG) tariff.	2006 (first exercise), 2010 (second exercise), 2012 (third exercise)	Results from the first and second costing exercises were used to pay hospitals that serve Jamkesmas patients. Results from the third costing exercise are being used to pay hospitals that serve BPJS patients.
	Indonesia Health Facility	Indonesia Health Facility Costing Exercise	Indonesian Ministry of Health	GIZ, Oxford Policy Management, and Gadjah Mada University	To estimate the production cost of services at primary care facilities and hospitals.	To better understand the cost of delivering services in health facilities and to examine the drivers of cost variation among providers.	2010-2011	To estimate capitated rates for health centers, to compare results with Indonesian DRG costs in hospitals, and to create awareness among policymakers about cost drivers and any implications for provider payment.
Malaysia	Malaysia COMPHEC	Malaysia Primary Health Care Costing (COMPHEC)	Malaysian Ministry of Health	Institute for Health Systems Research and Putrajaya Health Clinic, Ministry of Health	To obtain more accurate data on resource consumption in Putrajaya Health Clinic.	To estimate the cost of primary care services in a standalone IT-based health clinic.	2008-2009	To inform policymakers and stakeholders about the cost of services provided, from the perspective of the MOH.
	Malaysian DRG	Malaysian DRG Costing	Malaysian Ministry of Health	Government hospitals	To establish a national health tariff for secondary care services.	To estimate unit costs to calculate case-group weights.	2012 and 2014	To guide allocation of funds to hospitals.
	MNHA Hospital	Malaysia NHA Hospital Cost Accounting Project	Malaysian Ministry of Health	Malaysian Ministry of Health	To respond to a Malaysia National Health Accounts (NHA) and System of Health Accounts (SHA) framework requiring cost results.	To obtain average MOH hospital inpatient, outpatient, and daycare expenditures.	2002	To inform policymakers about MOH hospital spending by functional categories and to plan for provider payment reform.
Philippines	PhilHealth Case Rates	PhilHealth Case Rates	Philippine Health Insurance Corporation (PhilHealth)	PhilHealth	To shift from fee-for-service to case-based hospital payment.	To develop case payment rates for groups of procedures and medical cases.	2012	To develop the procedures and/or medical cases reimbursed by PhilHealth.
Vietnam	Vietnam Primary Care	Vietnam MOH, HMU, and HSPI Costing of Health Services at District and Commune Level	Department of Planning and Finance, Vietnamese Ministry of Health	Hanoi Medical University, Health Strategy and Policy Institute	To provide cost estimates to inform the revision of Vietnam Social Security's capitation payment system.	To estimate the costs of operating district hospitals and commune health stations, focusing on the unit cost of discharges and outpatient visits.	2012-2013	To use the historical costs of primary care services to inform capitation rate calculations.
Multiple	Central Asian Republics DRG	Central Asian Republics DRG Costing (capturing the experience of several countries)	National Ministries of Health and insurance funds	USAID-funded ZdravPlus Health Care Project	To develop weight coefficients for DRGs.	To estimate the cost of bed-days in the clinical departments of hospitals.	2008	To calculate weight coefficients for DRGs for case-based payment.

HOW THIS MANUAL IS ORGANIZED

This manual includes the following elements:

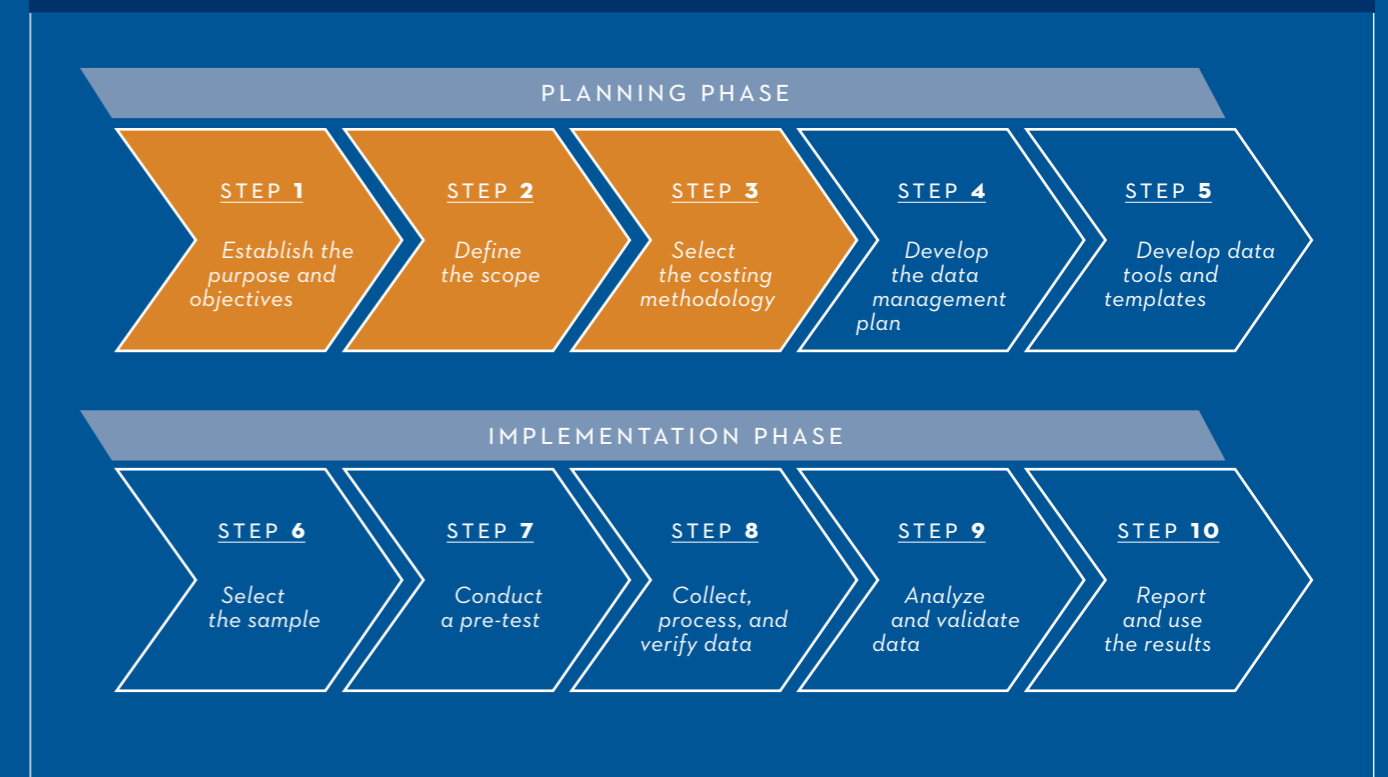


PART 1.

DEFINING THE GOALS, SCOPE, AND METHODOLOGY

PART 1 of this manual covers **Steps 1-3** of the costing exercise: establishing the purpose and objectives of the exercise, defining its scope, and selecting the costing methodology.

TEN-STEP PLAN FOR A COSTING EXERCISE



GETTING STARTED

Soon after the costing work is commissioned and before planning begins, the costing team should develop a strategy to engage key stakeholders. Involving all of the key stakeholders in the design of the costing exercise can yield better results, even though it can make the design process more complicated. Stakeholder involvement should start in the planning phase and continue through implementation, validation, and use of the results. This process can help analysts, practitioners, and providers make the most of their time and resources during implementation and help provide policymakers and purchasers with timely results in the desired format.

Several countries have found it useful to establish a working group of key stakeholders, as well as a process for periodically engaging a larger stakeholder group. Without such a working group, collaboration can be difficult because of the different institutional arrangements of the interested parties. Policymakers and purchasers typically represent health ministries and insurance institutions, while costing practitioners and analysts tend to work for universities, technical bureaus of health or finance ministries, or development partner organizations.

Providers can include public, private, and mission- or faith-based providers.

PARTICIPATORY PLANNING AND DESIGN SESSION

The key stakeholders should be involved in a participatory planning and design session to help define the purpose, objectives, and scope of the costing exercise and identify existing cost data and data gaps. The session should clarify what the costing exercise aims to achieve, establish specific objectives, and ensure that they can be communicated effectively. Analysts may need to remain

flexible as the costing exercise progresses because policy changes and new political priorities may modify the objectives. The initial session also can be used to identify the roles and responsibilities of various stakeholders in the exercise and to develop an initial work plan.

BOXES 1 AND 2 describe the participatory processes used by Vietnam and Indonesia, respectively, in designing and implementing their provider payment costing exercises.



BOX 1. A Participatory Process in Vietnam

In working toward universal health coverage, Vietnam embarked on a process to refine the provider payment systems used by Vietnam Social Security as part of the national Health Insurance Law.

One component of the provider payment reform included a costing exercise

commissioned by the Vietnamese Ministry of Health (MOH), which was intended to provide a cost basis to inform capitation payment arrangements for district hospitals and commune health stations (health centers).

Before initiating the costing exercise, the MOH convened policymakers and technical costing experts from the following institutions for a participatory planning and design session to jointly determine the purpose, objectives, and scope of the costing exercise:

- MOH Department of Health Insurance
- MOH Department of Planning and Finance
- Vietnam Social Security
- Health Strategy and Policy Institute
- Hanoi Medical University
- Provincial departments of health
- Hospitals
- Development partners

These key players participated throughout the planning and implementation phases, ultimately reviewing and accepting the costing results and contributing to discussions on their policy implications.

BOX 2. A Participatory Process in Indonesia

Responding to a request by the MOH Center for Health Policy Analysis, development partners in Indonesia designed a costing exercise to help inform a geographic budget allocation formula for providers and district health offices, set minimum service standards, and identify the drivers of cost variations among providers.

The development partners organized an inclusive design workshop attended by the following institutions:

- MOH Center for Health Policy Analysis
- MOH Bureau of Planning and Budgeting
- MOH Directorate General of Medical Services
- National Institute for Health Research and Development
- Development partners

The participatory process was intended to obtain strong commitment from all stakeholders. Although the Ministry of Finance and Ministry of Home Affairs were not directly involved in the design of the costing exercise, the research team kept these ministries informed and gained their support for data collection because they could influence local authorities and providers to participate in the project.

After the design workshop, the research team invited national authorities from related ministries and provincial authorities to the launch of the exercise and explained the main objectives of the project and the information that would be available to them after the project was completed.

Hospital directors were also invited to the project launch in order to obtain their commitment to participate in the exercise and provide data.

Based on this experience, the researchers involved stress the importance of including major stakeholders in discussions so they will understand the goals of the costing exercise. They also caution against involving too many stakeholders because the project objectives can expand uncontrollably due to competing perspectives, differing agendas, and limited understanding of the complexities of a costing exercise.



STEP 1.

ESTABLISH THE PURPOSE AND OBJECTIVES

The purpose of the costing exercise is the overarching policy reason for conducting the exercise; the objectives are what the exercise specifically aims to produce to inform policy.

The process of setting the purpose and objectives presents an opportunity to align all of the interested stakeholders. The policymakers and purchasers who are commissioning the exercise need to understand how cost information can inform provider payment policy, and they need to know and communicate the type and format of the results they require. Analysts, practitioners, and providers need to know how the results will meet broader policy and programmatic needs.

Even when the main purpose of the costing exercise is to inform provider payment policy and rate-setting, countries often have multiple objectives, some directly related to provider payment and others related more generally to planning and management. **TABLE 1** lists some typical objectives for conducting a health services costing exercise.

Key questions to guide the objective-setting effort include:

- What is the purpose of the costing exercise?
- What information already exists to inform the costing exercise?
- What new information are we seeking and why?
- What are the barriers to obtaining information?
- What are the political and stakeholder dynamics?
- How will we use the information for provider payment reform?

TABLE 1. Typical Costing Exercise Objectives

COSTING EXERCISE PURPOSE	TYPICAL OBJECTIVES
<i>Planning and Budgeting</i>	<ul style="list-style-type: none"> • Assess resource requirements and project future costs of strategic health sector plans for policy, management, and budgeting purposes • Estimate costs of expanding health coverage or providing a set of benefits in the context of universal health coverage
<i>Setting Provider Payment Rates</i>	<ul style="list-style-type: none"> • Provide a cost basis for the health services paid through a provider payment system • Inform coverage decisions and payment policies • Compare costs with payment rates • Inform contract negotiations between providers and purchasers and guide monitoring and reevaluation of contracts • Set performance-based financing arrangements
<i>Improving Provider Internal Management and Performance</i>	<ul style="list-style-type: none"> • Compare costs and performance of different departments or services within facilities • Establish standards and benchmarks to increase accountability • Inform decisions about operations or infrastructure investments • Provide data for informed decision making to improve management and provider operations

CHECKLIST

STEP 1: ESTABLISH THE PURPOSE AND OBJECTIVES

- ✓ **FORM** a working group of representatives from all key stakeholder groups to oversee the design and implementation of the costing exercise and the use of results.
- ✓ **CONVENE** a facilitated participatory workshop to reach consensus on the purpose, objectives, and scope of the costing exercise.

RESOURCES

Finkler, Steven A., David M. Ward, and Judith J. Baker. *Essentials of Cost Accounting for Health Care Organizations*. 3rd ed. Sudbury, MA: Jones and Bartlett Publishers, 2007.

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Mogyorosy, Zsolt, and Peter Smith. "The Main Methodological Issues in Costing Health Care Services: A Literature Review." *CHE Research Paper 7*. York, UK: University of York Centre for Health Economics, 2005.

Newbrander, William C., and Elizabeth Lewis. *HOSPICAL: A Tool for Allocating Hospital Costs. User's Guide*, version 3.1. Boston, MA: Management Sciences for Health, 2001.

LESSONS LEARNED

"Recognize that the costing exercise is an intermediate step; it is one of many important inputs to payment system development."

"ANALYZE THE FEASIBILITY OF CONDUCTING THE WORK. IF IT IS NOT FEASIBLE, YOU MIGHT WANT TO ABANDON OR COMPROMISE SOME ASPECTS OF THE COSTING EXERCISE."

"Researchers should consult with all the stakeholders while setting objectives, and the stakeholders should review and accept the objectives."

"WHEN SETTING YOUR OBJECTIVES, UNDERSTAND THE LIMITATIONS OF YOUR COSTING EXERCISE, THE AVAILABILITY OF DATA, AND THE FEASIBILITY OF DATA COLLECTION."

"Knowledge of the political situation is important during objective setting to establish a clear direction and an enabling environment for the study."

STEP 2.

DEFINE THE SCOPE

The **scope of the costing exercise** refers to what will fall within the parameters of the exercise. Defining the scope requires explicitly documenting what will and will not be included.

The scope of the costing exercise includes four key dimensions: the perspective, provider types, cost objects, and cost items. (See **TABLE 2.**) The stated purpose and objectives should ultimately drive decisions on the scope and methodology of the costing exercise, although other factors, such as timeline and budget constraints, will also play a role. If the scope is too narrow, the results of the exercise may be of limited use, but an exercise with a broad scope may not be feasible due to time, budget, and capacity constraints. In practice, costing teams often make trade-offs in the scope and design of their costing exercises.

TABLES 10 AND 11 at the end of this section offer examples of scope decisions made by the costing teams that

conducted the PHFI Hospital and Indonesia Health Facility costing exercises.

PERSPECTIVE

The perspective is the point of view from which costs are estimated. The perspective can be that of the purchaser, provider, patient, or society. The perspective determines which stakeholders' costs to include in the analysis. Some costs may be relevant for one perspective but not another, so it is important to specify the perspective and its expected impact on the results.

Costing exercises for provider payment purposes tend to be initiated by health purchasers and employ a purchaser or provider perspective. The purchaser perspective seeks to estimate the cost

of covering a service for beneficiaries, and the provider perspective seeks to estimate the cost of delivering the service. The two perspectives may differ, particularly if the purchaser does not pay for all cost items through its payment systems. The provider perspective gives a more complete picture of total costs, so it is the perspective used most often in costing exercises. Cost items not paid by the purchaser can be excluded during the analysis to inform payment rate-setting.

One objective of the costing exercise may be to estimate the gap between costs from the purchaser's perspective and costs from the provider's perspective. The distinction between the two perspectives is explained in **TABLE 3.**

TABLE 2. Key Dimensions of Scope

DIMENSION	DEFINITION	ELEMENTS
<i>Perspective</i>	The point of view from which costs will be measured	<ul style="list-style-type: none"> • Purchaser • Provider • Patient • Society
<i>Provider Type</i>	The health facilities that will be included	<p>OWNERSHIP:</p> <ul style="list-style-type: none"> • Public – government • Public – corporate • Private – not-for-profit • Private receiving government subsidies (e.g., faith-based) • Private – for-profit <p>FACILITY TYPE:</p> <ul style="list-style-type: none"> • Clinic • Hospital • Specialty facility <p>LEVEL OF SERVICE:</p> <ul style="list-style-type: none"> • Primary • Secondary • Tertiary <p>SIZE:</p> <ul style="list-style-type: none"> • Bed size (hospital) • Personnel (clinic) • Workload (clinic)
<i>Cost Objects</i>	The entity or entities whose cost will be determined	<ul style="list-style-type: none"> • Organization • Department/specialty • Service • Patient
<i>Cost Items</i>	The inputs, or resources, to which costs will be attached	<p>RECURRENT COST ITEMS:</p> <ul style="list-style-type: none"> • Personnel • Drugs/medical supplies • Utilities • Other recurrent costs <p>CAPITAL COST ITEMS:</p> <ul style="list-style-type: none"> • Building • Medical equipment • Non-medical equipment

TABLE 3. Purchaser Perspective vs. Provider Perspective

PURCHASER PERSPECTIVE	PROVIDER PERSPECTIVE
<p>OBJECTIVE: TO DETERMINE COSTS INCURRED TO COVER A SERVICE</p> <p>This perspective is useful for establishing payment rates for providers. The results can also help improve purchasing practices and management of care across providers to maximize health outcomes within a budget.</p> <p>This perspective is not concerned with costs that are not paid by the purchaser (such as salaries in some social health insurance systems, capital in some cases, donated drugs, or land).</p>	<p>OBJECTIVE: TO DETERMINE COSTS INCURRED TO DELIVER A SERVICE</p> <p>This perspective is concerned with all costs related to delivering services regardless of whether (or how) they are paid by purchasers.</p> <p>This perspective is useful for informing payment rate negotiations with purchasers, estimating gaps between costs and payment rates, informing cost-sharing rates, and improving technical efficiency (i.e., ensuring an effective mix of inputs to provide a service).</p>

Health services costing also can be performed from a patient or societal perspective. A patient perspective is concerned with patient out-of-pocket spending on health care services. If it is a priority to expand coverage to reduce out-of-pocket spending, it may be useful to understand costs from the patient perspective. For example, if a purchaser plans to include currently uncovered medicines in the benefits package, information about patient spending on medicines can help determine how much additional budget the purchaser would need in order to cover these costs.

A costing exercise from a patient perspective also can help inform population cost-sharing rates (formal

copayments or user fees). And it can be used to capture non-health-related costs associated with obtaining health services, such as travel and caretaker expenses or even lost wages due to illness. Cost measurement from this perspective can be challenging, however, because household or facility exit surveys are the primary means of collecting information from patients. It is important to weigh the benefits of obtaining this additional information against the costs of data collection.

A costing exercise from a societal perspective analyzes the costs to society as a whole—including the health sector and other sectors—rather than only for the purchasers, providers,

or patients directly involved. Often used in economic evaluation or cost-effectiveness and cost-benefit analyses, a societal perspective requires more extensive data collection and analysis and is typically broader than what is needed to determine provider payment rates.

Some costing exercises adopt multiple perspectives and measure costs by funding source and expenditure type to permit analysis for different stakeholders (e.g., public purchaser, private purchaser, provider, donor, patient, and so on).

TABLE 4 shows the perspectives adopted by the costing exercise case examples, along with some background on their policy objectives and purpose.

TABLE 4. Costing Exercise Perspectives

CASE EXAMPLE	POLICY OBJECTIVE	COSTING EXERCISE PURPOSE	COMMISSIONING ORGANIZATION	PERSPECTIVE
<i>Aarogyasri Hospital</i>	To provide evidence-based information to set rates for 938 new benefit packages and rationalize prices of previously developed packages.	To estimate the cost of new benefit packages and to understand costs of current packages to rationalize prices through negotiation with providers.	Aarogyasri Health Care Trust	Purchaser and provider
<i>Indonesia Casemix</i>	To contain escalating costs , turn around hospitals in debt, and improve the quality of hospital services for Jamkesmas patients by transitioning from fee-for-service to case-based (INA-CBG) payment.	To estimate the cost of health services and construct cost weights for the case-based (case mix) hospital payment system under construction.	National Casemix Center, Indonesian Ministry of Health	Purchaser and provider
<i>Indonesia Health Facility</i>	To provide evidence-based information for developing primary care and hospital payment systems.	To estimate the production cost of services at primary care facilities and hospitals, as well as the drivers of cost variations among providers.	Indonesian Ministry of Health	Provider and patient
<i>Central Asian Republics DRG</i>	To move from an input-based payment method to an output- or performance-based payment method without putting the health budget at risk.	To determine the cost of bed-days in cost centers or revenue departments in order to define DRG weight coefficients.	National Ministries of Health	Purchaser
<i>Malaysian DRG</i>	To inform a global budget system with case mix adjustment.	To assess the cost incurred to deliver health services in government hospitals and estimate budget requirements.	Malaysian Ministry of Health	Purchaser
<i>PhilHealth Case Rates</i>	To shift from a fee-for-service payment method to a case-based payment method.	To estimate the cost of health services and specific disease categories.	Philippine Health Insurance Corporation (PhilHealth)	Purchaser, provider, and patient (member)
<i>Vietnam Primary Care</i>	To inform calculations of capitated rates for primary care services to reform health financing policies, including revising the Health Insurance Law.	To estimate the unit cost of discharges, bed-days, and outpatient visits for both insured and uninsured patients.	Department of Planning and Finance and Department of Health Insurance, Vietnamese Ministry of Health	Purchaser and provider

PROVIDER TYPE

The provider type dimension of scope identifies the categories of providers that will be included in the exercise in terms of ownership status, facility type, level of service, and size.

The costing exercise should include a representative selection of facilities. Ideally, all provider types that will

be paid through the payment system should be included in the exercise. For example, a costing exercise that is intended to inform a per capita payment system should include any type of primary care provider that will be paid through the system. This might include government health centers, private clinics, and outpatient departments of district hospitals (but not referral

hospitals). Furthermore, if a purchaser is planning a phased approach whereby the system pays public providers initially and includes private providers at a later point, it is acceptable to exclude private providers from the initial costing exercise. However, a follow-up costing exercise that includes private providers should be conducted closer to when the system will expand.

The unique context of the country and the payment system will ultimately dictate which provider types are included in the costing exercise.

TABLE 5 shows the provider types included in some of the case examples, along with the rationale for inclusions and exclusions.

COST OBJECTS

The cost object dimension of scope refers to the entity or entities for which unit costs will be estimated. The cost object typically corresponds to the level at which cost data can be collected: organization, department/specialty, service, or patient. In practice, the cost object must match the organizational

structure of providers, and the choice of cost object is affected by whether the cost objects across providers are comparable so a fair unit cost comparison can be made. For example, if the cost object is the department/specialty, the clinical and operational profile of a department at one hospital may differ from that of the same department at another hospital.

TABLE 5. Costing Exercise Provider Types

CASE EXAMPLE	PROVIDER TYPES INCLUDED		RATIONALE FOR INCLUSIONS AND EXCLUSIONS
<i>Aarogyasri Hospital</i>	<ul style="list-style-type: none"> Private for-profit and private not-for-profit facilities Hospitals with specialty and super-specialty facilities (e.g., cardiothoracic surgery, pediatric surgery, ENT general surgery) Secondary and tertiary levels 		<ul style="list-style-type: none"> Included private providers in the costing exercise because they complained about low reimbursement rates.
<i>Indonesia Casemix</i>	<p>FIRST COSTING EXERCISE:</p> <ul style="list-style-type: none"> Public hospitals (MOH-owned) Tertiary level <p>SECOND COSTING EXERCISE:</p> <ul style="list-style-type: none"> Public hospitals (MOH-owned and independent) and specialty hospitals Primary, secondary, and tertiary levels <p>THIRD COSTING EXERCISE:</p> <ul style="list-style-type: none"> Public, private, and specialty hospitals Primary, secondary, and tertiary levels 		<ul style="list-style-type: none"> Included only MOH-owned hospitals in the first exercise due to easy access, feasibility, and availability of data as a result of the purchaser's direct management relationship. Expanded hospital scope in the second exercise to include all public hospitals that serviced the Jamkesmas insurance scheme. Included private hospitals in the third exercise so DRG payments could be implemented at those facilities.
<i>Indonesia Health Facility</i>	<ul style="list-style-type: none"> Public government primary care clinics Public and private hospitals Primary, secondary, and tertiary levels 		<ul style="list-style-type: none"> Included all facilities except private primary care clinics due to difficulties in accessing the sampling frame. Included clinics and hospitals from all levels except specialty hospitals because they had different operating characteristics and were not comparable to the other hospitals sampled.
<i>Central Asian Republics DRG</i>	<ul style="list-style-type: none"> Public hospitals Secondary level 		<ul style="list-style-type: none"> Included only public facilities because most hospitals are public and private providers are rare in the Central Asian Republics. Included only secondary-level hospitals because they offered the greatest variety of services, were typically the most efficient providers, and the reform objective was to reduce excess capacity and integrate specialty hospitals into general hospitals.
<i>Malaysian DRG</i>	<ul style="list-style-type: none"> Public hospitals Primary, secondary, and tertiary levels 		<ul style="list-style-type: none"> Included only public hospitals to test case-based payments and ensure that measurements of resource use and cost accurately reflected the services provided before expanding to private facilities. Included all MOH hospital levels but not teaching facilities, to test case-based payments in non-teaching facilities before expanding to teaching facilities.
<i>PhilHealth Case Rates</i>	<ul style="list-style-type: none"> Public, private for-profit, and private not-for-profit facilities Clinics, hospitals, and specialty facilities (maternity clinics, ambulatory surgical clinics, and other specialty clinics) Primary, secondary, and tertiary levels 		<ul style="list-style-type: none"> Included all facilities licensed and accredited by PhilHealth.

Similarly, a diabetes checkup at one clinic may differ significantly from that at another clinic. To determine whether cost objects are comparable, costing teams should consider the following factors:

- Institutional arrangements
- Facility ownership (public/private) and tax ramifications
- Organizational structure and administration
- Financial/payment systems
- Scope of services

- Clinical service content
- Setting
- Patient case mix
- Standards/treatment protocols
- Legal and compliance environment
- Quality
- Other unique characteristics

Organization as the Cost Object

The organization is the appropriate cost object when disaggregated data for the types of cases treated within

facilities are not available. In this case, estimating unit costs at the organization level is typically the best medium-term option until more extensive utilization data are available for departmental or service costing. The organization is also a suitable cost object when providers are paid at the same rate for all cases, regardless of differences in clinical or patient characteristics. **Box 3** describes MNHA Hospital's use of the organization as the cost object.

BOX 3. Organization as the Cost Object: MNHA Hospital

Responding to a System of Health Accounts requirement, the Malaysian MOH needed to disaggregate the National Health Accounts spending data into hospital inpatient, outpatient, and daycare expenditures.

The costing team initially relied on organization-level expenditure data, but the format of the available data did not permit an analysis of spending by inpatient, outpatient, and daycare services. To calculate the cost of hospital discharges, outpatient visits, and daycare

visits, the team collected data using provider questionnaires and estimated the proportion of organization-level expenditure by departments.

Calculating unit costs at the organization level is simple because the only data required are total facility costs and total units of service. For health center costing for primary care payment, the organization cost object is typically adequate because the units of service are relatively standard. However, for hospitals and some health centers that provide different types of services, it is important to separate total facility costs into the relevant portions for inpatient, outpatient, and other services, and to separate them further by department. Cost data may not be sufficiently subdivided to permit this type of analysis without costing at the department level (described next).

Department/Specialty as the Cost Object

A department/specialty cost object generates unit costs for divisions within facilities that either admit or discharge patients in an inpatient setting (such as an OB/GYN department) or treat patients in an outpatient setting (such as an outpatient hospital clinic). Data at this level of disaggregation are often relatively feasible to collect. Calculations of unit costs at the department/specialty level are required for payment methods that pay providers at different rates for patients seen in different departments or

specialties. **Box 4** describes the Central Asian Republics DRG's use of the department/specialty as the cost object.

The department/specialty cost object is typically limited to hospital costing because the exercise requires tracking of utilization and some expenditure data by department or specialty. Health centers often have no clear organizational structure to facilitate this type of analysis. However, this cost object can be used for specialty outpatient clinics that use department-based data tracking. The unit costs obtained through this level of costing are best used to inform case-based, per diem, or global budget payment systems, through either department-based or diagnosis-based group payments. The requirements for cost data are the same for department-based and diagnosis-based payment methods. The primary difference between costing for the two payment methods is that diagnosis-based methods require more extensive disaggregation of utilization data.

Service as the Cost Object

A service cost object generates costs for each individual service or package of services provided. Examples of individual services include cesarean section, cataract surgery, blood test, chest

X-ray, and vaccine injection. Examples of packages of services include laboratory tests, internal medicine bed-days, and coronary bypass surgery together with all diagnostic tests. The cost of a package of services, such as a generic laboratory test package, is the sum of the unit costs of the individual services, such as blood tests and urine tests.

A service cost object is used when the payment method pays providers at different rates for individual services or predefined bundles of services. This cost object is typically best for setting fee schedules because total facility costs are not captured and often only a subset of all services is coded. **Box 5** describes the use of the service cost object in a costing exercise completed by the Vietnamese MOH.

Patient as the Cost Object

A patient cost object is used to determine the cost of all services provided to a patient with particular characteristics (e.g., a specific diagnosis). All services delivered to patients in a particular category are aggregated to calculate an average cost per patient in that category. The costing exercise might also include the cost of individual services over a series of patient visits to arrive at a treatment cost for an entire

Box 4. Department/Specialty as the Cost Object: Central Asian Republics DRG

Most of the case examples in this manual use the department/specialty as the cost object. The Central Asian Republics DRG selected these departments:

ADMINISTRATIVE DEPARTMENTS:
Finance & Procurement
Laundry
Kitchen
Transport
Security
Other
Administrative

ANCILLARY DEPARTMENTS:
Pharmacy
Imaging
Laboratories
Physiotherapy
Operating Theater
Emergency Care
Admission

CLINICAL INPATIENT DEPARTMENTS:
Intensive Care
Surgery
Ophthalmology
Therapy (Internal Medicine)
Gynecology
Neonatal
Maternity
Mental Health

Dental
Pediatric
Infectious Diseases
Delivery
Otolaryngology (ENT)

CLINICAL OUTPATIENT DEPARTMENTS:
Outpatient

Box 5. Service as the Cost Object: Vietnam Fee-for-Service Costing

The Vietnam MOH initiated a costing exercise to determine the cost per service in the fee schedule. (This effort is different from the Vietnam Primary Care case example.) Government hospitals were asked to complete a questionnaire to

estimate the cost of more than 700 individual services, including the cost of drugs/medical supplies, utilities, repairs/maintenance, and other recurrent costs associated with each service. Services ranged from a simple urine pH test to PET/CT imaging diagnosis to heart

surgery. The data from this survey, along with consumption norms, were used to establish a standard fee schedule.



episode of care. The average cost per patient of a particular type can be useful for calculating adjustments that may be applied to payment rates, such as age/sex adjustments to capitation rates (see Step 10 in Part 3). **Box 6** describes the Malaysia COMPHEC costing team's use of the patient as the cost object.

COST ITEMS

The cost items dimension of scope defines which costs to include in the costing exercise.

The costing exercise should include all costs that are relevant to the payment system or that may become relevant within the time horizon covered by the exercise. The costing exercise purpose and perspective will help determine which costs are relevant to measure. Any costs unrelated to the provider payment system will be less relevant to the costing exercise, but they may be important to include to determine the full cost of delivering services.

The first decision regarding cost items is whether to include both capital costs

and recurrent costs. These cost categories are defined in **Box 7**.

Most countries include both capital and recurrent costs in their costing exercises, even if capital costs will not be paid through the provider payment system. Including capital costs provides a more complete facility cost profile and permits more flexible analyses. However, some countries opt to exclude capital costs because the data can be difficult to collect and analyze and because they will not be a factor in provider payment rates over the time horizon covered by the costing exercise.

Box 6. Patient as the Cost Object: Malaysia COMPHEC

The Malaysia Putrajaya Health Clinic initiated a costing exercise to determine the cost per visit for patients with specific conditions within a patient care setting that uses electronic medical records.

The team developed a costing template for each service at the clinic, covering the cost of personnel, drugs, medical and non-medical consumables, and equipment and devices. The team calculated the cost of 310 separate services that were grouped into 11 visit

categories. They added up the costs of services in each category to arrive at an average cost per patient visit for each of the 11 categories.

The visit categories included:

- Acute upper respiratory tract infection
- Pregnancy examination and test
- Routine child health examination

- Essential (primary) hypertension
- Non-insulin-dependent diabetes mellitus
- Dental exam
- Fever
- Dental caries
- Contraceptive management
- Nail avulsion
- Dengue rapid test



TABLE 6. Cost Categories and Cost Item Examples

COST CATEGORY	COST ITEM EXAMPLES
Recurrent Cost	
<p>PERSONNEL: The cost of all wages paid to permanent, contract, and temporary personnel. May also include local proxy wages for donated, volunteer, or free labor.</p>	<ul style="list-style-type: none"> Salaries Benefits and allowances (housing, family, location, hazard, etc.) Overtime Fees (consulting, etc.) Incentives and bonuses Payroll taxes
<p>DRUGS/MEDICAL SUPPLIES: The cost of all drugs and medical consumables used in direct and ancillary (paraclinical) patient care.</p>	<ul style="list-style-type: none"> Drugs (medicines/pharmaceuticals) Medical supplies/consumables Surgical supplies/consumables Diagnostic supplies/consumables Vaccines Oxygen and medical gases Blood products
<p>UTILITIES: The cost of utilities consumed by the facility.</p>	<ul style="list-style-type: none"> Electricity Water Generator fuel Heat Air conditioning
<p>OTHER RECURRENT: The cost of all other recurrent inputs that cannot be classified as personnel, drugs/medical supplies, or utility costs.</p>	<ul style="list-style-type: none"> General administrative (printing, official entertainment, advertising, etc.) Stationery/office supplies Housekeeping supplies Other non-medical supplies/consumables (uniforms, linens, etc.) Fuel, oil, and other lubricants Telecommunications (telephone, Internet) Patient/staff food Minor repairs/maintenance Travel Training Outsourced services Rent
Capital Cost	
<p>BUILDING: Total building depreciation costs.</p>	<ul style="list-style-type: none"> Building construction Building renovation
<p>MEDICAL EQUIPMENT: Total medical asset depreciation costs.</p>	<ul style="list-style-type: none"> Medical equipment Surgical equipment Diagnostic equipment
<p>NON-MEDICAL EQUIPMENT: Total non-medical asset depreciation costs.</p>	<ul style="list-style-type: none"> Office equipment Furniture Computers Software Air conditioners Generators Vehicles (ambulances, trucks, motorcycles)

BOX 7. Capital Costs vs. Recurrent Costs

Costs are classified as either capital or recurrent, depending on the working life of the inputs needed to perform an activity.

Capital costs are the costs of assets that have a working life of one year or longer. Buildings, medical equipment, computers, air conditioners, vehicles, and furniture are examples of capital assets. Countries establish a reasonable, common-sense floor, or threshold, above

which an item can be considered a capital asset. For example, a paper clip has a working life beyond one year, but inventorying thousands of paper clips would not be reasonable. The cost of capital items is determined by estimating their depreciation, as explained in Part 2 of this manual. The threshold cost varies by country and is typically established by Ministry of Finance regulations. For example, Malaysia has set the floor amount at 1,000 Ringgit Malaysia (about US\$325).

Recurrent costs, also called *operating costs*, apply to resources that are consumed within one year or have a working life of less than one year and must be regularly replaced. Salaries, medicines, and electricity are examples of recurrent cost items. Any items not consumed within one year but with prices below the floor price are also considered recurrent cost items.

TABLE 7. Cost Item Inclusion Criteria

INCLUSION CRITERIA	CONSIDERATIONS
Time Horizon	Include cost items that will be paid through the payment system in the country's policy time horizon or over the time horizon in which cost estimates are expected to be valid.
Country Context	Include cost items based on their relevance to a particular country context. (For example, the cost of land, research and development, and donor-funded training may be relevant in some contexts but not others.)
Provider Consultation	Include cost items that providers believe should be included. (For example, if a costing exercise is from a purchaser perspective only, providers may suggest including additional cost items that they consider relevant.)
Private-Sector Consultation	Include cost items that may be more relevant to private providers , such as the cost of capital or information technology investments. Also ensure that the budget categories and definitions are comparable across public and private providers.
Cost Contribution	Include cost items that are expected to have the greatest impact on total cost.
Data Availability	Include cost items for which data are readily available , accessible, and preferably automated (or determine whether innovative retrieval methods can supply data for important cost items).
Implementation Feasibility	Include cost items that can be measured and valued within the required costing exercise timeline and budget constraints.
Technical Team Capacity	Include cost items that the technical team has sufficient capacity to measure and value through data collection and analysis.

The second decision regarding cost items is which cost items to measure within the capital cost and recurrent cost categories. TABLE 6 offers examples of items that fall within these categories.

Costing teams usually classify costs using the standard set of budget categories that the providers use for accounting and reporting purposes. The set of public-sector budget categories—also known as *economic classifications* or a *chart of accounts*—is usually determined by the finance ministry for all sectors in the country. For example, the Malaysian MOH uses the following budget categories: Salary, Services and Supplies, Assets, Grants and Fixed Charges, Building, and Land. A crosswalk may be needed to map the definitions of budget categories to ensure that they are comparable across public and private providers.

To calculate the full cost of services, a good starting point is to include all cost items across different revenue sources and then remove costs items as appropriate. This can be difficult to do in practice, however. TABLE 7 offers some criteria to help decide which cost items to include or exclude.

If feasible, it is best to include all costs that eventually will be covered by the payment system. Some payment systems will have a phased rollout in which cost coverage will later increase. For example, a public purchaser may be inclined to exclude health worker salaries from the costing exercise because this cost item will continue to be paid directly from the general budget at the time of the exercise launch. Or the purchaser may exclude the cost of drugs provided by vertical programs because they are financed outside the payment system.

However, if the purchaser may become responsible for some salary costs later on or if the sustainability of vertical programs is a concern and drug costs eventually may be subsumed within the payment system, capturing salary costs and donated drug costs from the start may be important for trend analysis to establish future payment rates.

Cost items should be separated into inpatient, outpatient, and other service categories. Hospitals and health centers produce units of service that are not comparable (such as bed-days and outpatient visits), so total facility costs must be separated into the portions for inpatient, outpatient, and other services in order to allocate costs. See Step 9 in Part 2 of this manual for a description of the challenges of parsing aggregate costs, as well as some potential solutions to introduce during the analysis

stage. Separating these costs up front facilitates the cost accounting process.

TABLE 8 explains the cost item exclusions from some of the case examples.

SCOPE SUMMARY

The costing team may find it helpful to document the inclusions and exclusions in each element of scope to guide their discussions. TABLE 9 can serve as a template to document decisions about

scope. TABLES 10 AND 11 explain the scope decisions made by the costing teams of PHFI Hospital and Indonesia Health Facility, respectively.

TABLE 8. Cost Item Exclusions

CASE EXAMPLE	COST ITEM EXCLUSIONS	RATIONALE FOR EXCLUSION
<i>Aarogyasri Hospital</i>	<ul style="list-style-type: none"> Land 	<ul style="list-style-type: none"> Indian finance rules state that the cost of land always appreciates, so the cost of land was excluded.
<i>Indonesia Casemix</i>	<ul style="list-style-type: none"> Land Building depreciation (for the first two costing exercises; included for the third exercise) Vertical program drugs 	<ul style="list-style-type: none"> These costs were difficult to determine for government hospitals.
<i>Central Asian Republics DRG</i>	<ul style="list-style-type: none"> Building and equipment depreciation 	<ul style="list-style-type: none"> These costs were funded from different sources and were not slated for coverage by the payment system.
<i>PHFI Hospital</i>	<ul style="list-style-type: none"> Donated items and inventory 	<ul style="list-style-type: none"> The data were not available because most hospitals did not keep these records.
<i>Vietnam Primary Care</i>	<ul style="list-style-type: none"> Land Expired capital Donated items Long-term training 	<ul style="list-style-type: none"> The data were not available, and in the case of land, the providers were state-owned so they did not have to buy land.

TABLE 9. Scope Inclusion and Exclusion Template

SCOPE ELEMENT	INCLUSIONS	EXCLUSIONS	RATIONALE
PERSPECTIVE <ul style="list-style-type: none"> Purchaser Provider Patient Society 			
PROVIDER TYPE <ul style="list-style-type: none"> Ownership: Public government, public corporatized, private not-for-profit, private subsidized, private for-profit Facility Type: Clinic, hospital, specialty facility Level of Service: Primary, secondary, tertiary Size: Bed size (hospital), personnel (clinic), workload (clinic) 			
COST OBJECTS <ul style="list-style-type: none"> Organization Department/specialty Service Patient 			
COST ITEMS <ul style="list-style-type: none"> Recurrent Cost: Personnel, drugs/medical supplies, utilities, other recurrent Capital Cost: Building, medical equipment, non-medical equipment 			

TABLE 10. Scope Inclusions and Exclusions: PHFI Hospital

	SCOPE INCLUSIONS	SCOPE EXCLUSIONS	RATIONALE AND REFLECTIONS
Perspective	<ul style="list-style-type: none"> • Provider 	<ul style="list-style-type: none"> • Purchaser • Patient • Society 	<p>We selected the provider perspective to help hospital administrators understand their operating expenses and the unit cost of basic health services provided. This perspective was important because providers in both government and private settings were not generally aware of their costs.</p>
Provider Type	<p>OWNERSHIP STATUS:</p> <ul style="list-style-type: none"> • Public - government • Private - not-for-profit • Private - for-profit <p>FACILITY TYPE:</p> <ul style="list-style-type: none"> • Hospital <p>LEVEL OF SERVICE:</p> <ul style="list-style-type: none"> • Secondary • Tertiary <p>SIZE:</p> <ul style="list-style-type: none"> • 57-bed hospital • 200-bed hospital • 400-bed hospital • 655-bed hospital • 778-bed hospital 	<p>OWNERSHIP STATUS:</p> <ul style="list-style-type: none"> • Public - corporate • Private subsidized <p>FACILITY TYPE:</p> <ul style="list-style-type: none"> • Clinic • Specialty facility <p>LEVEL OF SERVICE:</p> <ul style="list-style-type: none"> • Primary 	<p>We selected five types of hospitals so we could include at least one hospital from each ownership and service-level category. In terms of sample size, we had to restrict ourselves to these five hospitals due to time and budget constraints. Given the size and diversity of the country and variations across hospitals and budgets, it was difficult to get a representative sample.</p> <p>The unit cost of health services at a secondary hospital is not comparable to that in a tertiary hospital because the two types of facilities serve different types of patients. Similarly, private hospitals are not comparable to government hospitals. In retrospect, we could have selected four government secondary hospitals of similar bed size and bed occupancy rate in four geographic zones. We could then have determined unit costs that were more representative of government secondary hospitals across the country. Similar studies could be done for private hospitals and/or tertiary hospitals.</p>
Cost Objects	<p>DEPARTMENTS:</p> <ul style="list-style-type: none"> • General Administration • Accounting/Clerical • Laundry • Nursing Administration • Transportation • Lab - Microbiology • Lab - Biochemistry • Lab - Pathology • Central Sterilization <ul style="list-style-type: none"> • Operating Theater • IPD - Medicine • IPD - Surgery • IPD - Eye • IPD - Orthopedics • OPD - Medicine/ Cardiology • OPD - Surgery • OPD - Eye • OPD - Orthopedics • Emergency • ICU <p>SERVICES:</p> <ul style="list-style-type: none"> • The most frequently performed surgical procedures (lower-section cesarean, hysterectomy, hernia repair, appendectomy) 	<p>DEPARTMENTS:</p> <ul style="list-style-type: none"> • None (followed the hospital's organizational structure) <p>SERVICES:</p> <ul style="list-style-type: none"> • Non-surgical health services were excluded • Infrequently performed surgical procedures were also excluded 	<p>We tried to estimate the cost of different types of surgical procedures in the selected hospitals. We chose several of the most frequently performed procedures and calculated only the procedure cost. Due to time and budget constraints, we were not able to cost other procedures or calculate pre- and post-surgical costs.</p>
Cost Items	<p>RECURRENT COSTS:</p> <ul style="list-style-type: none"> • Personnel • Drugs/medical supplies • Utilities • Other recurrent <p>CAPITAL COSTS:</p> <ul style="list-style-type: none"> • Building • Medical equipment • Non-medical equipment 	<p>RECURRENT COSTS:</p> <ul style="list-style-type: none"> • None <p>CAPITAL COSTS:</p> <ul style="list-style-type: none"> • Donated items and inventory 	<p>Data on stock value from inventory and donated items were not available because most hospitals did not maintain these records.</p>

TABLE 11. Scope Inclusions and Exclusions: Indonesia Health Facility

	SCOPE INCLUSIONS	SCOPE EXCLUSIONS	RATIONALE AND REFLECTIONS
Perspective	<ul style="list-style-type: none"> • Provider • Patient 	<ul style="list-style-type: none"> • Purchaser • Society 	<p>The MOH wanted to know the production cost of services in health centers and hospitals in order to inform budget allocations in public facilities and to set user charges/tariffs. There was a common perception that the insurance carrier paid less than the production cost, possibly jeopardizing the quality of services.</p> <p>We administered a patient survey to better understand how much patients spent in and outside health facilities on items such as drugs, and whether they made unofficial payments directly to the health staff.</p>
Provider Type	<p>OWNERSHIP STATUS:</p> <ul style="list-style-type: none"> • Public – government • Private – not-for-profit • Private – for-profit <p>FACILITY TYPE:</p> <ul style="list-style-type: none"> • Clinic • Hospital <p>LEVEL OF SERVICE:</p> <ul style="list-style-type: none"> • Primary • Secondary • Tertiary <p>SIZE:</p> <ul style="list-style-type: none"> • Hospitals >50 beds 	<p>OWNERSHIP STATUS:</p> <ul style="list-style-type: none"> • Excluded private primary care facilities (clinics and solo practices) <p>FACILITY TYPE:</p> <ul style="list-style-type: none"> • Excluded specialty facilities 	<p>The costing exercise was done in 15 provinces, 30 districts, 234 public health centers, 119 government hospitals, and 81 private hospitals (for-profit and not-for-profit). Private primary care clinics and solo practices were excluded because there were no sampling frames.</p>
Cost Objects	<p>PRIMARY CARE:</p> <ul style="list-style-type: none"> • General clinic visit • Maternal and child health visit • Dental visit • Inpatient stay <p>HOSPITAL CARE:</p> <ul style="list-style-type: none"> • Outpatient visit • Emergency visit • Admission • Inpatient day • Cost per discharge for specific diagnosis <p>Intermediate cost for:</p> <ul style="list-style-type: none"> - Pharmacy - Laboratory - Radiology - ICU - Operating Theater 	<p>DEPARTMENTS:</p> <p>None (followed the health facility’s organizational structure)</p>	<p>The data collected allowed us to calculate the department unit cost. We calculated the cost per outpatient visit and per inpatient stay.</p> <p>We focused on the 13 most common admissions in hospitals based on national statistics. Of these, 6 were medical conditions (conditions that did not need surgical intervention) and 7 were conditions that needed surgical intervention. The former conditions included diarrhea, dengue fever, stroke, heart failure, ischemic heart disease, and gastritis. The surgical conditions included appendicitis, inguinal hernia, urolithiasis, femoral fracture, cesarean section, cataract, and breast cancer.</p>
Cost Items	<p>RECURRENT COSTS:</p> <ul style="list-style-type: none"> • Personnel • Drugs/medical supplies • Utilities • Other recurrent <p>CAPITAL COSTS:</p> <ul style="list-style-type: none"> • Building • Medical equipment • Non-medical equipment 	<p>RECURRENT COSTS:</p> <ul style="list-style-type: none"> • None <p>CAPITAL COSTS:</p> <ul style="list-style-type: none"> • Land 	<p>We collected information about land, but because the impact on cost estimates was small, we did not include land costs in unit cost calculations.</p> <p>We developed a standard list of medical and non-medical equipment in our data collection instrument. As a reference, we used the useful life estimates for medical equipment from the American Hospital Association. We had difficulty determining the price paid and year purchased, so we developed standard pricing for equipment. If we could not determine the year of purchase, we used the current price to calculate depreciation.</p>

CHECKLIST

STEP 2: DEFINE THE SCOPE

- ✓ **DETERMINE** the costing exercise scope—the perspective, provider types, cost objects, and cost items.
- ✓ **ENSURE** that the scope elements are appropriate for the provider payment system selected, costing exercise objectives, and time horizon of the costing exercise.

LESSONS LEARNED



RESOURCES

Finkler, Steven A., David M. Ward, and Judith J. Baker. *Essentials of Cost Accounting for Health Care Organizations*. 3rd ed. Sudbury, MA: Jones and Bartlett Publishers, 2007.

Mogyorosy, Zsolt, and Peter Smith. "The Main Methodological Issues in Costing Health Care Services: A Literature Review." *CHE Research Paper 7*. York, UK: University of York Centre for Health Economics, 2005.

STEP 3.

SELECT THE COSTING METHODOLOGY

In addition to the scope, a costing exercise has three other main design elements: the orientation, the data period, and the costing methodology.

RETROSPECTIVE OR PROSPECTIVE ORIENTATION

A costing exercise can have either a backward-looking (retrospective) or a forward-looking (prospective) orientation. In a retrospective costing exercise, the resources have already been used and the objective is to look backward to estimate their costs. In a prospective costing exercise, the resources have yet to be used and the objective is to measure those costs as they occur over a defined time period.

The two orientations also differ in their data collection needs. In a retrospective exercise, utilization and expenditure data have already been generated and possibly already collected. In a prospective exercise, the data have not yet been generated and require future collection, typically through primary data collection methods.

A retrospective orientation is typically easier to implement because the data already exist, but deficiencies in the availability, quality, and transparency

of the data may affect the accuracy and reliability of the costing exercise results. A prospective orientation permits more control and flexibility in the measurement of resource use, but the implementation requirements can be more demanding so the scope and sample sizes are typically smaller.

DATA PERIOD

A costing exercise can be based on data from a single week, month, quarter, or year. The choice of retrospective or prospective orientation will help determine the data period. Other important factors include the disbursement and reporting cycles of funding sources and the structure of utilization and expenditure data. Costing teams also should consider whether the data period selected reflects current medical technologies, clinical practice, and utilization patterns.

For a retrospective costing exercise, one year is typically the ideal data period. A one-year data period captures one complete budgeting cycle and evens out

seasonal fluctuations. The choice of calendar year or fiscal year should be based on the country's budgeting and accounting context. Selecting a data period that spans multiple calendar or fiscal years is not advisable because a longer time horizon increases the chance that significant regulatory changes, changes in reporting requirements, and shifts in clinical practices will occur. If the data period spans more than one year, the costs should be discounted and stated in their present value.

For a prospective costing exercise, the data period is often less than one year for feasibility reasons. Prospective data collection is more time-consuming and resource-intensive than using historical data, so a shorter period is typically more feasible. However, changes in utilization patterns due to seasonal variation should be considered.

TABLE 12 shows the orientations and data periods used in the case examples.

TABLE 12. Orientation and Data Period

CASE EXAMPLE	ORIENTATION/REASON	DATA PERIOD
Aarogyasri Hospital	<ul style="list-style-type: none"> • Retrospective orientation because of time constraints due to pressure from hospitals to increase prices 	<ul style="list-style-type: none"> • 6 months for one hospital; 1 calendar year for three hospitals
Indonesia Health Facility	<ul style="list-style-type: none"> • Retrospective orientation for 3 months • Prospective orientation for 9 months to allow facilities to improve their financial reporting and better capture the information needed 	<ul style="list-style-type: none"> • 3 months retrospective and 9 months prospective
Central Asian Republics DRG	<ul style="list-style-type: none"> • Retrospective orientation so the research team could use actual historical expenditures for analysis 	<ul style="list-style-type: none"> • 1 calendar year to avoid seasonal fluctuations and cover the entire budget period
Malaysia COMPHEC	<ul style="list-style-type: none"> • Prospective orientation for time-motion study to document staff time worked and equipment used • Retrospective orientation for recurrent and capital costs 	<ul style="list-style-type: none"> • 1 fiscal year
Malaysian DRG	<ul style="list-style-type: none"> • Retrospective orientation because most of the required data were readily available and primary data collection techniques were not employed 	<ul style="list-style-type: none"> • 1 fiscal year
PHFI Hospital	<ul style="list-style-type: none"> • Retrospective orientation due to time and budget constraints 	<ul style="list-style-type: none"> • 1 fiscal year to avoid seasonal variations
Vietnam Primary Care	<ul style="list-style-type: none"> • Retrospective orientation to save resources 	<ul style="list-style-type: none"> • 1 calendar year to capture both periodic and one-time costs (personnel bonuses) and to account for seasonal variation in disease patterns

COSTING METHODOLOGY

The accounting and economics fields offer many methodologies for measuring and valuing resources for the costing of health services. They include activity-based costing, average costing, cost-benefit analysis, cost-effectiveness analysis, nominal costing, standard costing, and so on. It can be challenging to decide which methodology to use.

No single methodology is ideal for every country context or cost analysis perspective, but certain approaches are better suited to certain objectives. Cost accounting methods, as the name implies, use accounting principles to classify and measure all costs incurred in carrying out an activity. Economic methods, on the other hand, often focus on statistical analysis of marginal costs

to understand the change in cost as a result of a change in activity. For provider payment purposes, cost accounting methods are preferable. Provider payment decision making typically relies on total or average cost information—the result of analyses that use cost accounting methods.

Two cost accounting methods are used most frequently to provide cost results for provider payment rate-setting: top-down and bottom-up. Ultimately, the choice between top-down, bottom-up, or a combination of the two depends on the provider payment purpose, costing exercise scope, and cost objects selected. The desired accuracy of cost results and the feasibility of obtaining those results are also factors to consider.

The key difference between the two methods is that the bottom-up approach relies on detailed costing at the service or patient level while the top-down approach relies on average costing. Bottom-up costing documents the specific resources used to deliver a narrowly defined service or to treat a type of patient. This method calculates a total cost per service or patient and then, through repeated cost measurements, constructs an average cost for the service or patient type. The top-down approach, on the other hand, first documents total facility cost and then allocates the total cost down to departments and finally

to discharged patients by dividing total department costs by the number of discharged patients.

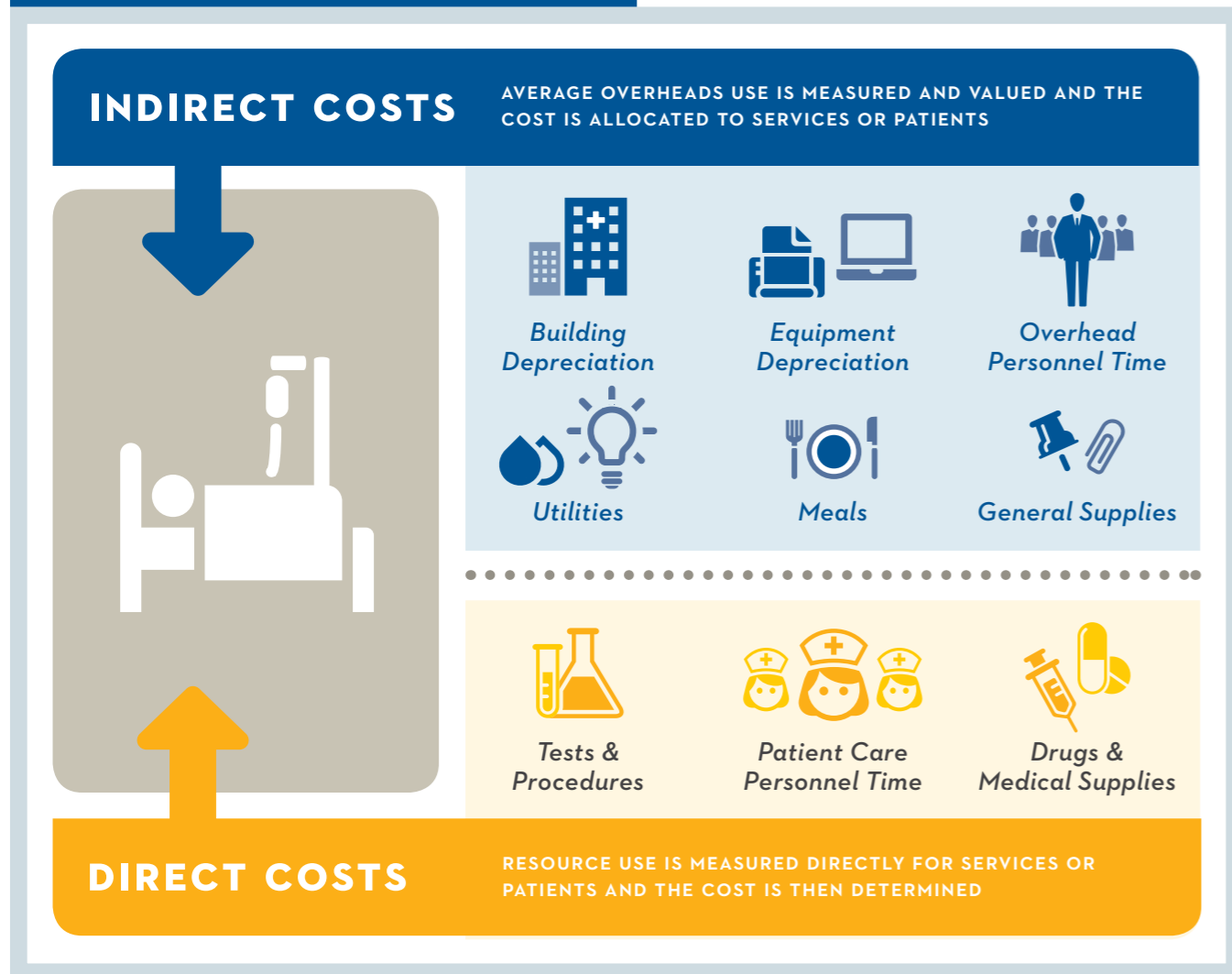
Either methodology can be employed for a retrospective or prospective costing exercise. Top-down exercises are typically retrospective by nature because they rely primarily on aggregate resource use data from accounts, financial statements, and management reports. Bottom-up exercises are either retrospective or prospective. An example of a retrospective bottom-up costing exercise is one that measures resource use either through a facility cost survey or through collection of data already recorded in medical records and billing systems. An example of a prospective bottom-up costing exercise is one that measures resource use through data collected from medical record reviews or direct observation over a specific time period during the costing exercise (known as a “time-motion” study). TABLE 13 explains how the two approaches typically differ.

The technique used to allocate overheads can differ depending on whether the allocation is at the department level (used for the top-down approach) or the health service level (used for the bottom-up approach). For the former, overheads are allocated to departments based on each department’s estimated use of the overheads. For the latter, different allocation techniques are used, including weighted service allocation, bed-day allocation, and marginal mark-up allocation (listed in order of most to least accurate and least to most feasible). Bed-day allocation is used most often in low- and middle-income countries. Indirect costs are allocated evenly to all bed-days, regardless of the health services provided. The total indirect cost is divided by the total number of bed-days to arrive at an average indirect cost per bed-day and then multiplied by the average length of stay for a particular service or the number of bed-days for a patient to arrive at the allocated overheads. This technique is not feasible for outpatient visits or other services. (Details about

TABLE 13. Bottom-up vs. Top-down Approaches to Cost Accounting

COST CATEGORY	BOTTOM-UP APPROACH	TOP-DOWN APPROACH
Personnel (e.g., time worked)	<ul style="list-style-type: none"> • Personnel time spent on individual services or patients is directly measured. • The cost of the personnel time is determined for the services or patients. 	<ul style="list-style-type: none"> • Personnel time is measured at the facility or department level (e.g., headcount or full-time equivalency), and a total cost is calculated. • Average cost per discharge, bed-day, or visit is calculated.
Materials (e.g., drugs/medical supplies, general supplies)	<ul style="list-style-type: none"> • Materials used by individual services or patients are directly measured. • The cost of the materials used by the services or patients is determined. 	<ul style="list-style-type: none"> • Materials used by facilities or departments are measured and a total cost is calculated. • Average cost per discharge, bed-day, or visit is calculated.
Overheads (e.g., administrative personnel time, utilities)	<ul style="list-style-type: none"> • Overheads use for individual services or patients is typically estimated using weighted service allocation, bed-day allocation, or marginal mark-up allocation. 	<ul style="list-style-type: none"> • Average overheads use for the facility or department is measured and valued, and the associated cost is allocated to discharges, bed-days, or visits.

FIGURE 1. Bottom-Up Costing



these techniques for allocating overheads are beyond the scope of this manual and can be found in other resources; top-down allocation methods are explained in greater detail in the appendix.)

FIGURE 1 depicts the major cost items and their direct assignment or indirect allocation to services/patients for a bottom-up approach. FIGURE 2 illustrates the sequence for direct cost assignment and indirect cost allocation to departments for a top-down approach.

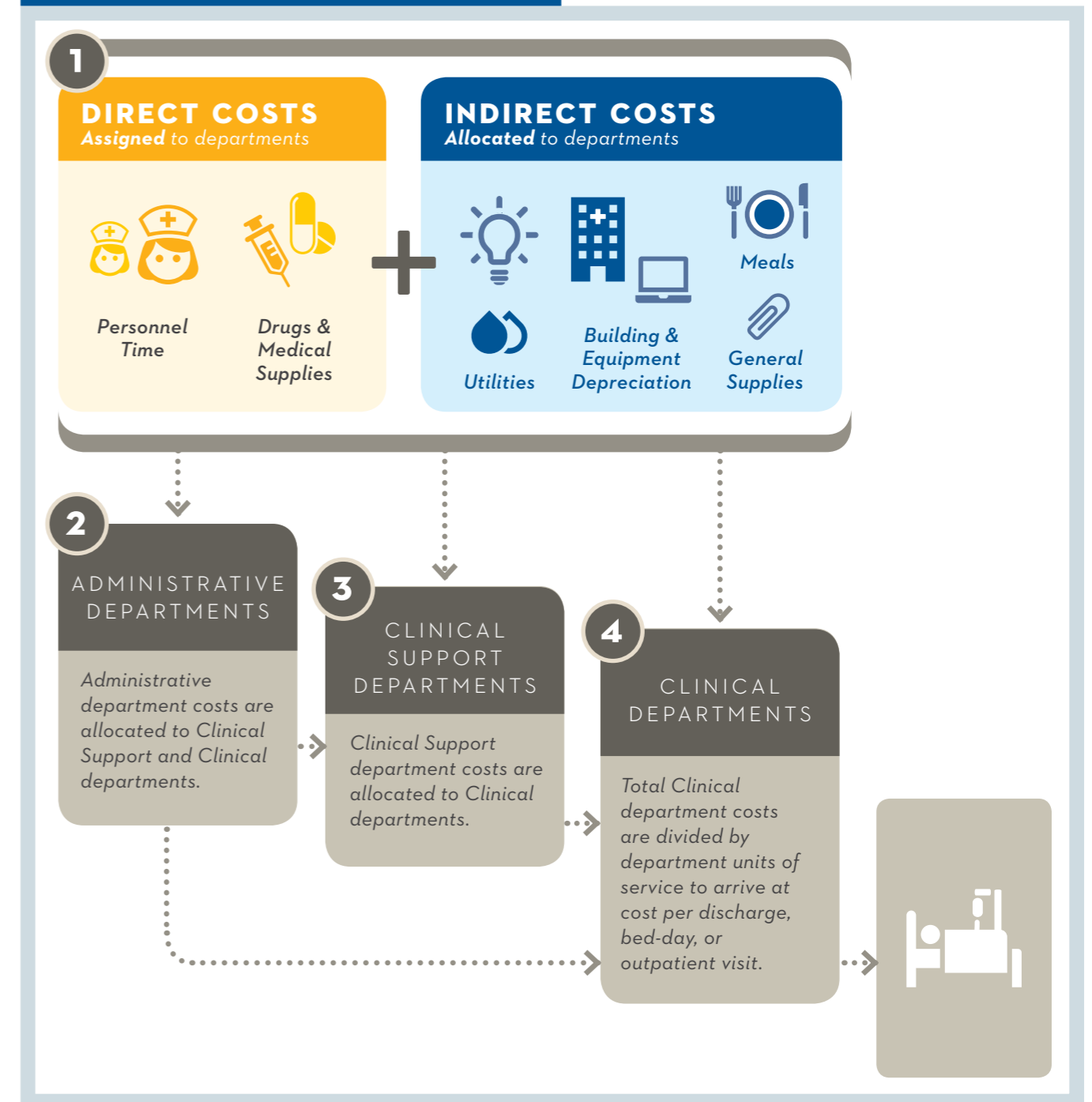
BOTTOM-UP APPROACH

The bottom-up approach—also known as *micro-costing* or *detailed costing*—aims to determine as accurately as possible the observed cost of a health service or

patient through direct measurement of resource use. Unit cost estimates are built from the individual service or patient level upward, and then the average cost for a particular service or patient group is constructed. This approach is called “bottom-up” because it measures the actual quantity of resources consumed by the service/patient, attaches a value to each of those resources, and then adds the unit costs to calculate the total service/patient cost. Measuring resources at the service/patient level often requires primary data collection (e.g., through facility questionnaires, medical record reviews, direct observation, and/or interviews with experts).

The simplified example in FIGURE 3 illustrates use of the bottom-up approach to estimate the cost of treating an individual patient admitted to an OB/GYN department. It involves documenting the time health workers spend treating the patient, along with all of the tests performed and the drugs and medical supplies used. The value of each of these resources (personnel time, tests, drugs, supplies) is identified and multiplied by the resource volume to calculate the total cost of the resources the patient directly consumed. Overheads are then estimated or allocated to the patient, typically using one of the approaches mentioned earlier (weighted service allocation, bed-day allocation, or

FIGURE 2. Top-Down Costing



marginal mark-up allocation). The result is a total cost estimate for treating the OB/GYN patient. Cost measurement can be repeated for a series of OB/GYN patients to construct an average cost per OB/GYN patient. The average cost can be used to estimate total facility costs to treat OB/GYN patients by multiplying the average unit cost by the patient volume.

Box 8 at the end of the Step 3 section describes normative costing, one bottom-up approach that can be useful in certain circumstances but is generally not recommended for costing for provider payment.

TOP-DOWN APPROACH

The top-down approach—also known as *macro-costing*, *gross costing*, or *average*

costing—starts by documenting the total cost of resources consumed by a health facility. This total cost is then allocated downward, first to the facility’s departments and then to the services/patients within the departments. Data routinely collected for accounting and management are used for the cost analysis. In this process, costs are either directly assigned or proportionally

allocated to departments according to their consumption of resources. Total department costs are then divided by the service volume in those departments to estimate unit costs. The result is the average cost of resources used to provide services or treat patients within the department. Patient unit costs are presented as an average cost per discharge, bed-day, or outpatient visit. Service unit costs are presented as an

average cost per test, exam, surgery, procedure, and so on. Using the same OB/GYN department example, **FIGURE 4** uses the top-down approach to calculate the total cost of the OB/GYN department. The total cost includes the direct costs of salaries and wages of department staff and materials used within the department, such as drugs and medical supplies. The

total cost also includes indirect costs, such as equipment depreciation, salaries and wages of administrative staff, and costs allocated from other departments that provide support services to OB/GYN (e.g., Laundry, Operating Theater, Laboratory). To arrive at a unit cost (cost per discharge, bed-day, or visit), the total department cost is divided by its total number of units.

FIGURE 3. Bottom-up Cost Calculation Example

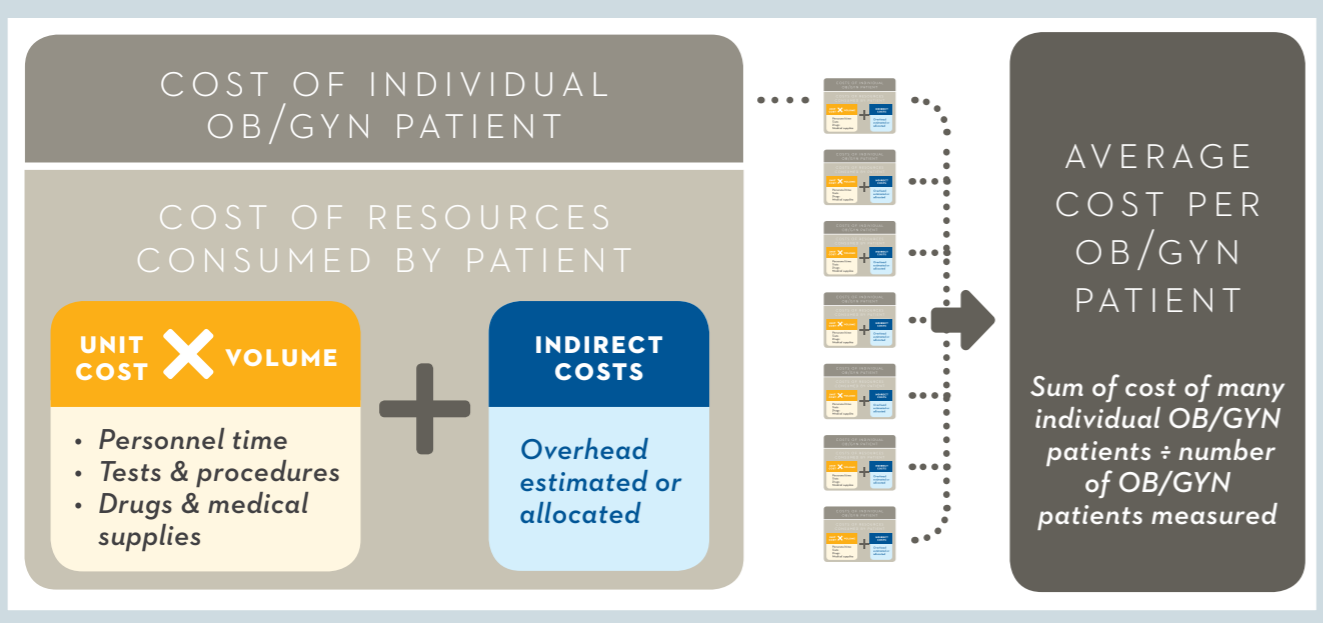
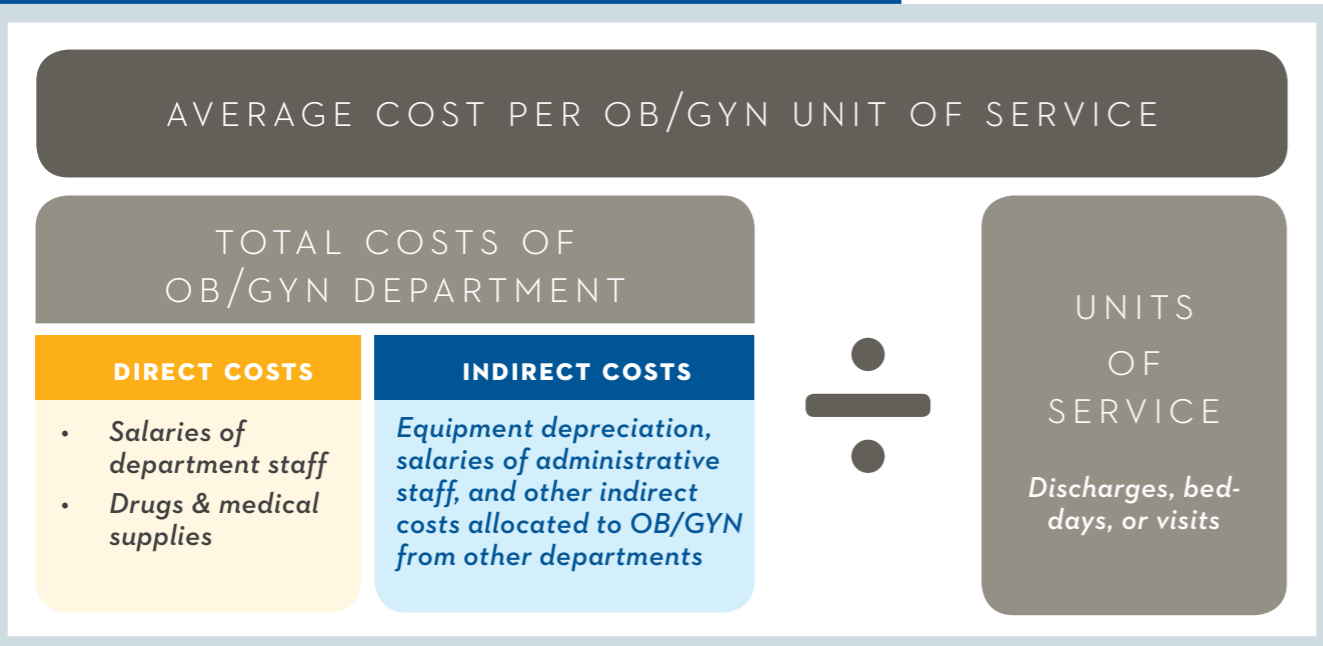


FIGURE 4. Top-down Cost Calculation Example



The appropriate costing methodology depends on the context and objectives. In selecting an approach, policymakers and analysts should weigh the advantages and disadvantages of each method with respect to the country context and provider payment system. Because of the inherent trade-offs, a combination of the two methods may be desirable. The approach also may evolve as the payment system matures. For example, the Central Asian Republics employed top-down costing early in the implementation of their case-based payment systems because the data were available and the method was appropriate for the development of both the initial department-based payment system and the later diagnosis-based payment system. They later added a

degree of bottom-up costing to expand and refine the diagnosis-related group (DRG) case groupings when it became necessary to cover some of the most expensive cases treated in tertiary hospitals.

TABLE 14 lists criteria to consider when selecting a costing methodology (or a combination of the two methodologies).

COSTING METHODOLOGY TRADE-OFFS

Every decision related to the design of the costing exercise ultimately involves a trade-off between perceived accuracy of the unit cost results and the operational feasibility and cost of obtaining the results. The purpose for which the unit cost results will be used can help

determine whether more precise cost information is worth the higher cost of obtaining that information. Generally, the recommended method is the one that provides adequate cost data using the least expensive means.

The typical trade-offs between perceived accuracy and feasibility for bottom-up and top-down costing are as follows:

- The bottom-up approach is sometimes perceived to generate more accurate cost estimates but is more complex, time-consuming, and costly to implement.
- The top-down approach is sometimes perceived to generate less accurate but adequate cost estimates but is easier, less time-consuming, and less expensive to implement.

TABLE 14. Criteria for Methodology Selection

Compatibility	<ul style="list-style-type: none"> • Which method is most appropriate for the payment method under development? Which method will yield results for the intended unit of payment (e.g., service, discharge, diagnosis)?
Inclusivity	<ul style="list-style-type: none"> • Will the payment system include all cases or a subset of cases? • Which method will produce a better cost estimate of these cases?
Feasibility	<ul style="list-style-type: none"> • What are the time and resource constraints on the costing exercise? • What is the capacity of the costing team?
Relativity	<ul style="list-style-type: none"> • Are relative costs within departments or between departments more important? • Which method produces a better estimate of the desired relative costs?
Variability	<ul style="list-style-type: none"> • How variable are the cost items to be measured within departments? • Is it important to capture this variability for provider payment?
Flexibility	<ul style="list-style-type: none"> • Which method will provide the most flexibility for future use in provider payment policy? (This is an important consideration for countries that have not yet decided on a provider payment system.)
Adaptability	<ul style="list-style-type: none"> • Which method will offer more opportunities for simulations of different resource use patterns (cost functions) and illustrate the impact of different payment rate scenarios?

Although some stakeholders may argue for bottom-up costing, it is important to consider whether the richness of the data generated actually improves accuracy and is worth the additional effort. Costing at the individual service or patient level is more complex, time-consuming, and expensive because it requires direct measurement and primary data collection. Further, with respect to accuracy, the bottom-up approach typically uses some type of averaging to allocate overheads and capital costs across individual services/patients, which introduces arbitrary allocation to some extent. Another challenge to the claim of accuracy is that the level of detail introduces risks of overlooking or underestimating some inputs. Data collectors may not fully understand all the resources that go into providing a service, or resources may be used outside of the primary data collection period. A further challenge is the high likelihood of overestimating the cost of each individual service/patient due to double counting of inputs. For example, personnel time is often overestimated because some tasks are shared among services.

Without accounting for total facility costs, the tendency to overestimate costs for individual services can result in purchasers overextending their budgets, leading to deficits and jeopardizing sustainability. Therefore,

the purely bottom-up approach is not recommended for costing for provider payment other than for fee-for-service payment systems.

TABLE 15 offers some questions to consider about the importance of accuracy versus feasibility for a costing exercise.

METHODOLOGY ADVANTAGES AND DISADVANTAGES

The main advantages of the top-down approach are that it is more complete and it uses readily available data sources. Top-down costing is easier to implement and requires less time and fewer financial resources for data collection. Potentially most important for provider payment, top-down costing is more complete because it records all relevant costs and services of a facility in order to estimate unit costs. Total costs are distributed among all health services in a facility, so any costing errors in one part of the facility will be counterbalanced by errors in other parts. The unit costs generated by this method provide a better view into purchaser budget requirements for provider payment because total facility costs are accounted for in the cost analysis. Actual treatment costs will vary by service or patient, but it is not essential to know the exact cost of each for the purposes of payment because cost coverage tends to break even; certain patients within a

department will be under-costed (and thus underpaid) and others will be over-costed (and thus overpaid).

Furthermore, because top-down costing methods capture all services and inputs, they often produce more accurate relative cost estimates. For provider payment, it is more important to obtain accurate relative cost estimates than accurate absolute cost estimates because relative costs and prices determine which services are more profitable for providers to deliver. Also, absolute costs become outdated soon after a costing exercise is completed and they can reflect provider inefficiencies and poor management and clinical decisions.

The main disadvantage of the top-down approach is that the cost estimates may be viewed as less accurate because they are averages constructed from aggregate data. While the criteria used to allocate total costs are based on resource use, the choice of allocation bases may be somewhat subjective, thereby compromising accuracy. Further, to derive average costs, the quantity of resources used to provide services or treat patients within a department is assumed to be equal. Because actual differences in the distribution of resources are not distinguished, the costs of particular components of a stay or outpatient visit are not detectable. In addition, because of the reliance on

secondary sources for data on utilization, resource use, and cost, the unit cost results will reflect any deficiencies in the availability, quality, and transparency of the data captured in accounts and management reports.

The bottom-up approach may yield more accurate cost results for specific services/patients because it uses direct and detailed cost measurement. In addition, the standard measurement of resource use using bottom-up costing helps deliver consistent and reliable data,

which is useful for precision estimates for statistical analysis. Note, however, that in practice, costing at a more detailed and disaggregated level can introduce inaccuracy due to the complex nature of capturing all inputs and the risk of double-counting inputs.

TABLE 15. Accuracy vs. Feasibility Considerations

ACCURACY CONSIDERATIONS	FEASIBILITY CONSIDERATIONS
<ul style="list-style-type: none"> • Will we need to do statistical analysis that depends on precision in cost estimates? • Do we need to understand cost variation between services or patients within a department? • What degree of averaging and cost allocation are we comfortable with? • Are average costs sufficient for our provider payment intentions? • Will detailed resource measurement improve accuracy or unintentionally introduce error? 	<ul style="list-style-type: none"> • What is our time frame for completing the costing exercise? • Do the anticipated financial costs of this approach fall within our costing exercise budget? • Do we have the personnel capacity to carry out this approach? • Is the approach flexible enough for implementation with all providers in our desired sample?

TABLE 16. Bottom-up vs. Top-down Methodologies

METHODOLOGY	ADVANTAGES	DISADVANTAGES
Bottom-up	<ul style="list-style-type: none"> • Potentially more accurate due to direct measurement of resource use. • Standardized data collection results in more consistent and transparent measurement of resource use. • Provides more detailed information on the cause-and-effect relationship between resource use and cost. • Provides information on the relative cost of different services within departments. • Allows cost analysis related to the different volume and mix of resources used. • Provides data on case mix impact on costs. • Facilitates statistical analysis of cost variation due to the number of observations. 	<ul style="list-style-type: none"> • Implementation is more complex due to reliance on primary data collection. • Implementation is more time-consuming and costly. • May not be comprehensive because it is complex and costly to cost every service delivered by providers. • May overlook or underestimate inputs used outside of the observation period. • Primary data collection methods (e.g., direct observation) may change provider behavior and influence results. • Dividing shared costs (overheads and capital) among individual services often requires use of cost allocation criteria that may be arbitrary. • High potential for double counting so staff time can be overestimated. • Risk of separately calculated costs for each service not adding up to equal total facility cost.
Top-down	<ul style="list-style-type: none"> • Less extensive primary data collection requirements. • Permits use of more aggregate data. • Easier to implement because it relies on data routinely collected for accounts and management. • Less time-consuming and less costly to implement. • Cost information is more complete because all relevant resources used by an organization are documented. • Easier to calculate and allocate indirect or overhead costs. 	<ul style="list-style-type: none"> • Provides no data on the impact of case mix on costs within departments. • Accuracy and reliability of cost results reflect deficiencies in the availability, quality, and transparency of secondary data. • Systems and reporting may differ across providers, and data can be challenging to obtain and analyze. • Cost allocation criteria are sometimes arbitrary. • Resource use and cost data are historical and represent past, not current, patterns. • Does not reveal whether cost differences are related to differences in the mix of resources or their volume, prices, or treatment protocols.

TABLE 17. Matching Costing Methodology to Payment Systems

PAYMENT SYSTEM	UNIT COST	DATA NEEDED TO CALCULATE PAYMENT RATES	RECOMMENDED MAIN COSTING METHODOLOGY
<i>Fee-for-service</i>	<ul style="list-style-type: none"> Average cost per service 	<ul style="list-style-type: none"> Unit cost for each service on the fee schedule 	<ul style="list-style-type: none"> Bottom-up due to costing a subset of services and no requirement to correspond to a budget
<i>Capitation</i>	<ul style="list-style-type: none"> Average cost per service in the capitation package 	<ul style="list-style-type: none"> Unit cost of main service groups included in the capitated rate Number of services in each main service group used each year per person covered by the payment system 	<ul style="list-style-type: none"> Top-down due to exhaustiveness of the approach and time and resource constraints
<i>Per diem</i>	<ul style="list-style-type: none"> Average cost per bed-day in the hospital Average cost per bed-day in each department (for department-based payments) 	<ul style="list-style-type: none"> Unit cost per bed-day in the hospital Unit cost per bed-day by department 	<ul style="list-style-type: none"> Top-down due to exhaustiveness of the approach, time and resource constraints, and delivery of accurate relative costs (between departments)
<i>Case-based</i>	<p>DEPARTMENT-BASED PAYMENTS:</p> <ul style="list-style-type: none"> Average cost per department or specialty discharge <p>DIAGNOSIS-BASED GROUP PAYMENTS:</p> <ul style="list-style-type: none"> Average cost per discharge in the diagnosis group 	<p>DEPARTMENT-BASED PAYMENTS:</p> <ul style="list-style-type: none"> Unit cost per discharge or outpatient visit in each department/specialty <p>DIAGNOSIS-BASED GROUP PAYMENTS:</p> <ul style="list-style-type: none"> Unit cost per bed-day in each department Average length of stay for cases in each diagnosis group discharged from each department 	<ul style="list-style-type: none"> Top-down due to exhaustiveness of the approach, time and resource constraints, and delivery of accurate relative costs (between departments)
<i>Global budget</i>	<p>VOLUME-BASED PAYMENT:</p> <ul style="list-style-type: none"> Average cost per discharge x number of discharges per year Average cost per outpatient visit x number of visits per year <p>VOLUME-BASED ADJUSTED FOR CASE MIX:</p> <ul style="list-style-type: none"> Average cost per discharge in the diagnosis group x number of discharges per year in each diagnosis group (calculated from unit costs of bed-days in department x average length of stay for the diagnosis group) 	<p>VOLUME-BASED PAYMENTS:</p> <ul style="list-style-type: none"> Unit cost per discharge Unit cost per outpatient visit Total number of discharges per year Total number of outpatient visits per year <p>VOLUME-BASED ADJUSTED FOR CASE MIX:</p> <ul style="list-style-type: none"> Unit cost per bed-day in each department Average length of stay for cases in each diagnosis group discharged from each department Total number of discharges in each diagnosis group 	<ul style="list-style-type: none"> Top-down due to exhaustiveness of the approach, time and resource constraints, and delivery of accurate relative costs (between departments)

Detailed bottom-up costing is often most useful for targeted supplemental information. For example, it is useful for documenting the variation in resource use within a department because it provides more information about the relationship between particular services/patient types and their costs. Because treatment intensity varies between services/patients within departments, this approach can provide more information on the mix of resources consumed (and thus their cost) within a department. Understanding cost variation can be especially important for departments that provide highly dissimilar services, such as the Intensive Care Unit (ICU).

The trade-offs of the two costing methodologies should be weighed against the priorities of the specific

costing exercise. TABLE 16 highlights additional trade-offs to consider.

TABLE 17 recommends an appropriate costing methodology for each type of provider payment system.

MIXED METHODOLOGIES

Analysts sometimes use both approaches in the same costing exercise—one as the primary approach, and the other to obtain supplemental information. (See TABLE 18.)

A costing team might use the bottom-up approach within a top-down exercise to target the measurement of the following items:

- Priority services, treatment episodes, activities, or cost items
- Services that differ significantly in their resource use (e.g., ICU

services, laboratory tests, and surgical procedures)

- Services for which a precise and accurate cost measurement is important
- Services that involve heavy personnel time or overheads related to using a technology
- Services that involve extensive sharing of personnel, buildings, or equipment between technologies or services
- Cost items that are expected to have the highest impact on total cost
- Data that are missing or not routinely captured

TABLE 19 describes the methodologies employed in some of the case examples.

BOX 8 describes normative costing, a type of bottom-up methodology that can be useful when applied to a limited range of services or packages of services but is generally not recommended for costing for provider payment.

TABLE 18. Mixed Methodologies

PRIMARY COSTING EXERCISE METHODOLOGY	TOP-DOWN	BOTTOM-UP
<i>Supplemental Costing Exercise Methodology</i>	<i>Bottom-up</i>	<i>Top-down</i>
<i>How Supplemental Methodology is Used</i>	<ul style="list-style-type: none"> • Validate or “spot-check” the unit cost of a subset of services or cost items to determine whether the unit cost results from both methods are relatively similar. • Generate allocation statistics based on direct measurements of resource use to provide a more objective means of cost allocation to departments. (Example: using personnel time surveys or time-motion studies to estimate the time different staff work in each department, in order to allocate some indirect cost items such as uniforms or stationery.) • Fill in missing data. 	<ul style="list-style-type: none"> • Use data from facility accounts and financial statements or national tariffs for top-down allocation of overheads.

TABLE 19. Costing Exercise Methodologies

CASE EXAMPLE	COSTING METHODOLOGY USED
<i>Aarogyasri Hospital</i>	<p>The costing team primarily used the top-down approach to determine both operating costs and capital costs. These direct and indirect costs were allocated to departments to determine unit costs, such as the cost per bed-day or cost per minute of Operating Theater time.</p> <p>The team used the bottom-up approach in addition to estimate the cost of specific benefit packages by averaging for a particular procedure or benefit package the number of days of stay, number of minutes of surgery, number of laboratory tests, etc. The cost was constructed by combining costs and resources used on average for each benefit package or procedure.</p>
<i>Indonesia Casemix</i>	<p>The costing team used the top-down approach because it was feasible for hospitals to submit the data required for top-down costing and there were insufficient data for bottom-up costing.</p>
<i>Indonesia Health Facility</i>	<p>The costing team relied primarily on the top-down approach for both recurrent costs and capital costs. They allocated these costs to departments in order to provide unit costs for the intermediate outputs of facilities, such as the cost per minute of Operating Theater time. They also calculated unit costs for final outputs of facilities to determine the cost of treated inpatients and outpatients.</p> <p>The team used the bottom-up approach in addition to estimate the cost of specific episodes of illness. They constructed the cost by combining intermediate unit costs—the cost per minute of Operating Theater time and cost per bed-day—and resources used by individual cases.</p>
<i>Central Asian Republics DRG</i>	<p>The costing team relied almost exclusively on top-down costing because most provider financial data and operating statistics were available at the department level and the team considered these data sufficient to estimate the cost of bed-days. The costing exercise results were needed in a relatively short period of time, and it was feasible to include an adequate number of hospitals in the sample for a top-down exercise. The team also used bottom-up approaches to obtain allocation statistics to allocate the costs of ancillary departments to clinical departments.</p>
<i>Malaysian DRG</i>	<p>The costing team costed all hospital inpatient cases using a top-down approach to measure and value personnel, drugs/medical supplies, overheads, and capital resource use. They plan to use the bottom-up approach to cost ICU stays because those stays are known to be heterogeneous in their resource use. The team also plans to use the bottom-up approach to cost expensive laboratory tests and radiological interventions.</p>
<i>PHFI Hospital</i>	<p>PHFI used a mixed-method approach because data on resource use were not always available at the department level. Relying on a top-down approach, the costing team used hospital accounts to obtain data on the cost of resources consumed. They used a bottom-up approach to measure personnel hours worked across departments. They then used the time distribution obtained through the bottom-up approach to assign personnel compensation payments to departments and inform allocation statistics for the top-down costing.</p>

BOX 8. Normative Costing

Normative costing is a type of bottom-up methodology that costing teams can consider when detailed service cost information is not available or is thought to be highly distorted.

The normative methodology, also known as *costing of clinical care pathways*, is sometimes suggested by purchasers when they believe that services should be paid based on clinical guidelines rather than on how services actually are delivered. Normative costing typically is not recommended for costing for provider payment, however, unless it is applied to a limited range of services or packages of services. Clinical guidelines, treatment protocols, and treatment inputs must be well defined and widely followed for normative costing to be used for payment, and this is typically true only for a very limited set of services (e.g., malaria treatment or diabetes management).

The normative costing methodology involves estimating resource use for different services using guidelines and norms. The first step is to estimate all input norms (e.g., direct personnel time, drug and lab utilization) to treat particular conditions. This is often done in consultation with MOH and hospital physician expert groups, who are asked to note the required quantities of particular inputs for treatment of a typical patient—for example, the staff mix and amount of staff time required and the quantity and type of drugs used to treat a patient during an episode of illness. Alternatively, the information can be based on global treatment guidelines and standards.

The next step is to calculate the standard unit costs for each input, typically using a bottom-up approach or borrowing from market prices or benchmarks. Standard facility and administrative overheads are then typically used to spread indirect costs

by some measure of output norms (e.g., number of facility visits or bed-days per episode of illness).

This methodology is generally not recommended for costing for provider payment because it is not feasible to make it exhaustive. It can also take significant time for expert groups to reach agreement on both the standard treatment guidelines and the standard resource use. In addition, normative costing provides results for “what ought to be” for the average patient rather than for what actually is, which can be challenging in environments in which typical practice varies significantly from what is recommended in clinical guidelines. Lastly, using normative costing for a large set of health services does not always facilitate the budgeting process because it does not fully distribute facility costs or include all health services that will be covered under the provider payment system.

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CHECKLIST

STEP 3: SELECT THE COSTING METHODOLOGY

- ✓ **DETERMINE** whether the costing exercise will have a retrospective or prospective orientation.
- ✓ **DECIDE** on the data period for the costing exercise.
- ✓ **UNDERSTAND** the advantages and disadvantages of the bottom-up and top-down costing methodologies and their trade-offs in relation to the objectives of the costing exercise, the availability of data, and the payment system.
- ✓ **SELECT** a bottom-up methodology, a top-down methodology, or a combination of the two.
- ✓ **UNDERSTAND** the techniques for cost measurement and valuation and the cost accounting process used for the selected methodology.

LESSONS LEARNED

“IT IS MORE IMPORTANT TO OBTAIN ACCURATE RELATIVE COST ESTIMATES THAN ACCURATE ABSOLUTE UNIT COST ESTIMATES.”

“The right costing methodology depends on the context, objectives, and payment system under development.”

“Methodologies may be used in combination because there are inherent trade-offs in selecting just one methodology.”

“START WITH TOP-DOWN COSTING TO CAST A WIDE NET AND GET A LARGE SAMPLE SIZE IN A TIMELY MANNER. BUT SUPPLEMENT WITH BOTTOM-UP COSTING TO CONTRIBUTE ADDITIONAL INFORMATION TO MEET THE OBJECTIVES OF THE COSTING EXERCISE.”

“The right methodology may evolve as the payment system matures.”

RESOURCES

Finkler, Steven A., David M. Ward, and Judith J. Baker. *Essentials of Cost Accounting for Health Care Organizations*. 3rd ed. Sudbury, MA: Jones and Bartlett Publishers, 2007.

Mogyorosy, Zsolt, and Peter Smith. “The Main Methodological Issues in Costing Health Care Services: A Literature Review.” *CHE Research Paper 7*. York, UK: University of York Centre for Health Economics, 2005.

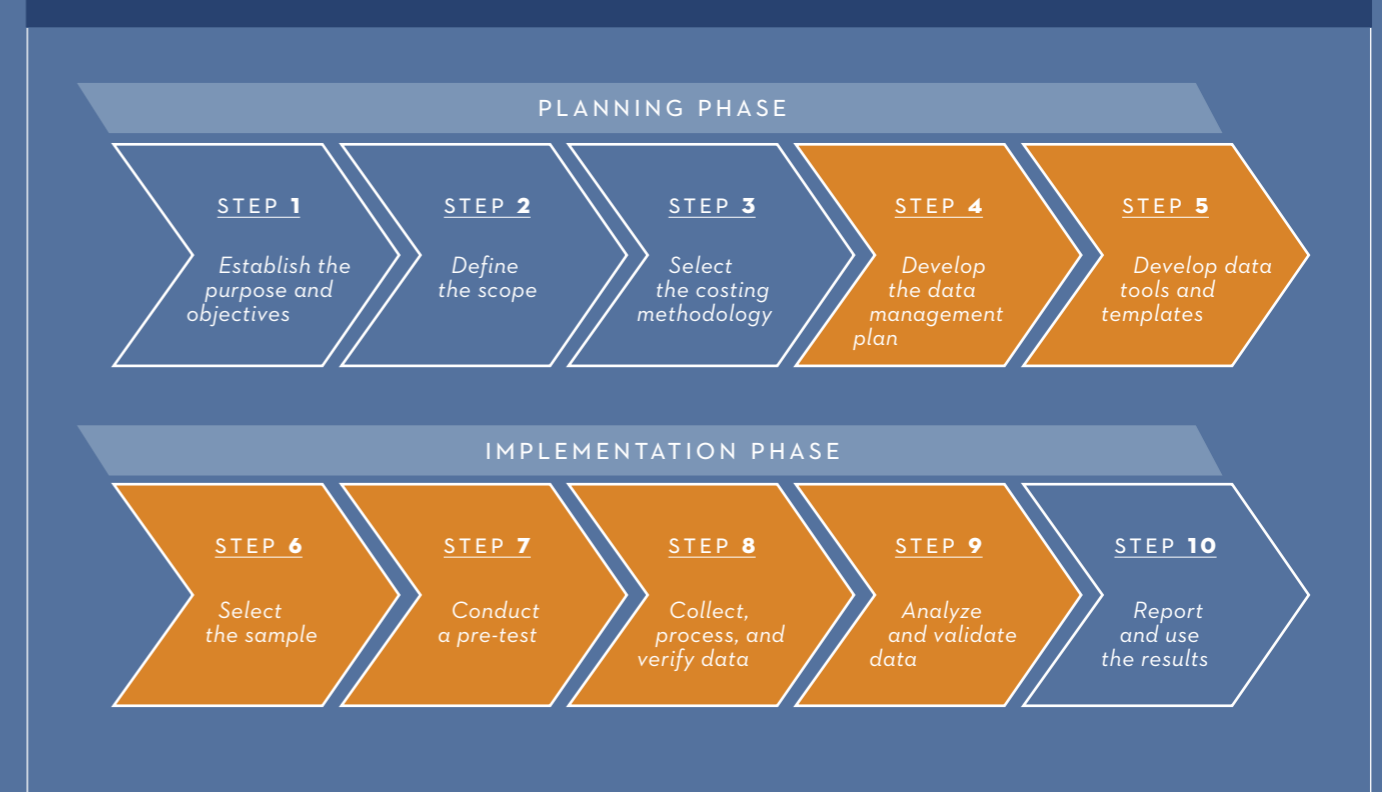
Tan, Siok Swan, and Lisbeth Serdén, Alexander Geissler, Martin van Ineveld, Ken Redekop, Mona Heurgren, and Leona Hakkaart-van Roijen. “DRGs and cost Accounting: Which Is Driving Which?” in *Diagnosis-Related Groups in Europe: Moving Towards Transparency, Efficiency and Quality in Hospitals*, edited by Reinhard Busse, Alexander Geissler, Wilm Quentin, and Miriam Wiley, 59-74. *European Observatory on Health Systems and Policies Series*. New York: Open University Press, 2011.

PART 2.

MANAGING DATA: PLANNING, COLLECTION, AND ANALYSIS

PART 2 of this manual covers **Steps 4-9** of the costing exercise: **developing a data management plan, designing data tools and templates, selecting the sample and pre-testing, and collecting, processing, and analyzing the data.** These six steps are often carried out iteratively. For example, findings from the pre-test performed in Step 7 may result in changes to the data management plan and data collection tools developed in Steps 4 and 5.

TEN-STEP PLAN FOR A COSTING EXERCISE



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Readers are encouraged to review the appendix to this manual before reading Part 2. The appendix provides detailed instructions on using the step-down cost accounting method and is necessary background for carrying out Steps 4-9.

INSTITUTIONAL ARRANGEMENTS FOR DATA MANAGEMENT

The institutional arrangements that support data management—the roles that various institutions will play in planning, overseeing, and implementing data collection, processing, and analysis—should be established at the outset of the costing exercise. These arrangements will differ from country to country. The appropriate arrangement will depend on factors such as the political and institutional environment, configuration of the health system, level of decentralization, payer and provider relationships, and the payment systems in use or under development.

The institutional arrangements will generally involve some division between the planning and oversight role (usually assumed by the health ministry or other health purchaser or a multi-stakeholder committee) and the implementation role (usually assumed by a technical unit within or outside the MOH or purchaser). If new provider payment systems are implemented following the costing exercise, the costing process may be institutionalized within the purchaser for continuous refinements to the system, using cost data submitted routinely by providers.

TABLE 20 describes the institutional arrangements used in the case examples. While there is no single ideal arrangement, the case example costing teams consider the following principles to be most important when deciding on the organizational structures and administrative procedures for data management:

- **Involve providers.** Representatives of providers should be involved in all stages of planning and carrying out data management. To ensure cooperation from the providers who are not involved in the planning process but will supply data, it can be helpful if the commissioning and/or implementing organization that engages with them has a mandate

or letter of support from relevant authorities. The institution should also be aware of the burden it is placing on providers and offer them some incentive to participate.

- **Safeguard against conflicts of interest.** If there is no purchaser-provider division, a third-party contractor may be better positioned to perform the data collection, processing, and analysis to ensure transparency in the process and impartiality in the results.
- **Strengthen local capacity.** Due to time constraints and/or costing expertise limitations, commissioning and implementing organizations sometimes engage external consultants or outsource the technical work of costing exercises entirely to third-party institutions. In these situations, knowledge transfer from the external consultants or institutions is critical to ensure that the implementing organization understands the methodology and builds local costing expertise. In addition, the external consultants or institutions should be encouraged to structure costing models and analytical files in a comprehensible and user-friendly format so the local team can modify them and even reuse them after the contract period concludes.

The companion flash drive contains a toolkit of tools and templates that the case example costing teams used to guide their data collection and analysis efforts. The toolkit includes terms of reference, costing questionnaires, dummy tables, simulation analyses, and more. These resources offer a starting point for costing teams; they require customization to suit the needs of the particular country, costing exercise, and provider payment systems. The contents of the toolkit are listed in detail in the Toolkit Resources List at the back of the manual.

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TABLE 20. Institutional Arrangements

INSTITUTIONAL ARRANGEMENTS			
CASE EXAMPLE	PLANNING AND OVERSIGHT	DATA COLLECTION	DATA ANALYSIS
<i>Aarogyasri Hospital</i>	<ul style="list-style-type: none"> • The Aarogyasri Health Care Trust (AHCT) committee—chaired by the CEO with representatives from various AHCT departments—oversaw the planning. • The AHCT costing team developed the data plan with input from providers, provider associations, and healthcare management graduates from the University of Hyderabad; they presented the plan to the AHCT committee for approval. 	<ul style="list-style-type: none"> • The AHCT costing team and University of Hyderabad research team collected the data. 	<ul style="list-style-type: none"> • The AHCT costing team and University of Hyderabad research team analyzed the data.
<i>Indonesia Casemix</i>	<ul style="list-style-type: none"> • The Indonesian MOH established the National Casemix Center (NCC), the MOH unit responsible for developing the case-based group (INA-CBG) system, and commissioned the costing exercise. • The NCC developed the data management plan for the costing exercise in partnership with an international consultant from United Nations University (UNU). 	<ul style="list-style-type: none"> • The NCC trained hospital staff in how to complete the costing template. • The NCC supervised the data collection process to ensure data quality. 	<ul style="list-style-type: none"> • The NCC team analyzed the data, assisted by the international consultant.
<i>Indonesia Health Facility</i>	<ul style="list-style-type: none"> • An MOH steering committee—chaired by the Secretary General, with members from various MOH units—oversaw the planning, with strong input from the donor and implementing organizations (Gadjah Mada University, GIZ Indonesia, and Oxford Policy Management). • International and local consultants from the donor and implementing organizations contributed to the development of the data plan. 	<ul style="list-style-type: none"> • The donor and implementing organizations contracted data collection to a private company through a competitive bidding process. 	<ul style="list-style-type: none"> • International and local consultants from Gadjah Mada University, GIZ Indonesia, and Oxford Policy Management analyzed the data.
<i>Central Asian Republics DRG</i>	<ul style="list-style-type: none"> • The MOH initiated the costing exercise, organized workshops with hospital personnel, and provided incentives for hospitals to supply data. • Local consultants funded through a USAID project designed the methodology and developed the data management plan. 	<ul style="list-style-type: none"> • Hospital staff (statisticians and economists) collected the requested data and completed the data entry forms provided by the local consultants. 	<ul style="list-style-type: none"> • Local consultants analyzed the data.

(continued)

TABLE 20, continued

INSTITUTIONAL ARRANGEMENTS			
CASE EXAMPLE	PLANNING AND OVERSIGHT	DATA COLLECTION	DATA ANALYSIS
<i>Malaysia COMPHEC</i>	<ul style="list-style-type: none"> • The MOH Institute for Health Systems Research (IHSR) initiated the project and developed the data management plan with involvement from the MOH Unit for National Health Financing and the provider (Putrajaya Health Clinic). 	<ul style="list-style-type: none"> • IHSR collected the data. 	<ul style="list-style-type: none"> • IHSR analyzed the data.
<i>Malaysian DRG</i>	<ul style="list-style-type: none"> • The Casemix team from the MOH Medical Development Division led the planning effort. 	<ul style="list-style-type: none"> • Hospital personnel collected the requested data using the costing templates provided by the Casemix team. 	<ul style="list-style-type: none"> • The Casemix team, together with accountants from the hospitals, analyzed the data.
<i>MNHA Hospital</i>	<ul style="list-style-type: none"> • The MOH Planning and Development Division oversaw the National Health Accounts (NHA) project, which included the costing exercise planning. • An MOH Research Unit developed the data management plan in collaboration with key MOH hospital personnel (administrators, accountants, matrons). 	<ul style="list-style-type: none"> • The MOH Research Unit supervised data collection. • Hospital administrators, accountants, and matrons collected the data. 	<ul style="list-style-type: none"> • The MOH Research Unit analyzed the data.
<i>PhilHealth Case Rates</i>	<ul style="list-style-type: none"> • PhilHealth initiated the costing exercise; the team assigned to develop the case rates carried out the planning. 	<ul style="list-style-type: none"> • The PhilHealth case rates team collected the data. 	<ul style="list-style-type: none"> • The PhilHealth case rates team analyzed the data.
<i>PHFI Hospital</i>	<ul style="list-style-type: none"> • The PHFI analyst led the planning effort, with the involvement of hospital administrators and personnel from various departments and divisions. 	<ul style="list-style-type: none"> • The PHFI analyst collected the data, with the assistance of hospital administrators and staff from various departments. 	<ul style="list-style-type: none"> • The PHFI analyst analyzed the data.
<i>Vietnam Primary Care</i>	<ul style="list-style-type: none"> • Numerous stakeholders contributed to the data management plan, including the MOH Department of Planning and Finance, MOH Department of Insurance, Hanoi Medical University (HMU), Health Strategy and Policy Institute (HSPI), provincial health bureaus, district health offices, and providers. 	<ul style="list-style-type: none"> • Providers submitted their data by completing costing instruments developed by HMU and HSPI. 	<ul style="list-style-type: none"> • HMU and HSPI staff analyzed the data.

COST MEASUREMENT AND VALUATION: THE CORE OF THE DATA MANAGEMENT PLAN

Costing involves measuring and valuing the resources, or cost items, consumed by a provider organization, department/specialty, service, or patient over the time period covered by the costing exercise. These resources are the inputs (direct and indirect) that the provider

uses to provide health services to patients and operate the facility.

The process to determine the cost of these resources has three stages, as shown in **FIGURE 5**.

In Step 2 of the costing exercise, the costing team identifies the resources used and determines which ones to

include in or exclude from the costing exercise. In Step 4, the team documents the data needed to measure and value these cost items for the data plan. The examples in **TABLE 21** illustrate the distinction between measurement and valuation and how their data needs differ.

FIGURE 5. Costing Sequence

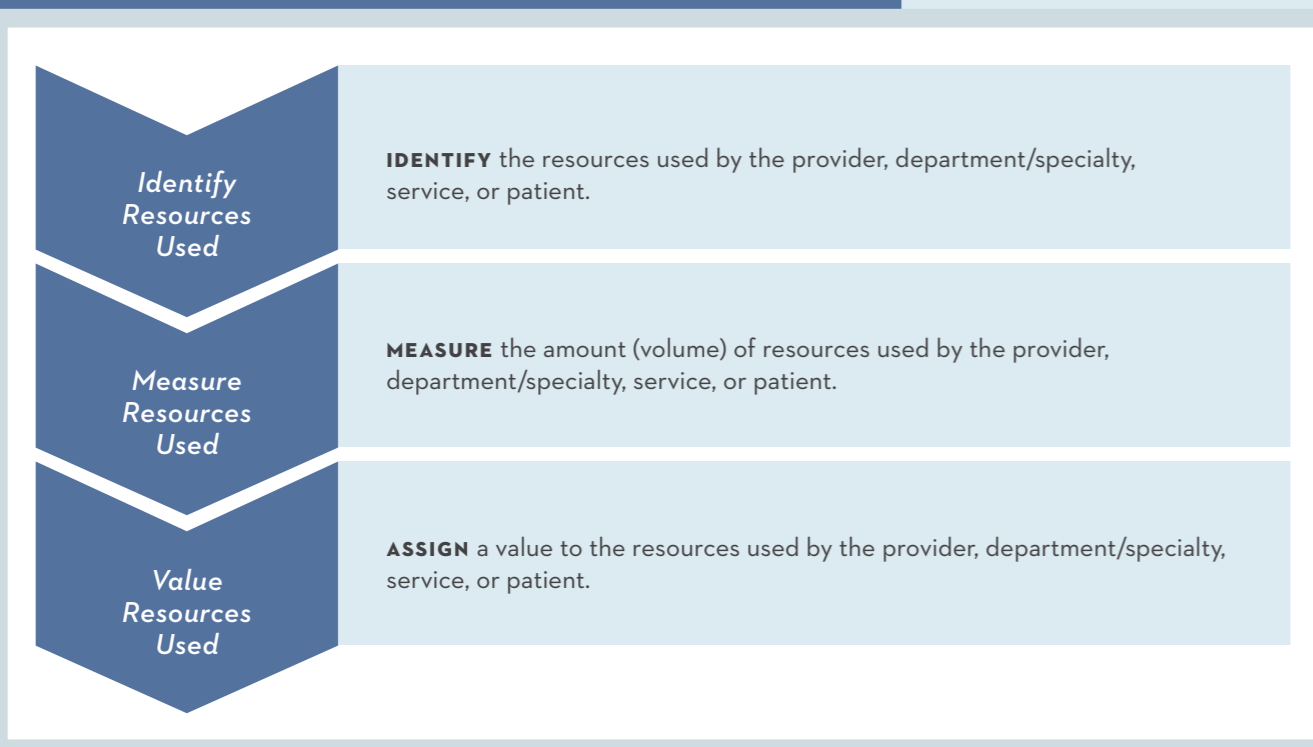


TABLE 21. Resource Measurement vs. Resource Valuation

RESOURCES (COST ITEMS) USED	RESOURCE MEASUREMENT	RESOURCE VALUATION	
Recurrent Costs			
PERSONNEL: <ul style="list-style-type: none"> Personnel time 	Amount of staff time spent on clinical, clinical support, or administrative activities, captured by number of full-time equivalents (FTEs)	Department FTEs	x Salary + benefits + overtime + other personnel payments
DRUGS/MEDICAL SUPPLIES: <ul style="list-style-type: none"> Drugs Medical, surgical, and diagnostic supplies and consumables Vaccines Blood products Oxygen and medical gases 	Quantity of drugs and medical supplies consumed	$\frac{\text{Department quantity consumed}}{\text{Total quantity consumed}}$	x Total drug/medical supply expenditures
UTILITIES: <ul style="list-style-type: none"> Electricity Water Generator fuel 	Volume of utilities consumed within a department, measured using an allocation base as a proxy for use (e.g., square meters for electricity costs)	$\frac{\text{Department square meters}}{\text{Total facility square meters}}$	x Total utility expenditures
OTHER RECURRENT COSTS: <ul style="list-style-type: none"> Administrative Non-medical supplies Patient/staff food Fuel, oil, and other lubricants Stationery/office supplies Communications (telephone, Internet) Minor repairs and maintenance Outsourced services Rent 	Quantity of materials consumed within a department, measured directly or using an allocation base as a proxy for use (e.g., bed-days, kilometers driven, number of phone lines)	$\frac{\text{Department volume consumed}}{\text{Total volume consumed}}$	x Total other recurrent expenditures
Capital Costs			
BUILDINGS: <ul style="list-style-type: none"> Building construction Building renovation 	Building area occupied by a department	$\frac{\text{Department square meters}}{\text{Total building square meters}}$	x Building depreciation cost
MEDICAL AND NON-MEDICAL EQUIPMENT: <ul style="list-style-type: none"> Medical, surgical, and diagnostic equipment Office equipment Air conditioners Generators Furniture Software Vehicles 	Number of items in department inventory for each categorized type of capital asset	Number of department assets	x Asset depreciation cost

STEP 4.

DEVELOP THE DATA MANAGEMENT PLAN

The **data management plan** involves identifying the minimum data set required for the costing exercise, identifying existing data sources, determining the level of data disaggregation, and anticipating challenges related to accessing sensitive data and data quality.

IDENTIFYING THE MINIMUM REQUIRED DATA SET

The first task in developing a data management plan is to identify the required data set for the costing exercise, which includes the data elements, their structure, and their sources. The least expensive and least labor-intensive approach is to use the minimum data set needed to obtain valid results and to use readily available data sources. Costing teams should consider more expensive and time-consuming data collection efforts only if the extra benefits outweigh the additional costs.

To identify the minimum required data set, costing teams should review previous costing exercises conducted in their country and consult with provider staff, health information system experts, and representatives from organizations involved in provider financing or management (such as health and finance ministries and provincial health departments) about their existing data sources. From there, the team can map out a data management plan, taking into account eight key considerations, as described in [TABLE 22](#).

Collecting more detailed and comprehensive data does not necessarily result in more accurate cost results. The following guidelines can help costing teams collect only the essential data and thereby minimize the burden on providers:

- Develop an inclusive data plan, but scale back after a reality-check assessment of what is feasible to collect.
- Focus on capturing large expenditure items rather than chasing down every single data point.
- Consider excluding data that are likely to have negligible impact on the results.

TABLE 22. Key Considerations for a Data Management Plan

Minimum Data Set	What is the minimum data set needed to generate cost estimates?	Data Collection	Does the team have the capacity, time, and budget to collect the minimum data set?
Data Availability	Is the minimum data set available from providers and other sources?	Data Accessibility	If the minimum data set is available, are providers willing to share it?
Data Format	Are the data in hard or soft copy (paper or digital format), and is the format standard across providers?	Data Structure	What level of data disaggregation is needed for the analysis?
Data Period	Are historical data sufficient or is new data collection needed?	Data Quality	How will problems with incomplete and inaccurate data be addressed?

The requested data elements should all be relevant to the costing exercise. The following questions can help ensure that the collected data are relevant:

- Will the data element directly contribute to meeting the objectives of the costing exercise?
- How will the data element be used in the analysis?
- If the data element is not readily available or is difficult to collect, is a reasonable substitute or proxy available or can the gap be filled

using an assumption, estimation, or extrapolation without compromising validity?

The pre-test in Step 7 also will help answer the question of whether all the data elements in the plan are necessary for the analysis and whether they are too difficult to collect.

TABLE 23 describes lessons that the case example costing teams learned about developing a minimum data set.

TABLE 24 presents an illustrative minimum data set for a top-down costing exercise and describes how the data elements would be used for analysis. The data elements listed include cost items, utilization statistics, and allocation statistics. The table is not meant to be prescriptive—rather, it offers a starting point for costing teams, who will need to make adjustments to reflect the unique aspects of their own costing exercise.

COLLECTING DATA ON EXPENDITURE AND REVENUE SOURCES

It may be important to collect data on both expenditures and revenues in order to map the funds flow and link expenditures to revenue sources as needed and if possible. For example,

salaries may be financed by the central government while some drugs may be provided in-kind by donors. Even though the costing team may ultimately exclude costs from some funding sources in the final cost estimates, it can be important to collect these data because they can provide a better understanding of the funds flow, help with expenditure tracking, and help construct a picture of the total facility cost.

Data on expenditures paid from funding streams outside of a facility’s mainstream budget also may be relevant for a costing exercise that takes a provider perspective. (See Step 2.) For example, the Aarogyasri costing team had to be creative in estimating fees that hospitals collected on behalf of non-staff clinicians and the associated payments for these services. These expenditures were often not recorded in hospital accounting books, so the costing team interviewed providers to determine how best to estimate those costs.

DETERMINING THE LEVEL OF DATA DISAGGREGATION

Next, the costing team must determine the level of disaggregation needed in the data. Note that it may be necessary to collect data in aggregate form and disaggregate them later using other methods. The level of disaggregation needed primarily depends on the cost object selected (see Step 2) and the costing methodology used (see Step 3). For example, measuring personnel time for a bottom-up costing exercise may require detailed estimates of minutes spent on patient care for specific diagnoses or procedures—highly disaggregated data. Measuring personnel time for a top-down exercise may require only the number of full-time equivalents and their positions within a department—far more aggregated data.

The available level of disaggregation will depend on the costing exercise orientation and the sophistication of the accounting and information systems of the providers. The orientation can impose limitations on the type of measurement that is possible. A prospective costing exercise typically allows more direct control over measurement because the resources have not yet been used and the costing instrument can dictate the level of disaggregation. In a retrospective costing

exercise, the resources already have been used and the data have already been captured, so opportunities for additional measurement are limited. The sophistication of the accounting and information systems also can affect the type of measurement that is possible. For example, some advanced systems track personnel time by room or procedure, while others track only the number of staff assigned to a department.

A good guiding principle is to collect data at their existing level of disaggregation and detail. If costing teams need further disaggregation, they can consult experts to parse the data or use allocation statistics to convert aggregate data into the disaggregated format they need. For example, this may be necessary to parse inpatient and outpatient expenditures recorded in aggregate. (See Steps 2 and 9.) They can also ask providers to modify how they track and record data to ensure that data are available in the right format for subsequent costing exercises or routine cost accounting, including for regular provider payment system refinements.

TABLE 23. Lessons on Developing a Minimum Data Set

THEME	LESSONS FROM THE CASE EXAMPLES
Focus on large expenditure items and data that are feasible to collect.	The MNHA Hospital costing team learned that they could have designed a simpler costing questionnaire because some of the detailed expenditure data requested of hospitals (e.g., telephone bills) were difficult to collect and did not have a significant impact on the final average cost. Likewise, the PHFI Hospital costing team spent a long time collecting data from laundry registers on the kilograms of laundry washed, to use as allocation statistics. An alternative allocation base (e.g., bed-days) could have yielded sufficient results without the time-consuming tallying of laundry registers. These examples illustrate the importance of striking a balance between practicality and a flawless methodology. The detail obtained from the telephone bills and laundry registers did not improve the validity of the cost analysis, and the data were impractical to obtain.
Avoid overcollecting data.	Research teams tend to request more data elements than are essential for the costing exercise for fear of failing to obtain data that may be deemed valuable. As a result, many case example teams found that they did not use all of the data they collected. For example, the Indonesia Health Facility costing team collected data with the intention of doing a more in-depth analysis, but they ultimately decided that the basic unit cost analysis was sufficient for the initial analysis. Similarly, the Aarogyasri Hospital costing team collected data at a very granular level and discovered after data collection that this level of granularity was not needed for their benefit packages costing.
Simplify costing instruments to collect only essential data.	When institutions repeat costing exercises, they typically update the costing instruments by deleting rather than adding data elements. In the Central Asian Republics, for example, the costing team conducted several costing exercises over the course of 20 years. The initial costing instrument was more complicated and comprehensive than necessary; the costing team simplified the instrument over time to enable routine costing by focusing on only essential data. Similarly, the Aarogyasri Hospital costing team simplified its costing instrument based on lessons learned from the initial costing exercise.
Conduct a pre-test.	The PHFI Hospital and Vietnam Primary Care costing teams initially collected more data than needed but adjusted the data requirements following a pre-test, which revealed that certain data were too difficult to collect or that data elements were extraneous to their analysis. PHFI collected more data from the first hospital sampled in order to assess the feasibility of and time required for data collection. The costing team determined that it was too labor-intensive to collect data at a highly detailed and disaggregated level (e.g., personnel time, equipment use time, materials used for laboratory procedures), so it discontinued the collection of those data for the other hospitals sampled. Similarly, the Vietnam team scaled down its data request after piloting the costing methodology and instrument and determining which data elements were peripheral to the analysis.

IDENTIFYING EXISTING DATA SOURCES

After identifying the minimum data set needed and the type of data to collect, the costing team should assess the availability of data to satisfy each data element; identify the database, report, or system that houses those data; and determine the format, level of disaggregation, and reporting frequency of the data. This usually involves visiting providers, purchasers, health offices, and health departments.

Data sources often are not centralized at provider facilities. They may be scattered among provider departments and potentially located outside the facility at purchasers, local health offices, health departments, or central ministry offices. **Box 9** provides examples of data sources that may be relevant for a costing exercise.

A data tracking form can be helpful for identifying and documenting the data sources for the required data elements.

Table 25 shows a sample data tracking form that can be tailored to a specific costing exercise. It also includes

a place to document the funding source (such as the central government, local government, insurance scheme, donor, or patient out-of-pocket), which can help determine which resources to include or exclude based on the perspective of the costing exercise (as part of Step 2).

ANTICIPATING DATA CHALLENGES

Even if the data sources exist, some providers may not be willing to make the data available. Depending on the relationship between providers and the commissioner of the costing exercise, providers may be hesitant to disclose data that they consider sensitive or confidential. For example, salary information is often considered sensitive, as are attendance records that may reveal dual practice among the facility staff. If private providers are included in the costing exercise, the costing team must work to win their trust and cooperation. Making an effort to identify the costs that are particularly relevant to private-sector providers (such as the cost of land and capital assets), understanding their data sources, and guaranteeing confidentiality can help build trust and

gain their cooperation. At this early stage, it is helpful to anticipate some of these data accessibility challenges and determine how to reassure providers. Step 8 provides more tips on how to work with providers to obtain data.

Costing teams will inevitably face challenges associated with the quality of the data obtained from providers—their accuracy, reliability, timeliness, relevance, completeness, and consistency. It is best to anticipate these problems at this early stage of the costing exercise. Some costing teams implement a quality assurance system that includes reviewing data to identify problems and developing a plan to address them. Step 8 reviews quality assurance systems, and Step 9 provides tips for managing data quality issues through analytical techniques.

Finally, the data management plan must fit within the time and budget constraints of the costing exercise. The team should flag potential challenges relating to the availability, accessibility, and quality of data and ensure that the entirety of the data management plan is feasible.

Box 9. Potential Data Sources

- Audited financial reports
- Managerial financial reports
- Profit and loss (P&L) statements
- Accountant General accounts databases
- Treasury disbursement reports
- Budget and planning documents
- General ledgers, cash books, or journals
- Building and asset inventory lists
- Capital management databases
- Capital expenditure reports
- Supply inventory reports
- Procurement invoices/reports
- Donated logistic reports
- Outsourced agency databases
- Facility price lists
- Health management information system (HMIS)
- Utilization reports
- Medical records/patient charts
- Claims databases
- Patient bills
- Utilization logbooks
- Department registers/logbooks
- Staff compensation reports
- Staff rosters and work schedules

TABLE 24. Illustrative Minimum Data Set for a Top-Down Costing Exercise

ILLUSTRATIVE DATA ELEMENT	HOW THE DATA ELEMENT IS USED FOR ANALYSIS
Facility Profile	
Facility reference number	<ul style="list-style-type: none"> To assign a unique identification number to each facility to link cost data with other data and/or preserve the anonymity of the facility
Provider departments/ specialties, services, and/or procedures	<ul style="list-style-type: none"> To identify the provider cost objects (see Step 2) to which costs will be assigned and allocated
Floor area (square meters)	<ul style="list-style-type: none"> To use as an allocation statistic for certain cost items (e.g., utilities cost, depreciation cost)
Utilization	
Discharges, bed-days, visits, lengths of stays	<ul style="list-style-type: none"> To calculate unit costs To use as an allocation statistic for certain cost items (e.g., overhead cost by bed-day, patient food costs by bed-day, transport costs by discharge)
EKGs, ultrasounds, X-rays, lab tests, blood products, etc.	<ul style="list-style-type: none"> To calculate intermediate unit costs To use as an allocation statistic for Clinical Support department costs (e.g., number of ultrasounds for Echography Department cost)
Number of surgeries or hours of surgery	<ul style="list-style-type: none"> To use as an allocation statistic for Operating Theater department cost
Personnel Cost	
Personnel (FTEs or headcount) by type or category of personnel	<ul style="list-style-type: none"> To measure the amount of personnel time used by a provider, department/specialty, service, or patient To use as an allocation statistic for certain costs (e.g., Administration department cost, uniforms cost)
Salaries, benefits and allowances (housing, family, location, hazard, etc.), overtime payments, incentives and bonuses, payroll tax, other personnel payments	<ul style="list-style-type: none"> To assign value to the amount of personnel time used by a provider, department/specialty, service, or patient
Drug/Medical Supply Cost	
Volume of drugs, medical/ surgical/diagnostic supplies and consumables, vaccines, blood products, oxygen, medical gases	<ul style="list-style-type: none"> To measure the amount of drugs, medical supplies and consumables, vaccines, blood products, oxygen, and medical gases used by a provider, department/specialty, service, or patient
Expenditures on drugs, medical/ surgical/diagnostic supplies and consumables, vaccines, blood products, oxygen, medical gases	<ul style="list-style-type: none"> To calculate the value of the quantity of drugs, medical supplies and consumables, vaccines, blood products, oxygen, and medical gases used by a provider, department/specialty, service, or patient

(continued)

TABLE 24, continued

ILLUSTRATIVE DATA ELEMENT	HOW THE DATA ELEMENT IS USED FOR ANALYSIS
Utilities Cost	
Electricity, water, generator fuel, other utility expenditures	<ul style="list-style-type: none"> To calculate the value of the volume of utilities used by a provider, department/specialty, service, or patient <ul style="list-style-type: none"> It is possible to measure at a detailed level the volume of utilities consumed (e.g., kilowatt usage, number of water taps, gasoline/diesel usage), but it is adequate and more practical to allocate utilities cost by square meters.
Other Recurrent Cost	
Expenditures on general administrative items, non-medical supplies, patient/ staff food, fuel/oil and other lubricants, stationery and office supplies, communications, minor repairs and maintenance, outsourced services, rent, other recurrent items	<ul style="list-style-type: none"> To calculate the value of the volume of other recurrent items used by a provider, department/specialty, service, or patient <ul style="list-style-type: none"> It is possible to measure at a detailed level the volume of other recurrent items consumed (e.g., number of patient meals, number of reams of paper), but it is adequate and more practical to allocate these costs using relevant allocation statistics (e.g., FTEs, square meters, bed-days).
Capital Cost	
Inventory of buildings	<ul style="list-style-type: none"> To identify the buildings used by a provider, department/specialty, service, or patient
Floor area (square meters)	<ul style="list-style-type: none"> To measure the portion of a building used by a provider, department/specialty, service, or patient in order to apportion building depreciation or construction cost
Building depreciation and construction cost	<ul style="list-style-type: none"> To calculate the value of the space of a building used by a provider, department/specialty, service, or patient
Inventory of medical equipment and non-medical equipment	<ul style="list-style-type: none"> To identify the capital assets used by a provider, department/specialty, service, or patient
Depreciation of medical equipment and non-medical equipment	<ul style="list-style-type: none"> To calculate the value of the capital assets used by a provider, department/specialty, service, or patient

TABLE 25. Sample Data Tracking Form

DATA ELEMENT	REPORT/SYSTEM	REPORTING FREQUENCY	DATA FORMAT	SOURCE OF FUNDS
Facility Profile				
Facility reference number	Unique identifier generated by the costing team or an existing identifier (used for claims data, for example)			
Provider departments/ specialties and/or services/ procedures	List of departments/specialties and/or services/procedures	E.g., annual	E.g., soft copy	
Floor area (square meters)	Building map, facility planning documents, or capital database			
Utilization				
Patient demographic characteristics	Health management information system (HMIS), utilization reports, medical records, or patient charts			
Discharges, bed-days, visits				
Length of stay (LOS)				
EKGs, ultrasounds, X-rays, lab tests, blood products, etc.	HMIS or registers from Clinical Support departments			
Number of surgeries or hours of surgery	HMIS or register from Operating Theater			
Personnel				
Personnel (FTEs or headcount) with positions and grades	Facility personnel list			
Salaries	Salary report, financial report, P&L statement, or general ledger			E.g., central gov't
Benefits and allowances	Financial report, P&L statement, or general ledger			
Overtime payments				
Incentives and bonuses				
Payroll tax				
Other personnel payments				

(continued)

TABLE 25, continued

DATA ELEMENT	REPORT/SYSTEM	REPORTING FREQUENCY	DATA FORMAT	SOURCE OF FUNDS
Drug/Medical Supply Cost				
Expenditures on drugs, medical/surgical/diagnostic supplies and consumables, vaccines, blood products, oxygen, medical gases	Central medical store invoices			
	Retail pharmacy invoices			
	Financial report, P&L statement, general ledger			
	Donated logistic reports			
Utilities				
Expenditures on electricity, water, generator fuel, other utilities	Financial reports, P&L statement, general ledger, or utility invoices			
Other Recurrent				
Expenditures on general administrative items, non-medical supplies, patient/ staff food, fuel/oil and other lubricants, stationery and office supplies, communications, minor repairs and maintenance, outsourced services, rent, other recurrent items	Financial reports, P&L statement, general ledger, or procurement invoices			
Capital				
Inventory of buildings, including year constructed	Building map, facility planning documents, or capital database			
Floor area (square meters)	Building map, facility planning documents, or capital database			
Building depreciation and construction expenditures	Capital asset database or capital expenditure report			
Inventory of medical and non-medical equipment				
Medical and non-medical equipment depreciation				

CHECKLIST

STEP 4: DEVELOP THE DATA MANAGEMENT PLAN

- ✓ **ESTABLISH** clear institutional arrangements, roles, and responsibilities for overseeing and implementing data collection, processing, and analysis.
- ✓ **IDENTIFY** the minimum data set required to obtain valid results, using readily available data sources.
- ✓ **REVIEW** previous costing exercises and consult with providers, health management information system experts, and other technical experts about existing data sources.
- ✓ **VISIT** provider facilities, health offices, health departments, and other locations where data may be stored to document where data are available and understand key characteristics of the data.
- ✓ **DETERMINE** the level of data disaggregation needed for the analysis.
- ✓ **DEVELOP** strategies for dealing with potential data challenges, such as inaccessible, incomplete, or inaccurate data.
- ✓ **EVALUATE** the feasibility of the data management plan given the time and budget constraints.

RESOURCES

Raftery, James. "Costing in Economic Evaluation." *BMJ* 320 (2000): 1597.

LESSONS LEARNED

"Adopt the least expensive and least labor-intensive data collection and management plan that is necessary to obtain valid results."

"DO NOT BE LIMITED COMPLETELY BY DATA AVAILABILITY—CRITICAL DATA WILL NEED TO BE COLLECTED SOMEHOW."

"IDENTIFY A MINIMUM REQUIRED DATA SET WITH A SIMPLE FORMAT TO MINIMIZE THE BURDEN ON PROVIDERS AND DATA COLLECTORS."

"PRIMARY DATA COLLECTION MAY BE NECESSARY TO DEVELOP ALLOCATION STATISTICS TO PARSE INPATIENT AND OUTPATIENT COSTS."

"It is not essential to trace expenditures to the revenue source for estimating unit costs, but it can be helpful to do so to understand the full picture of resources available at the provider level."

STEP 5.

DEVELOP DATA TOOLS AND TEMPLATES

DESIGNING COSTING INSTRUMENTS

Most costing exercises use one or more costing instruments to collect the bulk of the data. These instruments may include financial modules, provider staff or patient questionnaires, medical record audits, surveys for direct observation or time-motion studies, and so on. Costing teams typically develop their own costing instruments because it may be too time-consuming to extract the necessary data from existing sources such as reports and databases. Using existing sources also often requires some analysis or modification to put the data into the format needed for the costing exercise. Costing teams therefore develop instruments that integrate both primary and secondary data collection requirements in one form.

The costing teams in the case examples reviewed instruments obtained from colleagues or costing training courses to help them develop the structure and key questions for their instruments. They then significantly adapted the instruments to address their own particular costing exercise objectives and the availability and format of existing data. They also adapted the language to ensure that providers would understand the terminology.

Instruments vary in format, ranging from paper-based questionnaires to data entry workbooks in Microsoft Excel. The main disadvantage of paper-based questionnaires is the significant data entry and processing work required to convert the data into a usable format for analysis. The main disadvantage of the digital format is the potential for file corruption and data loss.

Another common data collection method involves extracting data from existing databases. This method does not require development of an instrument, but retrieval is limited to existing data.

TABLE 26 describes the instruments

used in the case examples. Many of these instruments are available in the toolkit on the companion flash drive.

DEVELOPING DATA PROCESSING AND ANALYTICAL TOOLS

To ensure that the costing instruments are comprehensive and compile data in the needed structure, the costing team should determine how data will be analyzed, which variables they will examine, and how they will present the results. It can be helpful to create data flow diagrams, data entry templates, dummy tables, and analytical models at this stage.

A data flow diagram depicts the movement of data between actors in the costing exercise—for example, movement between enumerators, data processors, data verifiers, and analysts. The diagram should note the work or actions each actor performs to transform input data into output results. FIGURE 6 shows the data flow diagram for the Indonesia Health Facility costing exercise.

Dummy tables are mock tables that mimic a regular results table but are not populated with data. (See FIGURE 7.)

They can be developed for both data entry and data analysis. Dummy tables ensure that data processing and analysis follow a logical sequence. They facilitate analysis in the following ways:

- They help define the required structure and organization of data before it is processed and analyzed.
- They help identify any previously overlooked data elements that should be incorporated into the costing instrument.
- They clarify to enumerators and providers which data elements are needed, and they describe how the requested data will contribute to a unit cost calculation.
- They provide rationale for inclusion of variables that may not seem directly related to the cost analysis (e.g., urban/rural).
- They can expose variables or data elements that will not be used in the analysis and can be excluded from the minimum data set.

TABLE 26. Data Collection Instruments

CASE EXAMPLE	INSTRUMENT FORMAT	INSTRUMENT DESCRIPTION
Aarogyasri Hospital	7 Excel workbooks	The instruments included: (1) templates to collect data on the facility profile, capital cost, and operating expenditures for the top-down methodology; (2) templates to collect clinical data for the bottom-up approach; and (3) templates for verification and triangulation of both methodologies to understand the authenticity of the data.
Indonesia Casemix	1 Excel workbook with 2 worksheets	The instrument included one table to collect utilization and other basic hospital data and one table to collect operating cost and capital data.
Indonesia Health Facility	4 hard-copy instruments	The instruments were tailored for public health centers (Puskesmas), hospitals, hospital lab and radiology departments, and district health offices. The instruments had modules for the facility profile, physical infrastructure, funds flow, equipment, activities (utilization), intermediate activities (ancillary/paraclinical utilization), human resources, drugs and medical supplies, expenditures, and a patient survey.
Central Asian Republics DRG	1 Excel workbook	The instrument had one long table with columns for the standard list of departments and rows for required allocation statistics and financial data.
Malaysia COMPHEC	1 Excel workbook	The line-item template listed all of the resources consumed for a particular procedure.
Malaysian DRG	1 Excel workbook with 22 worksheets	The file included tables for listing departments, personnel department distribution and time allocation, personnel compensation, assets and inventory, drug expenditures, other expenditures, utilization, floor area, and out-of-pocket expenditures.
MNHA Hospital	1 Excel workbook with 18 worksheets	Each worksheet targeted a different hospital department, with questions on the cost of services, expenditures, personnel workload, personnel compensation, utilization, and allocation statistics.
PhilHealth Case Rates	Not applicable	PhilHealth routinely extracted data from the claims database, so a special data collection effort was not necessary and a data collection template was not required.
PHFI Hospital	1 Excel workbook	The workbook included tabs for cost centers, human resources, personnel time allocation, building and land, equipment, utilities, and other materials.
Vietnam Primary Care	2 Excel workbooks	One workbook requested data for district hospitals and another requested data for commune health stations (health centers). The workbooks had tabs for general information, utilization, revenue, personnel, drugs, recurrent expenditures, building, medical equipment, and non-medical equipment.

FIGURE 6. Data Flow Diagram: Indonesia Health Facility

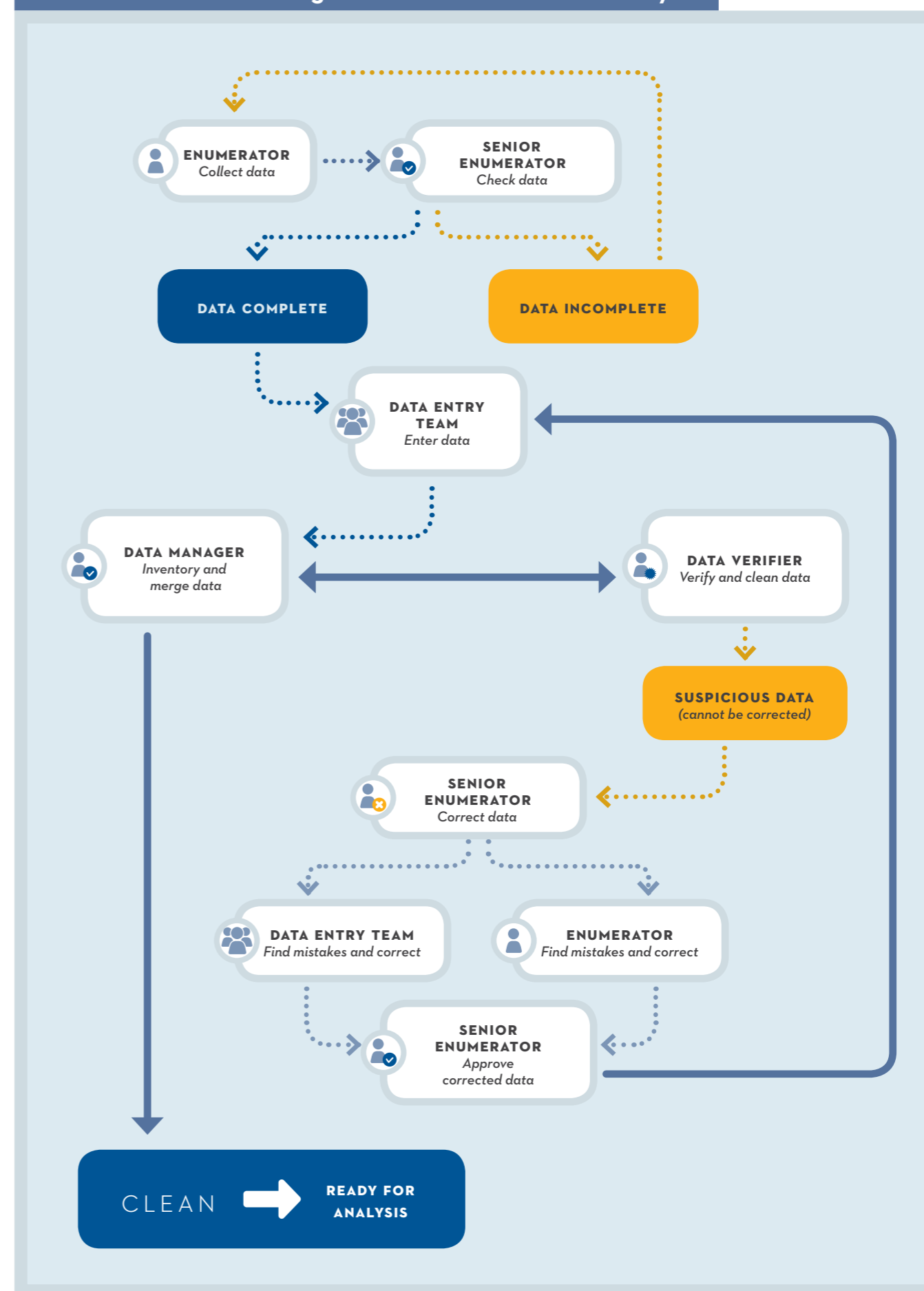


FIGURE 7. Cost Accounting Dummy Table: Central Asian Republics DRG

	Finance & Procurement	Laundry	Kitchen	Transport by Staff	Security	Other Administrative	Pharmacy by Docs	Imaging	Laboratories	Physiotherapy	Operating Theater	Emergency Care	Admission
Hospital Totals													
Finance & Procurement													
Laundry													
Kitchen													
Transport													
Security													
Other Administrative													
Pharmacy													
Imaging													
Laboratories													
Physiotherapy													
Operating Theater													
Emergency Care													
Admission													
Intensive Care													
Surgery													
Ophthalmology													
Therapy (Internal Medicine)													
Gynecology													
Neonatal													
Maternity													
Mental health													
Dental													
Pediatric													
Otolaryngology (ENT)													
OPD													
Other Health Professionals (Disease Prevention) Infectious Diseases													
Delivery													
Total													

SELECTING SOFTWARE FOR DATA PROCESSING

The costing team must also select and procure the appropriate software, materials, and equipment for data processing. Data processing involves entering data into spreadsheets and dummy tables, reformatting data, and cleaning data to prepare for analysis. This can be particularly time-consuming when the data are collected using paper-based instruments. But even teams that use Excel-based costing instruments must process the data for analysis by reorganizing, cleaning, and verifying the data.

Excel is typically an adequate software package for data processing because it permits relatively easy manipulation of data and is widely used and understood, thus allowing for more transparent data capture and presentation.

For most of the case examples, the data entry process was not distinct from data collection because provider, purchaser,

or third-party staff completed Excel-based costing instruments that were directly imported into the dummy tables and/or costing models for analysis. PhilHealth also did not have a separate data entry process because the purchaser extracted data for analysis directly from its claims database. The Indonesia Health Facility team, on the other hand, manually entered data into electronic files because the costing instrument was administered in hard-copy format only. Data collectors first recorded raw data in the costing instrument using a ballpoint pen. Data processors then manually entered the data into Excel-based data entry tools. Analysts imported the files from the data entry tools into Microsoft Access for analysis.

To build the costing model for the analysis, the case example costing teams used published models, tailored published models to their own costing needs, or developed their own models. The software they selected for the analysis depended on the requirements

of the analysis, as described in **TABLE 27.** The toolkit on the companion flash drive includes some examples of their cost accounting models.

IDENTIFYING AND TRAINING THE DATA TEAM

The data management plan should include a profile of the data team, including the desired qualifications of team members, their role in the project, and their numbers. The team may include data management supervisors, enumerators (data collectors), data processors, data verifiers, and analysts. Individual team members often play multiple roles.

The profile of the team will depend on the scope of the costing exercise and time and budget constraints, all of which can affect the approach to data collection, processing, and analysis. For more labor-intensive and analytically rigorous tasks, additional consultants or technical advisors may be needed to supplement the capabilities of the data team.

TABLE 27. Costing Models and Analytic Software

CASE EXAMPLE	COSTING MODEL		ANALYTIC SOFTWARE	
	TYPE	RATIONALE	TYPE	RATIONALE
Aarogyasri Hospital	Unique model	The model was customized based on the size of the facility and the level of disaggregated data.	Microsoft Excel	The costing team and provider personnel were familiar with Excel, and the files were easy to analyze, share, and present to various stakeholders.
Indonesia Casemix	Model published by United Nations University (UNU): The Clinical Costing Model (CCM)	The National Casemix Center (NCC) contracted UNU for the project, and UNU provided the CCM software.	Statistical Package for the Social Sciences (SPSS) and CCM software package	The team used SPSS to analyze hospital statistics and patient diagnosis data; it used CCM to calculate unit costs.
Indonesia Health Facility	Unique model	The data forms at facilities were very specific, so it was more useful to design a questionnaire and a model that reflected the reality of the data.	Stata	The software facilitated analysis of large data sets and quick rerun of analyses.
Central Asian Republics DRG	Published model, later modified for subsequent costing exercises	After a few years, the team developed a unique template with a standard set of departments, budget chapters, and allocation parameters based on the country.	Microsoft Excel	Excel made the analysis transparent for hospital administration so the results could be used for internal management.
Malaysia COMPHEC	Unique model adapted from multiple published models	The model could accommodate variations across clinics in Malaysia and could be adapted and used at other health centers.	Microsoft Excel	The MOH and clinic staff understood how to use and interpret Excel.
Malaysian DRG	Published model (first used in Rio de Janeiro, Brazil)	The model summarized in a simplified diagram all the cost centers, data elements, and allocation statistics.	Microsoft Excel	Excel was easy to understand and was user-friendly.

(continued)

TABLE 27, continued

CASE EXAMPLE	COSTING MODEL		ANALYTIC SOFTWARE	
	TYPE	RATIONALE	TYPE	RATIONALE
MNHA Hospital	Unique model	A unique model was helpful because of the requirements of the analysis and the information available.	Microsoft Excel	Excel was easy to learn, and the data were easy to see and trace if any errors were made during analysis.
PhilHealth Case Rates	No model	The team analyzed claims directly in the scheme database.	Microsoft Excel	Excel was sufficient for the analysis.
PHFI Hospital	Unique model	The published models could not support the requirements of the analysis.	Microsoft Excel	Excel was a convenient and adequate tool for the cost accounting.
Vietnam Primary Care	Unique model adapted from published models	The team decided that a unique model would be more flexible if changes were needed.	Microsoft Excel	Excel was user-friendly, made the analysis transparent, and could link data from an Excel-based costing instrument to cost accounting calculations.

The qualifications of the data team will vary depending on the context and complexity of the costing exercise and the role for which the team members are hired. For example, some medical expertise may be helpful if the costing exercise includes bottom-up costing of particular diagnoses or procedures, but such expertise would not be critical for a top-down costing exercise. The Aarogyasri costing exercise employed enumerators with a medical background for the bottom-up component but not for the top-down financial component. Another important consideration is the extent to which team members should have finance or health economics expertise. Enumerators and data processors typically do not need to have this background, but some finance or health economics training is important for analysts.

There is no definitive rule regarding the number of people to include on the data

team. The scope of the costing exercise (see Step 2) and the number of facilities in the sample (see Step 6) will certainly influence the required size. There are trade-offs between having a large team that can quickly complete the work and a small team that can handle the data in a standardized way. The Indonesia Health Facility costing exercise employed hundreds of enumerators to meet the needs of the large sample size (almost 500 facilities). The MNHA Hospital costing exercise engaged fewer team members with the intention of collecting and analyzing data in a standardized way.

The case examples used the following criteria to determine the appropriate size of the data team:

- Number and types of health facilities
- Facility volume of services/workload
- Volume of data to collect
- Available time to collect the data

- Sophistication/automation of facility accounting and reporting systems
- Geographical distance between facilities
- Available budget

The enumerators for the case examples came from providers, purchasers, and/or third-party organizations (such as universities and research institutes), depending on the configuration of the health system and the scope and institutional arrangements of the costing exercise. The data collection arrangements can evolve over time as the costing exercise is institutionalized within the purchaser or other agency and providers routinely submit cost data to inform continuous provider payment system refinements.

TABLE 28 describes the affiliations of the enumerators retained in the case examples. TABLE 29 describes the qualifications of the various data team members.

TABLE 28. Enumerators and Their Affiliations

CASE EXAMPLE	ENUMERATOR DESCRIPTIONS	ENUMERATOR AFFILIATIONS
Aarogyasri Hospital	<ul style="list-style-type: none"> • The Aarogyasri costing team and University of Hyderabad graduate students led the data collection. • Hospital personnel supported the data collection. 	<input checked="" type="checkbox"/> Provider <input checked="" type="checkbox"/> Purchaser <input checked="" type="checkbox"/> Third Party
Indonesia Casemix	<ul style="list-style-type: none"> • The MOH National Casemix Center (NCC) sent a data collection form to hospitals for completion. • Hospital personnel collected the data. 	<input checked="" type="checkbox"/> Provider <input type="checkbox"/> Purchaser <input type="checkbox"/> Third Party
Indonesia Health Facility	<ul style="list-style-type: none"> • The implementing organizations contracted data collection to a private company through a competitive bidding process. • In some facilities, provider personnel also collected data. 	<input checked="" type="checkbox"/> Provider <input type="checkbox"/> Purchaser <input checked="" type="checkbox"/> Third Party
Central Asian Republics DRG	<ul style="list-style-type: none"> • The research team provided the costing instrument to hospital economists and trained them in how to complete it. • Hospital personnel collected the data. 	<input checked="" type="checkbox"/> Provider <input type="checkbox"/> Purchaser <input type="checkbox"/> Third Party
Malaysia COMPHEC	<ul style="list-style-type: none"> • An MOH research team hired enumerators and trained them and clinic staff on the data collection process. • The enumerators and clinic staff collected data. • The research team verified the data. 	<input checked="" type="checkbox"/> Provider <input type="checkbox"/> Purchaser <input type="checkbox"/> Third Party
Malaysian DRG	<ul style="list-style-type: none"> • Hospital staff completed the costing instrument. 	<input checked="" type="checkbox"/> Provider <input type="checkbox"/> Purchaser <input type="checkbox"/> Third Party
MNHA Hospital	<ul style="list-style-type: none"> • Hospital staff completed the costing instrument. • MOH NHA data collectors verified data. 	<input checked="" type="checkbox"/> Provider <input checked="" type="checkbox"/> Purchaser <input type="checkbox"/> Third Party
PHFI Hospital	<ul style="list-style-type: none"> • The PHFI analyst collected data in collaboration with hospital staff. 	<input checked="" type="checkbox"/> Provider <input type="checkbox"/> Purchaser <input checked="" type="checkbox"/> Third Party
PhilHealth Case Rates	<ul style="list-style-type: none"> • PhilHealth extracted data from the claims database. 	<input type="checkbox"/> Provider <input checked="" type="checkbox"/> Purchaser <input type="checkbox"/> Third Party
Vietnam Primary Care	<ul style="list-style-type: none"> • Provider staff collected the data after being trained by the Health Strategy and Policy Institute (HSPI) and Hanoi Medical University (HMU). • Analysts from HSPI and HMU collected and verified some data. 	<input checked="" type="checkbox"/> Provider <input type="checkbox"/> Purchaser <input checked="" type="checkbox"/> Third Party

TABLE 29. Data Team Composition and Qualifications

CASE EXAMPLE	DATA TEAM COMPOSITION	DATA TEAM QUALIFICATIONS
<i>Aarogyasri Hospital</i>	<ul style="list-style-type: none"> 22 people (8 full-time; 14 for 3 months only) collected and entered data. An additional 4 people (on average) from the hospitals collected data. 4 people analyzed the data. 	<ul style="list-style-type: none"> The team lead was a medical doctor with experience in data analysis and costing. The data analysts had backgrounds in medicine, health care management, and/or public health. The remaining staff had paramedical, nursing, health care management, accounting, or data entry backgrounds.
<i>Indonesia Casemix</i>	<ul style="list-style-type: none"> 1 person at each hospital was responsible for data collection. 40 NCC staff members were assigned to develop clinical pathways, calculate costs, code diseases, and support information technology (IT) systems for data management and analysis. 2 international consultants assisted with analysis. 	<ul style="list-style-type: none"> The hospital employee either had a finance background or worked in the accounting department. NCC staff had medical, accounting, medical record specialist, or IT backgrounds.
<i>Indonesia Health Facility</i>	<ul style="list-style-type: none"> The costing exercise employed 200 enumerators, 50 data entry specialists, and 3 data analysts. 12 independent data verifiers, comprising 4 teams from 4 universities, verified the collected data. 	<ul style="list-style-type: none"> Senior enumerators had backgrounds in public health. There were no specific requirements for enumerators; they were independent enumerators, health facility staff, or students at faculties of public health. Data entry specialists had some experience in entering data for large surveys. Data analysts were health economists.
<i>Central Asian Republics DRG</i>	<ul style="list-style-type: none"> 1-2 people from each hospital collected data. 1 analyst analyzed the data. 	<ul style="list-style-type: none"> The hospital staff were health economists and statisticians, selected for participation by hospital administration. The data analyst was an international health financing specialist.
<i>Malaysia COMPHEC</i>	<ul style="list-style-type: none"> 4 enumerators collected data. 2 MOH personnel and 1 IT consultant entered the data. 1 MOH analyst analyzed the data. 	<ul style="list-style-type: none"> MOH hired recent graduates with a background in IT or medical sciences to collect data. The data analyst had a background in health economics.
<i>Malaysian DRG</i>	<ul style="list-style-type: none"> The number of people involved in data collection varied from hospital to hospital, ranging from 12 to more than 50. 8-10 personnel from the MOH Casemix Unit conducted the analysis. 	<ul style="list-style-type: none"> The hospital data team included clinical consultants, accountants, nurses, administrative officers, pharmacists, engineers, medical record personnel, and IT officers.

(continued)

TABLE 29, continued

CASE EXAMPLE	DATA TEAM COMPOSITION	DATA TEAM QUALIFICATIONS
<i>MNHA Hospital</i>	<ul style="list-style-type: none"> 5 MOH NHA personnel managed the data collection and analysis process. NHA staff worked with more than 20 staff within each hospital to complete the costing questionnaires. 	<ul style="list-style-type: none"> The NHA personnel included research officers and a medical officer with some costing training. The hospital staff who contributed data represented different departments of the facility, ranging from Administration and Accounting to the clinical departments.
<i>PHFI Hospital</i>	<ul style="list-style-type: none"> 1 PHFI analyst collected, processed, and analyzed data. The analyst worked with staff from different hospital departments. 	<ul style="list-style-type: none"> The analyst had a Ph.D. in economics.
<i>PhilHealth Case Rates</i>	<ul style="list-style-type: none"> 7-10 PhilHealth staff worked with the PhilHealth IT department to extract data from the claims database. 	<ul style="list-style-type: none"> The data analysts had medical degrees.
<i>Vietnam Primary Care</i>	<ul style="list-style-type: none"> 2-3 staff from each hospital collected and entered data. 2-3 staff from each district health office collected data from about 25 commune health stations. 6 staff from the two research institutes verified data and conducted the analysis. 	<ul style="list-style-type: none"> Hospital staff from the Planning department and Finance and Accounting department were involved.

PLANNING FOR SUPERVISION AND QUALITY ASSURANCE

The data management plan should also include a management structure for the data team and a quality assurance plan. Some costing exercises employ supervisors to manage team members and ensure data quality. For example, the Indonesia Health Facility costing exercise included senior enumerator positions. Another common practice is

to create positions for data verifiers. In most costing exercises, staff from the organization overseeing data processing and analysis will flag questionable data and verify those data with providers. In some cases, as in the Indonesia Health Facility costing exercise, independent verifiers are hired to perform this task.

Once the data management plan is completed, the data team can be hired

and trained. Training should be targeted to each role. Training manuals that describe the data management plan, data collection instruments, data entry tools, dummy tables, and associated processes can help ensure that team members carry out their functions consistently and correctly, especially for large costing exercises.

CHECKLIST

STEP 5: DEVELOP DATA TOOLS AND TEMPLATES

- ✓ **DEVELOP** costing instruments to guide data collection and verification.
- ✓ **CREATE** data flow diagrams, data entry templates, and dummy tables.
- ✓ **SELECT** and procure the appropriate software, materials, and equipment for data processing and analysis.
- ✓ **CONFIRM** that the data collection instruments and data processing tools provide the necessary data to populate the dummy tables, and make revisions as necessary.
- ✓ **DEVELOP** the cost accounting model for the analysis.
- ✓ **ASSESS** the staff capacity, time, and budgetary needs for data management.
- ✓ **DETERMINE** the profile of the data team, including the number of data management supervisors, enumerators, data processors, data verifiers, and analysts.
- ✓ **DEVELOP** training manuals on the data collection instruments, data entry tools, and associated processes.
- ✓ **HIRE AND TRAIN** the data team.

LESSONS LEARNED

“Excel was the preferred software for us—as long as the sample size was not too large—because it is widely used and understood, making analyses transparent.”

“THERE CAN BE INITIAL CONCERN ABOUT RECRUITING HEALTH FACILITY STAFF TO COLLECT DATA BECAUSE OF POTENTIAL BIAS, BUT IN REALITY THE BIAS MAY BE LESS BECAUSE THEY ARE MOST FAMILIAR WITH THE DATA.”

RESOURCES

See the toolkit on the companion flash drive.

STEP 6.

SELECT THE SAMPLE

CHOOSING THE SAMPLING CRITERIA

This step revisits decisions made in Step 2 about the provider types to include in the costing exercise, focusing on provider ownership status, facility type, level of service, and size. All of these criteria, along with others (such as geography, generalizability of the results, desired precision of the costing estimates, and practicality of the sampling scheme), are factors to consider when determining the sample of providers and the strata, or subgroups, for sampling.

Various sample selection methods are available, as described in detail in the sampling literature. The sampling literature recommends selecting a representative sample, but this may not be feasible or necessary in a non-research context. Capturing essential elements of diversity and variability and using analytic techniques can correct for lack of representativeness in the sample. The sampling objective for a costing exercise for provider payment is to select the right benchmarks for cost estimates rather than to obtain a statistically valid sample. Pragmatic rather than statistical methods are almost always used to determine sample size and composition in costing exercises for provider payment.

General questions to guide the sample selection process include:

- Which providers are you estimating costs for?
- What is the variability of these providers (e.g., range of services)?
- Which providers are most efficient and why (e.g., high volume of services)?
- Which providers matter for accessibility of health services?
- How much information already exists?
- How difficult will it be to collect the data?
- Are providers willing to supply data?
- How reliable are the data from individual facilities?
- What level of precision is needed in the estimates?

The following pragmatic guidelines can help with the sampling process:

- If provider variability is large, select a larger sample with greater variability.
- Stratify the provider population into different categories to reduce variation, and include providers from each category.
- For a large and diverse country, take cluster samples.
- Identify all of the subsets of facilities where cost differences are expected and important for provider payment (e.g., ownership status, facility type, geography), and select as many facilities in each subset as is feasible.
- Consider the global literature on important variations in provider cost structure in order to capture those deemed important for the sample.

Other practical considerations influenced the sample selection choices in the case examples, ranging from selecting facilities with strong information systems (Vietnam Primary Care) to selecting high-volume facilities (Central Asian Republics DRG) to selecting public facilities from a government list (Indonesia Health Facility). Another important consideration is which providers are committed to the costing exercise. Step 8 describes ways to obtain provider consent and offer incentives to providers to participate.

Most countries at all income levels include less than 20 percent of all facilities in the sample, with many

countries including less than 10 percent. One recommended approach is to start with a small sample of providers with the best accounting systems, and then move toward a more representative sample stratified by all provider types after the provider payment processes have been established and when refinements are being made.

SELECTING THE SAMPLE

Once the costing team determines the sampling criteria and sampling method, they should identify the sampling frame by obtaining or creating a list of health facilities. The team should organize the list of facilities according to the subgroups (strata) that capture the main

drivers of cost variation. They can do this by determining which factors drive cost variations and develop a matrix of variability to ensure that the relevant factors are considered in defining the sample strata. Common factors that drive cost variations include geography, volume, facility ownership, bed size, and level of service. (See TABLE 30.) The matrix can guide the team in selecting the sample of providers, using cluster sampling, purposive sampling, or another method.

TABLE 31 describes the sampling methods used in the case examples, and BOX 10 describes how a sampling approach may change over time with repeated costing exercises.

TABLE 30. Sample Matrix of Variability

	GEOGRAPHY			VOLUME			LEVEL OF SERVICE		
	Urban	Rural	Remote	Low	Medium	High	Primary	Secondary	Tertiary
Provider A									
Provider B									
Provider C									
Provider D									
Provider E									
Provider F									
Provider G									
Provider H									
Provider I									
Provider J									

TABLE 31. Sampling Methods

CASE EXAMPLE	SAMPLE SELECTION METHOD	SAMPLE SELECTION CRITERIA	SAMPLE DESCRIPTION
<i>Aarogyasri Hospital</i>	<ul style="list-style-type: none"> Purposive sampling 	<p>HOSPITALS:</p> <ul style="list-style-type: none"> Facility ownership Geography (rural, urban, tribal) Bed size (<99, 100-299, 300-499, >500) Services (basic/super-specialty, medical/surgical) Teaching/non-teaching <p>PROCEDURES:</p> <ul style="list-style-type: none"> High-volume High-cost Probability of disparity between existing package price and market price 	<ul style="list-style-type: none"> 4 hospitals for the top-down component 42 procedures of the 938 funded by Aarogyasri
<i>Indonesia Casemix</i>	<ul style="list-style-type: none"> Stratified purposive sampling 	<ul style="list-style-type: none"> Hospital class (4 classes) Region (4 regions) Good data Good governance and financial management capacity in the hospital Provider willingness to participate 	<ul style="list-style-type: none"> 500 hospitals sampled 137 of 1,273 (11%) hospitals provided data <ul style="list-style-type: none"> 30 hospitals per class Public and private
<i>Indonesia Health Facility</i>	<ul style="list-style-type: none"> Stratified random sampling (using cluster analysis software to arrive at 4 optimum province clusters) and then random selection of 15 provinces and 2 districts within each province Statistical sampling for all facilities within districts other than large teaching hospitals Purposive sampling of large teaching hospitals 	<ul style="list-style-type: none"> Public primary care facilities (there was no sampling frame for private facilities) Government and private general hospitals with ≥50 beds Large teaching hospitals based on data availability and feasibility of data collection 	<ul style="list-style-type: none"> 200 of 1,400 (14%) hospitals <ul style="list-style-type: none"> 106 randomly selected private hospitals (25 dropouts) from the 30 districts 121 randomly selected public hospitals (2 dropouts), including 1 district hospital from each district and 91 other randomly selected hospitals from other districts in the provinces 235 of 9,000 (3%) health centers (Puskesmas), totaling 8-9 randomly selected per district with 1 dropout

(continued)

TABLE 31, continued

CASE EXAMPLE	SAMPLE SELECTION METHOD	SAMPLE SELECTION CRITERIA	SAMPLE DESCRIPTION
Central Asian Republics DRG	• Purposive sampling	• General hospitals (because, consistent with reform objectives, they provided the most services, had the largest number of clinical departments, and had more than 10,000 cases annually)	Most recent ZdravPlus USAID costing exercise in Kazakhstan: <ul style="list-style-type: none"> • 15 hospitals for the full cost accounting analysis • 300 hospitals for a DRG-based simulation using average length of stay (ALOS) data
Malaysia COMPHEC	• Purposive sampling	• IT-based health clinic • Strong information system	• 1 public health center
Malaysian DRG	• Stratified random sampling	• All hospital levels served by MOH	<ul style="list-style-type: none"> • 10 of 142 hospitals (7% of the sampling frame): <ul style="list-style-type: none"> - 5 state hospitals (≥20 clinical specialties) - 2 major hospitals (10-20 clinical specialties) - 2 minor hospitals (6-10 clinical specialties) - 1 non-specialist hospital (minimum 6 clinical specialties)
MNHA Hospital	• Stratified purposive sampling	• All MOH hospital categories (based on number of specialists and type of services provided)	• 13 of 136 hospitals (10% of the sampling frame): <ul style="list-style-type: none"> - 3 hospitals from each of the 4 categories and 1 tertiary hospital
PHFI Hospital	• Purposive sampling	<ul style="list-style-type: none"> • All hospital types (based on size and facility ownership) • Provider willingness • Data accessibility • Access to the facility 	<ul style="list-style-type: none"> • 5 hospitals <ul style="list-style-type: none"> - 1 charitable hospital - 1 private hospital - 1 government district hospital - 1 private teaching hospital - 1 government tertiary teaching hospital
PhilHealth Case Rates	• Stratified hospitals in PhilHealth's network by level and selected all their claims	• Tertiary hospitals (specialized/departmentalized and teaching training hospitals)	• Analyzed all claims reimbursements of tertiary hospitals
Vietnam Primary Care	• Purposive sampling	<ul style="list-style-type: none"> • Strong information system • Geographical proximity to the research team • Provider willingness to participate 	<ul style="list-style-type: none"> • 2 district hospitals • 76 commune health stations

BOX 10. Sampling Method: Indonesia Casemix

The Indonesian MOH commissioned the National Casemix Center (NCC) to develop the country's case-based payment system (INA-CBGs). The NCC pilot-tested the system with hospitals that provided care to members of Jamkesmas, the insurance scheme for the poor. As a first step in constructing the relative cost weights from unit costs, the NCC emailed a cost survey to 15 Class A (≥400 beds) and Class B (200 to 399 beds) tertiary hospitals that served Jamkesmas patients. These 15 hospitals were all MOH-owned facilities, so the NCC was able to obtain their cooperation.

For the second costing exercise two years later, the NCC expanded the selection criteria to include small- and medium-sized, secondary, and large tertiary hospitals of Classes A, B, C

(100 to 199 beds), and D (25 to 99 beds) that served Jamkesmas patients. The NCC emailed surveys to 200 public hospitals (both MOH- and local government-owned); 160 surveys were completed, and 100 were deemed comprehensive enough to use for the analysis.

Shortly after the second survey round, the government passed a regulation requiring that all hospitals implement accounting systems. The government also decided to scale up the case-based payment system to include not only Jamkesmas providers but all providers under the new national social health insurance scheme. These developments enabled the NCC to increase the number of hospitals surveyed and add private

hospitals to the sampling frame for the third round.

One year after the second round, the NCC sampled both public and private secondary and tertiary hospitals of Classes A, B, C, and D, emailing the survey to 500 hospitals. Of the 325 hospitals that returned the cost survey, data sets from 137 hospitals were used for the analysis.

Going forward, the NCC is planning to update the cost survey and institute routine cost accounting to regularly survey hospitals to update the case payment rates.



CHECKLIST

STEP 6: SELECT THE SAMPLE

- ✓ **REVISIT** scope decisions about which provider types to include in the cost analysis.
- ✓ **DETERMINE** which sampling criteria are important for the costing exercise.
- ✓ **UNDERSTAND** the pros and cons of various sampling methods and determine the optimal method for the costing exercise.
- ✓ **OBTAIN** the sampling frame of providers (if available).
- ✓ **FINALIZE** sample strata.
- ✓ **SELECT** the sample.

RESOURCES

Kish, Leslie. *Survey Sampling*. New York: John Wiley & Sons, 1995.

Levy, Paul S., and Stanley Lemeshow. *Sampling of Populations: Methods and Applications*. 4th ed. Wiley Series in Survey Methodology. Hoboken, NJ: Wiley, 2008.

LESSONS LEARNED

“SELECT FACILITIES THAT HAVE STRONG INFORMATION SYSTEMS.”

“Remember that the sampling objective for provider payment is to select the right benchmark for costs rather than a statistically valid sample.”

“SELECT HIGH-VOLUME, EFFICIENT FACILITIES.”

“Use a cluster sample when you have a large and diverse country.”

STEP 7.

CONDUCT A PRE-TEST

Before launching a full-scale data collection effort, costing teams should conduct a pre-test—also known as a pilot study, feasibility study, or small-scale preliminary study.

A pre-test checks the feasibility of the selected costing methodology and data management plan and helps ensure the quality and efficiency of the actual costing exercise. A pre-test also serves as a useful training activity for the enumerators, data processors, and analysts. [TABLE 32](#) highlights why a pre-test is a worthwhile endeavor even for costing exercises that do not have a research objective.

TABLE 32. Rationale for a Pre-Test

COSTING EXERCISE ELEMENT	KEY QUESTIONS ANSWERED BY A PRE-TEST
Methods and procedures	<ul style="list-style-type: none"> • Are any procedural improvements needed? • Should any logistical arrangements or procedures be modified? • Should any competing methods or procedures be considered?
Time and budget	<ul style="list-style-type: none"> • How long does it take for the data team and/or health facility staff to locate data? • How long does it take for the data team and/or health facility staff to complete data collection instruments? • What is the cost of implementing the costing exercise design?
Data team	<ul style="list-style-type: none"> • Are there any issues with management of the data team (enumerators, data processors, data verifiers, analysts)? • Do the data team members have the skills needed for their assigned tasks? • Do the enumerators understand the instruments and data collection processes? • Is the size of the data team adequate for the costing exercise?
Data quality	<ul style="list-style-type: none"> • Are there any issues with data management? • Are the data collection instruments constructed appropriately? • Have any important data elements or data sources been overlooked? • Do the costing instruments include any data elements that are not informative and can therefore be removed? • Are the data processing and analysis tools adequate for the cost analysis?

DESIGNING THE PRE-TEST

If possible, the pre-test should include providers in each stratum of the sample to account for the likely differences in data availability and data collection complexity between strata. Note that there may also be differences between providers within the same stratum. The costing team should be prepared for potential data availability and data collection differences in the main costing exercise based on the distinct nature of facility management, accounting, and operations.

In scientific research, pre-testing usually uses data outside of the sample because materials or procedures may need to be modified based on the results of the pre-test. But costing exercises for provider payment tend not to have a research objective and often have

limited resources, so using data within the sample is recommended. However, if the costing instruments are modified after the pre-test, the data collected in the pre-test may need to be treated differently or additional data may need to be collected at the pre-test facilities for the main costing exercise.

REVISING THE DATA PLAN FOLLOWING THE PRE-TEST

The results of the pre-test will reveal whether any changes are needed to the costing methodology, data management plan, costing instruments, and data processing and analysis tools. Costing teams should budget sufficient time to make revisions before the start of data collection for the main costing exercise.

The next step is to determine whether to include the pre-test data in the costing

exercise results, and whether collection of additional data from the pre-test providers is needed.

TABLE 33 describes the pre-tests used in the case examples, how the costing teams changed their methodologies following the pre-test, and whether they included the data from the pre-test in the overall cost results. The Indonesia Casemix team did not use a pre-test, and the Central Asian Republics DRG team also skipped the pre-test because the costing team had already been using and refining its costing methodology for 15 years. The Malaysia DRG team solicited recommendations from those providing data; instead of conducting a pre-test for the subsequent costing exercise, they changed their collection approach and revised instruments based on the feedback.

TABLE 33. Pre-Tests and Their Results

CASE EXAMPLE	PRE-TEST DESCRIPTION	INSIDE OR OUTSIDE THE SAMPLE	MODIFICATIONS MADE AFTER THE PRE-TEST	USE OF PRE-TEST DATA
<i>Aarogyasri Hospital</i>	Pre-test in 1 hospital—the smallest bedded hospital with the minimum number of services and basic specialties	Inside	The team adjusted 6 tools after the pre-test and designed and added a verification tool.	Pre-test data were included in the main costing exercise.
<i>Indonesia Health Facility</i>	Pre-test with 4 district health offices, 5 health centers (Puskesmas), and 5 hospitals (3 public, 2 private)	Both inside and outside	The team changed instruments to address data availability issues and improve the feasibility of data collection.	Pre-test data were excluded from the main costing exercise due to partial data collection, slight changes made to the instruments, and inclusion of facilities that were not part of the sample.
<i>Malaysia COMPHEC</i>	Pre-test in a few departments and including a few procedures at the clinic	Inside	The team modified the costing instrument for ease of data collection.	Pre-test data were included in the main costing exercise.
<i>MNHA Hospital</i>	Pre-test in 1 hospital	Inside	The team made minor changes to the costing instrument.	Pre-test data were included in the main costing exercise.
<i>PHFI Hospital</i>	Pre-test in the smallest hospital in the sample	Inside	The team did not make any changes to the methodology or instruments.	Pre-test data were included in the main costing exercise.
<i>Vietnam Primary Care</i>	Pre-test in 2 district hospitals and 1 district health office	Inside	The analysts modified the costing instruments due to problems with data availability and differences in the format and reporting system of the data.	Pre-test data were included in the main costing exercise following revision of the instruments and collection of additional data from pre-test facilities.

CHECKLIST

STEP 7: CONDUCT A PRE-TEST

- ✓ **IDENTIFY** providers for inclusion in the pre-test and decide whether they will be inside or outside the sample.
- ✓ **CONDUCT** the pre-test and take note of changes that should be made to the costing exercise methodology, data collection and analysis plans, costing instruments, and data processing and analysis tools.
- ✓ **MAKE** the necessary modifications to the costing exercise methodology, data collection and analysis plans, costing instruments, and data processing and analysis tools.
- ✓ **DECIDE** whether to include pre-test data in the main costing exercise and determine whether additional data are needed from the pre-test providers.

RESOURCES

Thabane, Lehana, Jinhui Ma, Rong Chu, Ji Cheng, Afisi Ismaila, Lorena P. Rios, Reid Robson, Marroon Thabane, Lora Giangregorio, and Charles H. Goldsmith. "A Tutorial on Pilot Studies: The What, Why and How." *BMC Medical Research Methodology* 10, no. 1 (2010): 1-10.

LESSONS LEARNED

"Include providers in each stratum of the sample in the pre-test, if possible, in order to observe likely differences in data availability and data collection complexity between strata."

"Use pre-test data in the sample. A costing exercise is not a research study and resources are often limited, so a data point should not be wasted. But if the instrument changes, pre-test data may have to be treated differently in the main costing exercise results."

STEP 8.

COLLECT, PROCESS, AND VERIFY DATA

ESTIMATING THE TIME AND EFFORT REQUIRED FOR DATA COLLECTION

Costing teams should be conservative in estimating the amount of time and effort required to collect data. The number of facility visits and the length of the process will depend on the scope of the costing exercise, the institutional affiliation of the enumerators, the quality and accessibility of data, the responsiveness of providers, and other factors relating to the health system.

The pre-test can be helpful in aligning expectations about the time and effort required. The time required for data collection in the case examples ranged from five days to three months per facility. (See [TABLE 34](#).)

Key factors that affect the time required for data collection at a facility include:

- **Costing exercise orientation.** Prospective data gathering typically takes longer than data collection for a retrospective costing exercise.
- **Costing methodology.** Data collection for a bottom-up costing exercise is more laborious and time-consuming than for a top-down exercise.
- **Provider size and complexity.** Data collection at a tertiary hospital requires significantly more time than at a health center.
- **Manual vs. automated data.** Manual tabulation of hard-copy data is more time-consuming than extracting data from accounting system software.
- **Data organization.** Data that are more organized, standardized, and systematically kept are easier and faster to retrieve.
- **Provider involvement.** Heavier reliance on provider personnel requires accommodating their schedules and competing demands.
- **Number of enumerators.** A larger number of enumerators per facility can speed up data collection.

In addition to estimating the time and budget requirements for the costing exercise, costing teams should also anticipate how to handle potential time and budget overruns. From the first planning meeting to the dissemination of results, many delays can occur along the way. The time overruns typically occur during the data collection and data verification phases. Time overruns were common in the case examples. In addition, facilities sometimes delay sharing data due to concerns about confidentiality and the use of data. Data verification can take longer than planned because providers may initially submit incomplete data or incorrectly fill out the costing instruments.

[TABLE 35](#) describes the duration of data collection and the duration of the entire costing exercise (from planning to completion) in the case examples.

GAINING PROVIDER COOPERATION

If the purchaser is the commissioner of the costing exercise, the power of the purchaser may be enough to ensure provider participation because facilities depend on payments from the purchaser. They will understand that payment rates are set based on the quality of the data they supply. A letter signed by the

Minister of Health or the president/CEO of the purchaser also may be needed to ensure cooperation.

Another way to gain provider commitment is to hold a workshop to engage provider personnel and brief them on the exercise and explain the costing methodology and data collection process. This approach was used by the Indonesia Casemix, Indonesia Health Facility, Central Asian Republics DRG, Malaysian DRG, MNHA Hospital, and Vietnam Primary Care costing teams. During this workshop, the team can explain the benefits of the cost analysis to providers, assure them that any sensitive data will be handled confidentially, and discuss the plan for verifying the data and sharing the results. Because providers often complain that payment rates are too low, explaining to them that the cost analysis will inform revisions to payment rates may encourage them to submit quality data. However, some providers may also view the costing exercise as an opportunity for them to manipulate data to influence payment rates. (This makes data verification an important step, as explained later in this section.)

Costing teams should explain to provider personnel how the requested

TABLE 34. Facility Data Collection

CASE EXAMPLE	SHORTEST DATA COLLECTION DURATION			LONGEST DATA COLLECTION DURATION		
	FACILITY TYPE	NUMBER OF ENUMERATORS	NUMBER OF DAYS*	FACILITY TYPE	NUMBER OF ENUMERATORS	NUMBER OF DAYS*
<i>Aarogyasri Hospital</i>	Private/corporate 50-bed hospital	2 hospital staff and 3 Aarogyasri enumerators	17 days	Private/corporate 300-bed hospital	6 Aarogyasri enumerators and 14 University of Hyderabad enumerators	45 days
<i>Central Asian Republics DRG</i>	Public 116-bed hospital	2 hospital staff and 1 costing team enumerator	15 days	Public 745-bed hospital	2 hospital staff and 1 costing team enumerator	15 days
<i>PHFI Hospital</i>	Public 400-bed secondary hospital	3 hospital staff and 1 PHFI enumerator	5 days	Public 778-bed tertiary teaching hospital	7 hospital staff and 1 PHFI enumerator	25 days
<i>Vietnam Primary Care</i>	Public 120-bed district hospital	4 hospital staff	14 days	Public 127-bed district hospital	4 hospital staff	24 days
	Commune health station (health center)	2 district health office staff	10 days	Commune health station	2 district health office staff	14 days

*Excluding weekends

data will be used for cost estimates. It may not be apparent to providers how some of the requested data elements are related to a costing exercise. For example, providers may not immediately understand why the costing team wants data on the floor area of buildings or the number of telephone lines or kilograms of laundry. Explaining how the data will be used to allocate costs and calculate unit costs will help convince providers of the necessity of the data.

Costing teams should also address provider concerns about the intended use of the data—particularly sensitive data. Guaranteeing confidentiality of

data (such as salary reports) will increase the willingness of providers to cooperate. Different approaches can be used to ensure confidentiality. For example, the PHFI analyst requested salary reports with names of staff members omitted because of the sensitivity of salary information. The providers included in the Aarogyasri costing exercise were concerned that their data would be used to raise their tax rate, so the costing team agreed to omit facility names and only present the bed size range of facilities in the costing exercise results.

Providers often need some incentive to cooperate with data collection. One way

to gain their commitment is to provide financial incentives, ranging from making direct staff payments (Indonesia Health Facility, Vietnam Primary Care) to paying per diems to staff for attending training sessions (Malaysian DRG, MNHA Hospital) to providing computers to facilities (Central Asian Republics DRG).

One attractive non-financial incentive is to offer to share the results of the costing exercise with providers—particularly the results for their facility benchmarked against all other facilities in the same cohort. This can be particularly appealing to private-sector

TABLE 35. Costing Exercise Duration

CASE EXAMPLE	NUMBER OF FACILITIES	DATA COLLECTION DURATION	DATA COLLECTION TIME OVERRUN	COSTING EXERCISE DURATION
<i>Indonesia Casemix</i>	500 hospitals (data analysis on 137)	5 months	5 months	10 months
<i>Indonesia Health Facility</i>	200 hospitals and 235 Puskesmas (public health centers)	18 months, including 8 months for data verification and validation	6 months due to the need for data verification and additional facility visits	3 years, including the planning phase, instrument development, bidding process, data collection, data verification and validation, analysis and report writing, and dissemination of results
<i>Central Asian Republics DRG</i>	15 public hospitals in Kazakhstan, with 116 to 745 beds (most recent ZdravPlus USAID costing exercise)	4 weeks	2 weeks	3 months
<i>Malaysian DRG</i>	10 public hospitals	3 months	1 month to ensure data accuracy by correcting values and obtaining missing data	6 months
<i>Vietnam Primary Care</i>	4 district hospitals and 76 commune health stations (health centers)	2.5 months, including 1 month for data verification and validation	14 days	6 months, including planning, data collection, analysis, and so forth

providers. (See Step 10.) Other effective non-financial incentives include:

- Training provider staff so they can eventually perform cost accounting themselves
- Providing special recognition or certificates to provider staff for participating in training sessions or collecting data
- Providing human resources support to help provider staff collect data

TABLE 36 describes how the case example costing teams gained commitment from providers.

COLLECTING DATA ON PERSONNEL COSTS

Measuring personnel time often requires some primary data collection to determine personnel costs by department/specialty, service, or patient.

Time-motion studies are one method of detailed time measurement, but these studies are resource-intensive and can influence personnel work patterns and thus produce inaccurate time estimates. A more practical method of measuring personnel time is to ask staff (or department heads) to provide a breakdown of their estimated hours worked (or a percentage of time

TABLE 36. Ways to Gain Provider Commitment

CASE EXAMPLE	COMMUNICATION TO PROVIDERS	INCENTIVES TO PROVIDERS
<i>Aarogyasri Hospital</i>	<ul style="list-style-type: none"> • THE AAROGYASRI TEAM: <ul style="list-style-type: none"> - Explained to hospital directors that the costing exercise was an important component of a project to update outdated package prices - Shared the costing tools in a meeting with more than 200 provider staff, describing the methodology and making the process transparent - Encouraged providers to volunteer to participate, using Aarogyasri's influence as their payer - Explained to relevant staff in participating hospitals about the need for their cooperation - Reassured personnel that sensitive data (e.g., individually identifying salary and allowance data) would not be reported 	<ul style="list-style-type: none"> • The Aarogyasri team explained to providers that their involvement would inform the revision of 5-year-old package prices. • The Aarogyasri team committed to sharing the cost results with providers.
<i>Indonesia Casemix</i>	<ul style="list-style-type: none"> • The National Casemix Center (NCC) convened hospital administrators at advocacy workshops to obtain their commitment. • The NCC trained hospital administrators on the case-based system, principles of costing, and the costing template. 	<ul style="list-style-type: none"> • The NCC explained that the results would be used to revise hospital payment rates.
<i>Indonesia Health Facility</i>	<ul style="list-style-type: none"> • The Ministries of Health, Finance, and Home Affairs endorsed the costing exercise and encouraged provider cooperation. • The research team held an advocacy workshop for top provider managers to gain support for the costing exercise. • The research team assured providers that data would be treated confidentially. 	<ul style="list-style-type: none"> • The research team employed staff from some facilities as paid enumerators. • Enumerators received payment for each completed module of the costing instrument. • Each hospital received its own data set and cost results.
<i>Central Asian Republics DRG</i>	<ul style="list-style-type: none"> • MOH issued a directive to hospitals requiring participation in the costing exercise. • The costing team requested data right after hospitals had submitted annual reports to MOH, so the data were easy to access for completing the costing instrument. 	<ul style="list-style-type: none"> • MOH provided computers to providers.

(continued)

TABLE 36, continued

CASE EXAMPLE	COMMUNICATION TO PROVIDERS	INCENTIVES TO PROVIDERS
<i>Malaysian DRG</i>	<ul style="list-style-type: none"> • MOH mandated that providers participate, and then the costing team led an awareness campaign. • MOH trained provider staff and promised to share results with them. 	<ul style="list-style-type: none"> • MOH gave per diem payments to provider staff who attended the training.
<i>MNHA Hospital</i>	<ul style="list-style-type: none"> • MOH directly informed hospital directors that the costing exercise was part of an important national project. • The MOH costing team held a centralized training session for provider staff. • The MOH costing team reassured providers that only average salary rates for various staff categories and seniority scales would be collected. 	<ul style="list-style-type: none"> • MOH informed provider staff that the data they provided would be useful in acquiring larger budgets based on workload. • MOH gave per diem payments to provider staff who attended the training.
<i>PhilHealth Case Rates</i>	<ul style="list-style-type: none"> • PhilHealth participated in provider events and involved provider staff on committees (e.g., peer review and quality) to establish a trusting relationship. • PhilHealth presented the concept and advantages to providers of shifting to the all case rate payment system. 	<ul style="list-style-type: none"> • PhilHealth assured providers that they would be active partners in determining new case rates, which would not be too different from payments under the prior fee-for-service payment system.
<i>PHFI Hospital</i>	<ul style="list-style-type: none"> • PHFI sent a formal consent letter to the hospital director describing the purpose of the costing exercise and the data requirements. • The PHFI analyst met the hospital director to clarify any issues, explain the importance of the costing exercise, and provide reassurance that sensitive data (i.e., individually identifying salary data) would not be collected. • The director assigned 1 or 2 points of contact for data collection. 	<ul style="list-style-type: none"> • PHFI committed to giving providers the costing results.
<i>Vietnam Primary Care</i>	<ul style="list-style-type: none"> • The Health Strategy and Policy Institute provided official letters to the providers to request their cooperation in collecting information for revising the current capitation design. • The research team held training sessions to introduce the research and explain the data required for collection. 	<ul style="list-style-type: none"> • The research team provided financial incentives to hospital staff who provided/collected data or supervised data collection.

worked) by department/specialty or service/patient type over some period of time. (See TABLE 37.) For example, the Indonesia Health Facility enumerators administered a survey to clinical personnel requesting their time allocation in minutes for the previous week. The Vietnam Primary Care analysts provided a template for staff to note the percentage breakdown of their average hours worked in each department.

Sophisticated information systems may allow for the extraction of the actual time that clinicians spend on each service. This level of detail is useful for bottom-up costing exercises that need personnel time assigned to various services, procedures, or patients. For example, the Malaysia COMPHEC project obtained actual staff time spent on each procedure

by reviewing staff movements recorded in the electronic medical record database.

It is important for costing teams to determine how to measure the time spent by different categories of personnel and whether to calculate the value. (See TABLE 21 in Part 2.) Personnel costs should include the wages of clinical staff as well as staff that provide support services (e.g., drivers, cleaners). Costing teams should categorize clinical personnel by type so opportunities to gain efficiency can be exposed. For example, this can help reveal whether a service delivered mostly by high-cost doctors could be delivered by lower-cost nurses.

Health facility personnel lists are a good starting point for generating a list of staff whose time should be measured

and valued in the costing exercise. Note, however, that facility lists sometimes leave out less common categories of personnel. For example, if the time spent by medical students, residents, or interns is not reflected in the facility personnel list, the costing team may decide to use a reasonable proxy for their wages (even though the provider and purchaser do not bear the cost of that labor). Some costing teams also cost the time spent by volunteers or donor-funded international staff. Local salaries and allowances for these categories of personnel are an appropriate proxy for their wages and can inform what the cost of care would be without the free or inexpensive labor. Costing teams should be as inclusive as possible in deciding which categories of staff to include. These costs can always be separated out during analysis when calculating unit costs.

Costing teams should separate out time that clinical staff spend on non-clinical activities so they can allocate it to overhead or exclude it when calculating unit costs. These non-clinical activities can include, for example, completing paperwork (which should be allocated to overhead and included in service cost estimates) or teaching and research (which should be excluded from unit costs of services). For example, the previously mentioned clinician survey administered by the Indonesia Health Facility enumerators aimed to document time spent on non-service-delivery activities and dual practice through the response categories of “non-medical activity—e.g., training, meeting” and “practice outside hospital.” Facilities in which teaching and research are common—such as teaching hospitals—should be placed in a separate provider category because they distort average cost estimates.

Costing teams may also want to record personnel time spent providing care outside the facility, such as when clinicians serve as visiting or contract staff or work part-time elsewhere (<1.00 FTE). There is also dual practice, dual employment, and moonlighting, whereby clinicians may be assigned full-time to a facility but work only part-time due to other employment arrangements. This category of personnel also includes “ghost” employees on the payroll who no longer work at the facility (i.e., 0.00 FTE) but still collect wages. Providers may not want to provide individually identifying data on FTE status and attendance records because this can be a sensitive issue. Time-motion studies can be a useful option for documenting time that personnel actually spend on different activities in a health facility.

In some countries, all individually identifying salary and allowance data are considered confidential and providers will be hesitant to share these data. In the absence of individual-level

data, estimation techniques can yield approximate labor costs. If individually identifying data on time allocation and compensation are not accessible, costing teams can ask for the total personnel cost paid to each department. Although payments classified by department are likely based on the primary department assignment of personnel and may not reflect their true time allocation, the aggregate information is acceptable in the absence of more detailed data.

Alternatively, costing teams can construct personnel costs by using the midpoint personnel costs paid for each salary grade and personnel category (e.g., doctor, nurse, medical assistant, etc.). Salary grading scales should be available from facility administrators, and information on typical allowance and incentive packages for a particular grade may be attainable through interviews with management. To calculate the total cost for a department, costing teams should multiply the average personnel cost for each grade and personnel category by the number of department staff at that particular grade and category. To calculate the cost for a service or patient, they should first determine the daily rate for staff at that grade and category, and then multiply that rate by the average number of minutes that staff at that grade and category spent on a particular service or patient divided by the total possible minutes of work.

COLLECTING DATA ON CAPITAL COSTS

The definition of capital costs and the methods used to calculate those costs will vary from setting to setting. Step 2 provides initial guidance on the definition of capital costs. See the resources list at the end of Step 8 for a source that describes how to calculate capital costs. The standard definition of capital costs pertains to assets that have a useful life of one year or longer and a purchase price above a certain threshold.

Capital costs generally include the cost of the following items:

- Buildings (construction and major renovation)
- Medical equipment (e.g., medical, surgical, and diagnostic equipment with a working life of one year or longer)
- Non-medical equipment (e.g., office equipment, furniture, computers, software, air conditioners, generators, and vehicles with a working life of one year or longer)

Health facility depreciation tables can be helpful for calculating capital costs if the same depreciation method is used for all facilities in the sample. If facilities do not already have a depreciation schedule, costing teams can develop an inventory of assets or use a standard list of capital assets to calculate depreciation. The Indonesia Health Facility and Vietnam Primary Care costing teams used a standard list because it took less time than documenting the make, model, year purchased, and quantity of all capital assets at the sampled facilities. (Depreciation is explained in greater depth in Step 9.)

In the absence of a depreciation schedule, the costing team should develop an inventory of assets to calculate capital costs. An inventory of assets documents capital stock data, such as the facility’s buildings and the type and quantity of medical and non-medical equipment by department. In addition to recording the quantity and department home of the items, costing teams should record each asset’s physical description, manufacturer name, model number, and year purchased. For buildings, the inventory includes the construction materials (e.g., wood, concrete) if relevant and their age. TABLE 38 provides a template for inventorying assets.

The estimated useful life of assets should be appropriate to the country context because depreciation calculations are

TABLE 37. Personnel Time Measurement Template

#	POSITION	GRADE	COMPENSATION	ADMINISTRATION DEPARTMENT	MEDICINE DEPARTMENT	EMERGENCY DEPARTMENT	MATERNITY DEPARTMENT	PEDIATRICS DEPARTMENT	OTHER DEPARTMENT
1	DOCTOR	3	122,610	80%					20%
2	DOCTOR	3	90,194	20%		50%			30%
3	NURSE	2	45,121		100%				
4	MEDICAL ASSISTANT	1	22,750			75%			25%
5	MEDICAL ASSISTANT	1	29,400		60%		40%		
6	NURSE	1	38,700		60%			10%	30%
7	NURSE	2	63,899			30%		70%	
n	DOCTOR	2	65,716		40%	40%			20%
TOTALS			478,390	1.00 FTE	2.00 FTE	1.80 FTE	0.75 FTE	1.20 FTE	1.25 FTE

TABLE 38. Capital Asset Inventory Template

PHYSICAL DESCRIPTION	MANUFACTURER	INVENTORY CODE	MODEL NUMBER	QUANTITY	YEAR PURCHASED	PURCHASE PRICE	USEFUL LIFE
GLUCOSE MONITOR WITH BLOOD SUGAR DOCK	Abbott Labs						
DATASCOPE MONITOR	DataScope						
BLOOD PRESSURE MONITOR	SunTech						
BLOOD PRESSURE GAUGE	Hokanson						
BLOOD PRESSURE GAUGE	Welch Allyn						
ULTRASOUND SYSTEM	Phillips						
ULTRASOUND SYSTEM	Phillips						
ULTRASOUND UNIT	Phillips						
CASE TREADMILL	GE						
CASE EXERCISE STRESS-TESTING SYSTEM	GE						
GEL WARMER	Parker Labs						
SURGICAL CLIPPERS WITH CHARGING CABLE	3M						
DEFIBRILLATOR	Phillips						
EKG CART	GE						

greatly affected by assumed life years. Costing teams can follow Ministry of Finance official accounting rules, if available, to determine the useful life of assets. For example, the Aarogyasri Hospital costing team referred to the Income Tax Act of India for useful life estimates and depreciation rates. In the absence of official policies, local experts can provide useful life estimates.

Useful life estimates vary by country and by industry, making it difficult to compare useful lives across countries and industries. For example, the useful life of buildings in the Vietnam Primary Care costing exercise was 30 or 50 years (depending on the type of construction), and the useful life of other assets was 3, 5, or 10 years. The PHFI Hospital costing team in India set the useful life of buildings to 20 years and other capital items to 5 years. The Indonesia Health Facility team used the American Hospital Association publication of equipment life years as a reference.

Fully depreciated assets—expired capital items—should also be included in capital costs if they are still in use (either because their useful life was underestimated or they have not yet been replaced). To reflect the reality of how these assets are being used, costing teams should charge depreciation costs until the assets are replaced—by simply recalculating depreciation costs using new useful life estimates and then conducting sensitivity analyses (see Step 9) with and without expired assets

included to determine whether there is any significant impact on the results.

Sometimes donated capital assets should be included in capital costs. One approach to costing these items is to determine their local market rate for calculating depreciation. Another approach is to include their recurrent costs (e.g., maintenance) because these are the only costs that will be covered by the payment system within the time horizon of the costing exercise. As with expired capital assets, costing teams should run sensitivity analyses with and without donated items included.

PROCESSING AND CLEANING DATA

Data processing includes importing or entering data into spreadsheets and dummy tables, cleaning the data so they are in the right format for analysis, and verifying the accuracy of the data collected and entered. Close monitoring of the data team during this entire process is recommended to ensure high-quality and accurate work.

The optimal quality-control measure for entering data from hard-copy instruments into digital form is to employ double data entry for the entire data set. Double data entry, also called two-pass verification, essentially employs two data-entry operators to enter the same data. The accuracy of their records is then compared. Some data entry programs, such as SPSS, provide this comparison and verification feature.

When double data entry is not feasible due to time or resource constraints, which is often the case, an appropriate alternative is to conduct double entry of a sample of data to assess the accuracy of the data team's work. Another option is to use single-pass data entry with verification of entered data using manual range checks.

During data entry, the data team may detect gaps or identify data values that appear inconsistent or improbable. They should flag missing and potentially erroneous data values for the data cleaning phase.

Data cleaning means correcting inaccuracies in a data set, often by employing data verification techniques. Data cleaning can include correcting erroneous values, identifying incomplete records, and removing irrelevant data. Common errors include too many zeros in a figure or misplaced decimal points. **Box 11** offers tips for data processing and cleaning. One of the most important verification steps is to reconcile disaggregated utilization and cost data with facility totals to ensure that they add up to the same amount. **Box 12** offers tips for verifying data.

MANAGING DATA AVAILABILITY AND QUALITY ISSUES

Data availability and quality issues may arise for many various reasons. Providers may not account for all requested data, either because they cannot locate data or they do not want to divulge data

BOX 11. Tips for Processing and Cleaning Data

- **Review** submitted costing instruments for completeness prior to data entry.
- **Employ** double data entry for entering data from hard copy.
- **Manually spot-check** entered data against the hard-copy version.
- **Save** original data files separately from newly cleaned versions.
- **Document** the data cleaning process in a log that notes where the team has finished data entry at the end of each day.
- **Employ** a data processing supervisor to review the work of junior data processors.
- **Employ** an independent (third-party) data verifier to review the data entry process.

BOX 12. Tips for Verifying Data

- **Compare** data values between different reporting periods to ensure logical consistency.
- **Compare** data values across similar providers to ensure logical consistency.
- **Spot-check** data or develop scatter charts to identify outliers.
- **Cross-check** data obtained through other data sources to determine accuracy.
- **Triangulate** across different data sources to create a complete picture of the data.
- **Check** every row of data manually.
- **Check** the accuracy of 10 percent of all data.
- **Contact** providers to clarify data values or request missing data.
- **Visit** facilities to consult with providers and review original data sources.
- **Refer** to the original data source to address missing data.
- **Employ** an independent verifier to review and compare raw data with entered data.
- **Reconcile** disaggregated utilization and cost data with totals to see if they add up to the same number.

that they consider confidential. In other cases, provider utilization and financial reports may be inaccurate if they were poorly compiled or are fraudulent (e.g., inflated utilization, excluded under-the-table payments). Facility visits during the development of the data management plan may help to identify sensitive data, incorrect reporting, or fraudulent practices.

The costing team should decide how to address issues of limited availability and poor quality of data from providers. The case example costing teams confronted many data challenges, and they employed creative solutions to address them. (See TABLE 39.)

Typical data challenges include:

- Missing data (e.g., capital asset data)
- Incomplete data (e.g., costing instruments not completely filled out)

- Undisclosed data (e.g., staff salaries)
- Hard-copy data (e.g., ancillary/paraclinical department registers)
- Irreconcilable data (e.g., provider accounting records that conflict with centrally maintained records)
- Aggregate data (e.g., commingled inpatient and outpatient expenditures)

Thinking creatively about how to close data gaps means looking beyond readily available data. The following measures (in recommended order) can help address data gaps:

- Consult with facility or subject-matter experts to obtain estimates.
- Use data points from other providers to serve as proxies for the missing data.
- Exclude providers with missing data from the sample.

The costing team should weigh the benefits of obtaining detailed data

against the costs associated with collecting these data. Data may be difficult to collect because providers do not routinely keep reports, they record data at a more aggregated level than desired for the cost analysis, or the records are in hard copy and would require manual tabulation. For example, the ideal way to apportion the cost of laundry done by the Laundry department to other departments may be to use the number of pieces of laundry or kilograms of laundry washed as an allocation statistic for each department. If these data are not available or are available only in hard-copy registers that require manual tabulation, the costing team may decide that achieving this optimum level of disaggregation is not worth the effort. Apportioning laundry cost by bed-days or some alternative allocation base may be more practical.

TABLE 39. Data Availability and Quality: Challenges and Solutions

CATEGORY	CASE EXAMPLE	CHALLENGES	SOLUTIONS
Utilization	AAROGYASRI HOSPITAL	<ul style="list-style-type: none"> Registers were not available for each clinical department. Outpatient visits were not always recorded, and there was a mismatch at some facilities between utilization noted in physical registers and utilization recorded in the health management information system (HMIS). 	<ul style="list-style-type: none"> The costing team manually recorded departmental stays from patient case sheets. The team organized meetings with the hospital CEO, director, and other facility staff to elicit information on data that were not readily available.
	MNHA HOSPITAL	<ul style="list-style-type: none"> Daycare cases were occasionally reported in the inpatient utilization totals (i.e., discharges, bed-days). 	<ul style="list-style-type: none"> The NHA team cross-checked patient registrations in the Daycare unit with inpatient data to extract any misclassified daycare cases.
Personnel Time	AAROGYASRI HOSPITAL	<ul style="list-style-type: none"> Records did not exist on personnel time across departments or time spent on specific procedures or in the Operating Theater. 	<ul style="list-style-type: none"> The costing team interviewed doctors and nurses for estimates of their time allocation.
	INDONESIA HEALTH FACILITY	<ul style="list-style-type: none"> Data were not available on the time allocation of clinical personnel. 	<ul style="list-style-type: none"> The enumerators administered a survey asking personnel for a one-week recall of their time allocation.
	MALAYSIA COMPHEC	<ul style="list-style-type: none"> Personnel time spent on very rare procedures was not available. 	<ul style="list-style-type: none"> The costing team created a simple form to collect data on personnel time and interviewed clinic staff.
	MNHA HOSPITAL	<ul style="list-style-type: none"> Hospitals did not record data on personnel time allocation by department. 	<ul style="list-style-type: none"> The team administered a simple questionnaire to a random sample of staff within departments to obtain time estimates.
Personnel Payments	MNHA HOSPITAL	<ul style="list-style-type: none"> Hospitals were unwilling to provide data on individual personnel salaries due to confidentiality concerns. 	<ul style="list-style-type: none"> Analysts used the average salary for various personnel grades rather than actual salary figures.

(continued)

TABLE 39, continued

CATEGORY	CASE EXAMPLE	CHALLENGES	SOLUTIONS
Drug Expenditures	AAROgyASRI HOSPITAL	<ul style="list-style-type: none"> Pharmacy expenditure data were difficult to obtain. 	<ul style="list-style-type: none"> The analysts used assumptions for the cost of each medicine.
	INDONESIA HEALTH FACILITY	<ul style="list-style-type: none"> The closing stock of drugs and consumables was not available from some facilities. 	<ul style="list-style-type: none"> The team either requested the data from a higher office in the health system or counted drugs in stock for selected facilities.
	PHFI HOSPITAL	<ul style="list-style-type: none"> Data on drug and medical supply expenditures were not available by department. 	<ul style="list-style-type: none"> The team consulted with experts to estimate the distribution of drugs and medical supplies among different departments.
Utilities Expenditures	CENTRAL ASIAN REPUBLICS DRG	<ul style="list-style-type: none"> The average monthly power consumption of various departments was not available. 	<ul style="list-style-type: none"> The analysts assumed that power consumption was higher for the X-Ray department than other departments, so they sought the opinion of X-Ray personnel to allocate expenditures for power consumption.
Capital Assets	AAROgyASRI HOSPITAL	<ul style="list-style-type: none"> Data on equipment purchase prices and years were not available due to central purchasing or purchasing across different time periods. 	<ul style="list-style-type: none"> The analysts used government standard equipment lists and prices.
	INDONESIA CASEMIX	<ul style="list-style-type: none"> Hospitals submitted incomplete data on buildings and equipment. 	<ul style="list-style-type: none"> The analysts excluded hospitals from the analysis that did not provide data on capital assets.
	MALAYSIA COMPHEC	<ul style="list-style-type: none"> Data on the clinic buildings were unavailable. Data on some clinic equipment were not available, and data on the price and working life of equipment were not always accurate. 	<ul style="list-style-type: none"> The analysts sought advice on how to handle the data gaps from the Public Works Department, which was responsible for building and maintaining government buildings. The analysts used the replacement price from other providers that used equipment from the same manufacturer and of the same make and model.

(continued)

TABLE 39, continued

CATEGORY	CASE EXAMPLE	CHALLENGES	SOLUTIONS
Capital Assets, continued	MNHA HOSPITAL	<ul style="list-style-type: none"> Data on some equipment and buildings were not readily available. 	<ul style="list-style-type: none"> Capital costs were excluded from the cost estimates because they were not needed under the System of Health Accounts framework.
	PHFI HOSPITAL	<ul style="list-style-type: none"> Some departments did not maintain a list of equipment and furniture. 	<ul style="list-style-type: none"> Hospital department staff gathered the missing data on equipment and furniture.
	VIETNAM PRIMARY CARE	<ul style="list-style-type: none"> The inventory report with the purchase price and year of equipment and buildings was incomplete. 	<ul style="list-style-type: none"> The analysts substituted centrally developed standard equipment and building lists and prices.
Cost of Land	PHFI HOSPITAL	<ul style="list-style-type: none"> The cost of land was not available from providers. 	<ul style="list-style-type: none"> The civil engineering department associated with each hospital kept information on current land prices and was able to provide the data.
	VIETNAM PRIMARY CARE	<ul style="list-style-type: none"> The cost of land was not available from providers or the central government. 	<ul style="list-style-type: none"> The analysts excluded the cost of land from the analysis.
Aggregated Expenditures	CENTRAL ASIAN REPUBLICS DRG	<ul style="list-style-type: none"> Data on certain indirect costs (e.g., electricity, patient food) were not available by department. 	<ul style="list-style-type: none"> The analysts developed allocation criteria to apportion those costs to departments.
	INDONESIA CASEMIX	<ul style="list-style-type: none"> Hospitals submitted data in aggregate due to problems with the costing template and lack of more disaggregated data by department. 	<ul style="list-style-type: none"> The costing team discussed the expenditure data submitted in aggregate with the hospitals and decided on a percentage share to assign to various departments.
	MNHA HOSPITAL	<ul style="list-style-type: none"> Some hospital departments had no assigned budget line and thus no documentation of their expenditures. 	<ul style="list-style-type: none"> Analysts consulted with department managers to estimate disaggregated expenditures.
	VIETNAM PRIMARY CARE	<ul style="list-style-type: none"> The facilities did not record inpatient and outpatient expenditures separately. 	<ul style="list-style-type: none"> The costing team consulted with facility staff to obtain inpatient and outpatient percentage estimates in order to separate the expenditures for departmental allocation.

(continued)

TABLE 39, continued

CATEGORY	CASE EXAMPLE	CHALLENGES	SOLUTIONS
Financial Data	AAROGYASRI HOSPITAL	<ul style="list-style-type: none"> Many financial documents (e.g., bills, receipts) were not available because payments occurred outside the formal transaction system. 	<ul style="list-style-type: none"> The team met with the hospital CEO, director, and other personnel to try to elicit information on financial data that were not readily available.
	CENTRAL ASIAN REPUBLICS DRG	<ul style="list-style-type: none"> The sum of disaggregated expenditure data rarely matched reported aggregate hospital expenditures. 	<ul style="list-style-type: none"> The costing team met with hospital staff, discussed issues of data quality, and requested that the hospitals correct the data.
	MNHA HOSPITAL	<ul style="list-style-type: none"> Some informal financial transfers between departments were not captured in hospital records, so some expenditures were associated with the wrong department. 	<ul style="list-style-type: none"> The NHA team interviewed hospital staff about department financial transfer practices in order to trace expenditures to their correct department.
Allocation Statistics	AAROGYASRI HOSPITAL	<ul style="list-style-type: none"> Building plans and floor area measurements were poor or outdated. 	<ul style="list-style-type: none"> The costing team measured the buildings.
	INDONESIA HEALTH FACILITY	<ul style="list-style-type: none"> Some facilities did not have a building map or documentation on the floor area of the buildings. 	<ul style="list-style-type: none"> The enumerators measured the buildings.
	MNHA HOSPITAL	<ul style="list-style-type: none"> Not all hospitals could provide data on floor area. 	<ul style="list-style-type: none"> The enumerators obtained floor area estimates from the floor plans of cleaning contractors.
	PHFI HOSPITAL	<ul style="list-style-type: none"> Data on floor area were missing. 	<ul style="list-style-type: none"> Hospital personnel measured the buildings.

(continued)

TABLE 39, continued

CATEGORY	CASE EXAMPLE	CHALLENGES	SOLUTIONS
Costing Questionnaire	INDONESIA CASEMIX	<ul style="list-style-type: none"> Hospitals submitted incomplete costing questionnaires. 	<ul style="list-style-type: none"> The analysts returned the questionnaires to the hospitals and requested their completion, eventually removing hospitals from the analysis if they failed to resubmit a completed questionnaire.
	INDONESIA HEALTH FACILITY	<ul style="list-style-type: none"> The difference between a true zero value in the data set and a zero denoting data missing from the costing instrument was difficult to distinguish. 	<ul style="list-style-type: none"> The verification team checked the hard-copy instrument, visited the health facility, or called the facility supervisor to confirm the data.
Data Period	AAROGYASRI HOSPITAL	<ul style="list-style-type: none"> Some facilities reported fewer months of data than requested. 	<ul style="list-style-type: none"> The analysts costed only the months for which data were available.
	INDONESIA HEALTH FACILITY	<ul style="list-style-type: none"> Some facilities reported fewer months of data than requested. 	<ul style="list-style-type: none"> The analysts either extrapolated data to an entire year or imputed missing monthly data using the average of available and collected monthly data.

CHECKLIST

STEP 8: COLLECT, PROCESS, AND VERIFY DATA

- ✓ **DEVELOP** a plan for working with and providing incentives to providers.
- ✓ **COLLECT** data.
- ✓ **ENTER** data into data entry tools and dummy tables, and follow quality control measures.
- ✓ **CLEAN** the data.
- ✓ **IDENTIFY** irregular data for verification.
- ✓ **VERIFY** data and correct the data set as necessary.
- ✓ **DECIDE** how to address issues of limited availability and poor quality of data from providers.

RESOURCES

Walker, Damian, and Lilani Kumaranayake. "Allowing for Differential Timing in Cost Analyses: Discounting and Annualization." *Health Policy and Planning* 17, no. 1: 112-18.

Also see the toolkit on the companion flash drive.

LESSONS LEARNED

"Visit facilities to identify sensitive data, incorrect reporting, or fraudulent practices."

"To close data gaps, think creatively and look beyond readily available data."

"Weigh the benefits of obtaining detailed data against the costs associated with collecting those data."

"Provider participation increased when they understood that payment rates depended on the data."

"Providers often need some incentive to participate in data collection initially, but over time they will understand that their payment depends on the quality of the data they supply."

STEP 9.

ANALYZE AND VALIDATE DATA

The data analysis portion of the costing exercise happens after the data have been processed, cleaned, and verified. The analysis focuses on calculating unit costs one facility at a time. Analysis for a particular facility can begin once data are verified for that facility. Costing teams should validate the preliminary results of the analysis with providers to ensure that the results make sense and to correct any residual errors that may not have been identified during data cleaning and verification.

Costing teams should use a cost accounting model to analyze the data. The entire cost accounting process, including the analytical steps, is described in the appendix. Costing teams need a thorough understanding of the cost accounting process in order to make the necessary decisions about data requirements and model inputs and accurately conduct the analysis.

Several cost accounting dummy tables and models are included in the toolkit on the companion flash drive. These dummy tables and models can serve as a starting point for designing analytical tools; the samples should be tailored for each country and costing exercise.

The analysis process is iterative and can take longer than anticipated, as the case example costing teams discovered. It can be helpful to allot extra time up front for multiple iterations and for communication with providers.

The costing team should also thoroughly document each step of the analysis so the iterations can be retraced, decisions on assumptions and extrapolations are transparent, and data gaps or other limitations are specified. Teams that use Microsoft Excel for the analysis can use the program's comment feature to document the decisions made during the analysis. Teams should also consider engaging a peer reviewer or other third

party to review the analysis, provide an outside perspective, and identify any gaps or other limitations.

DATA ANALYSIS CHALLENGES AND LESSONS LEARNED

While the case example teams spent significant time developing and refining the cost accounting model (Step 5) to guide their analysis, the process of entering the data in the model and analyzing it went quickly. One of their greatest challenges was deciding when to finalize the analysis because the potential for additional data collection or cleaning is limitless. At a certain point, it is important to complete the process, document any limitations, and develop a plan to share the results. For example, the MNHA Hospital costing team learned that making very precise calculations of small expenditure items, while possible, was unnecessary for the analysis and added a significant time requirement. In such cases, it may not be worth the additional time and effort because costing for provider payment is not a pure research endeavor.

The case example costing teams also faced other data analysis challenges:

- Remembering to continually step back from the process to assess whether additional data were needed
- Realizing that important data elements had not been collected

- Discovering surprising data and having to decide how to handle them
- Choosing assumptions and then justifying those choices
- Making transparent to policymakers and other stakeholders what was and was not included in the cost results
- Conducting sensitivity analyses
- Responding to new requirements for the analysis when the political situation changed mid-exercise
- Explaining the limitations of costing to policymakers and meeting their expectations for a "magic number" or an account of the "true costs"
- Responding to the changing priorities of policymakers
- Addressing ongoing queries from policymakers about the cost analysis that were difficult to respond to
- Adhering to timelines and budgets
- Managing scope creep during the analysis
- Documenting assumptions and all analytic steps
- Deciding when to conclude the analysis
- Understanding and presenting analyses completed by consultants without adequate transfer of technology or knowledge to the local costing team

TABLE 40 describes the key analysis challenges in the case examples and the solutions the costing teams implemented.

TABLE 40. Data Analysis Challenges

CATEGORY	CASE EXAMPLE	CHALLENGES AND SOLUTIONS
Data Completeness	AAROgyASRI HOSPITAL	<ul style="list-style-type: none"> To address incomplete data, the analysts used a cumbersome bottom-up procedure to fill the data gaps.
	INDONESIA HEALTH FACILITY	<ul style="list-style-type: none"> To address incomplete months of data, the team extrapolated data to generate estimates of annual expenditures.
	MALAYSIAN DRG	<ul style="list-style-type: none"> To address incomplete data, the team used averages of data from other hospitals of the same category to fill data gaps.
	PHILHEALTH CASE RATES	<ul style="list-style-type: none"> The team generated unit costs using data that were readily available but not necessarily the most comprehensive.
Data Structure	PHFI HOSPITAL	<ul style="list-style-type: none"> Detailed data were not available for several clinical support departments, so the costing team was unable to allocate these costs to final cost centers (clinical departments).
	VIETNAM PRIMARY CARE	<ul style="list-style-type: none"> It was difficult to separate inpatient and outpatient utilization and expenditures using provider reports, so the costing team relied on estimates from hospital staff.
Data Accuracy	INDONESIA CASEMIX	<ul style="list-style-type: none"> The costing team could not verify the accuracy of the data the hospitals submitted because they did not have access to the original data sources.
Allocation Bases	MNHA HOSPITAL	<ul style="list-style-type: none"> The greatest challenge for the costing team was selecting relevant allocation bases to apportion costs to different departments.
Costing Capacity	AAROgyASRI HOSPITAL	<ul style="list-style-type: none"> The data team required more training because not all team members had cost accounting experience.
	INDONESIA HEALTH FACILITY	<ul style="list-style-type: none"> Not all team members understood details of the step-down method for some complex aspects of the analysis that required many assumptions.
	MNHA HOSPITAL	<ul style="list-style-type: none"> The costing team struggled with a lack of trained personnel to carry out the analysis.
	PHILHEALTH	<ul style="list-style-type: none"> The data team did not have enough time or expertise to analyze all the data.

MAKING ASSUMPTIONS, ESTIMATES, AND EXTRAPOLATIONS

No costing exercise will have a comprehensive and impeccable data set from which to generate unit cost estimates, so it is appropriate and completely acceptable to make assumptions, extrapolate data, and use estimates to address unreliable, invalid, or incomplete data. Although policymakers and analysts may feel some discomfort in employing these techniques, uncertainty is an important aspect of any analytical exercise and there is always some rationale behind the use of these techniques for analysis. Policymakers and researchers should also feel reassured that assumptions, estimates, and extrapolations do not have a significant impact on relative costs, which are the key outputs of costing for provider payment.

The case example costing teams used different techniques to address unreliable, invalid, or incomplete data. (See TABLE 41.) They often sought expert opinion from health facility personnel to obtain estimates to fill in data gaps. They also commonly replaced missing data with norms, standards, or benchmarks obtained from country sources or the costing literature. In other cases, they used fees, charges, local market prices, or international reference prices to substitute for missing data.

PARSING AGGREGATE COSTS

Many health facilities do not record inpatient and outpatient expenditures separately, which creates a challenge for costing teams because their units of service—bed-days and outpatient

visits—are not comparable. It is therefore necessary to find a way to parse these expenditures. For example, a hospital may have co-located inpatient and outpatient services provided by a single department, such as OB/GYN or Pediatrics. Expenditures are sometimes commingled because department staff serve both inpatients and outpatients, expenditures on drugs and other consumables are recorded at the department level, and space and equipment are shared between inpatient and outpatient services. Health centers often record expenditures in aggregate as well, even though personnel, consumables, buildings, and equipment are also used for other activities such as health promotion and outreach.

PhilHealth faced the challenge of commingled expenditures for hospital inpatient, outpatient, and emergency departments. The MNHA Hospital costing team dealt with commingled expenditures for hospital inpatient, outpatient, and daycare departments. For Vietnam's commune health stations (health centers), expenditures were commingled for inpatient, outpatient, and preventive and promotive services.

In these situations, costing teams can use assumptions, estimates, or allocation statistics to separate costs that were supplied in aggregate. Consultation with facility experts such as department directors about the share of costs to apportion for inpatient and outpatient and other services is often the best solution. These experts can often offer an opinion on the appropriate ratio of inpatient and outpatient expenditures for different cost items (e.g., personnel

time, drugs and medical supplies, utilities, other recurrent items, building space, and other capital asset use). Constructing ratios for different cost items is time-consuming, but it is preferable to determining one overall department inpatient/outpatient/other cost ratio because the ratio typically varies by cost item.

Another approach is to collect primary data to develop an appropriate allocation between inpatient and outpatient and other services. For example, the Indonesia Health Facility costing team collected primary data for a subset of the sampled facilities on pharmacy use between inpatient and outpatient services in order to allocate drug cost.

Yet another technique is to create an equivalence scale to assign aggregate costs. An equivalence scale is an index that converts units of service so they are comparable measures. Assumptions are made, typically in consultation with providers, on the resource use of the different units of service (e.g., bed-day vs. outpatient visit) in order to determine an appropriate equivalence scale. The most data-driven approach is to use a sensitivity analysis (described later) to inform the equivalence scale. Primary data collection can inform the equivalence scale as well. The costing team can use the equivalence scale to separate aggregate costs into representative costs for the various units of service.

TABLE 42 shows the equivalence scales that the case examples used to assign aggregate costs.

TABLE 41. Techniques for Addressing Unreliable, Invalid, or Incomplete Data

TECHNIQUE	CASE EXAMPLE	DESCRIPTION
Extrapolation	INDONESIA HEALTH FACILITY	<ul style="list-style-type: none"> Constructed a monthly average using data from available months and extrapolated the data point through the entire data period.
	INDONESIA HEALTH FACILITY	<ul style="list-style-type: none"> Substituted missing expenditure data with the average expenditure of facilities with similar characteristics (i.e., size, specialization). Used the drug price index to calculate drug expenditures in regions where data on drug expenditures were not available.
Proxies	MALAYSIAN DRG	<ul style="list-style-type: none"> Used average expenditures constructed from facilities in the same geographic area for those that had submitted incomplete data.
	PHFI HOSPITAL	<ul style="list-style-type: none"> Substituted missing data on equipment and instrument prices with prices of those same items at similar hospitals.
	VIETNAM PRIMARY CARE	<ul style="list-style-type: none"> Used standard asset lists obtained from centrally maintained records on the purchase price of equipment and construction cost of buildings.
	PHFI HOSPITAL	<ul style="list-style-type: none"> Substituted missing data on equipment and instrument prices with prices of those same items at similar hospitals.
Estimation	AAROgyasri HOSPITAL	<ul style="list-style-type: none"> Assigned doctor time to various cost centers based on discussions with the team of doctors.
	VIETNAM PRIMARY CARE	<ul style="list-style-type: none"> Consulted with facility personnel to estimate the proportion of expenditures for inpatient and outpatient care in order to apportion aggregate expenditure data to departments that served both inpatients and outpatients.
Assumptions	AAROgyasri HOSPITAL	<ul style="list-style-type: none"> Broadly assumed that the pharmacy cost was 30% of the price.
	CENTRAL ASIAN REPUBLICS DRG	<ul style="list-style-type: none"> Used the number of staff per 1,000 bed-days in a department as a proxy for the department's treatment complexity.
	MALAYSIA COMPHEC	<ul style="list-style-type: none"> Distributed overhead cost to each patient type by assuming average resource use across patient types. Calculated the average time spent by staff on procedures and assigned personnel cost based on those averages.
	PHFI HOSPITAL	<ul style="list-style-type: none"> Used the number of visits and admissions per department to allocate drug and medical supply expenditures, assuming that inpatients consumed three times more than outpatients or emergency patients. Calculated the personnel cost for the most commonly performed surgical procedures by using the average of staff time spent on all procedures.

TABLE 42. Equivalence Scales

CASE EXAMPLE	EQUIVALENCE SCALES
Aarogyasri Hospital	<ul style="list-style-type: none"> 1 General ward bed-day = 3 outpatient visits 2.7 General ward bed-days = 1 ICU ward bed-day 3.1 ICU ward bed-days = 1 Operating Theater hour of general surgery
Indonesia Health Facility	<ul style="list-style-type: none"> 1 inpatient admission = 2.4 (average) and 3.5 (median) outpatient visits
MNHA Hospital	<ul style="list-style-type: none"> Personnel time for 1 bed-day = personnel time for 1 outpatient visit
Vietnam Primary Care	<ul style="list-style-type: none"> 1 bed-day = 3 outpatient visits

DEPRECIATING CAPITAL ASSETS

Depreciation is the amount by which the value of an asset decreases continuously over time due to its use. That is, depreciation spreads an asset's cost over the duration of its useful life to capture how much of an asset's value has been used up. Depreciation policies tend to vary by country, institution, or provider. While different methods exist for depreciating capital assets, straight-line (constant) depreciation is the simplest and most commonly used method in costing for provider payment. This method divides the asset purchase price by its years of useful life, assuming that assets lose their value evenly over their life span, and allocates a portion of the net cost to each year. The case examples used the straight-line method for depreciating all capital assets.

Note that the choice of depreciation method can vary by the type of capital asset being depreciated. Straight-line depreciation is standard practice for buildings, but other methods (e.g., the reducing balance method or the production unit method) are sometimes preferred for equipment or vehicles that

lose value more quickly in the early years. Regardless of which depreciation methods the costing team choose, they should apply them consistently to all facilities in the sample.

Capital assets should be valued using either their original purchase price or their replacement price. The case examples used different depreciation bases to value capital assets. For example, the Malaysian DRG team used the purchase price because those data were readily available and routinely collected. The PHFI Hospital team used the replacement price because the purchase prices of the capital items were not available at most hospitals. Countries with high inflation should be careful about using the purchase price; if they don't adjust for inflation, they may underestimate the value of capital assets. Using the replacement price for equipment (e.g., computers, CT/MRI machines) or vehicles can have drawbacks because it may be higher than the acquisition price.

The cost of land can be useful for distinguishing variations in property

prices by region and location, but many costing teams exclude it because it is often very difficult to calculate. But costing exercises that include private providers should attempt to estimate the cost of land (if applicable) because it can be a significant additional cost borne by private providers, unlike with public providers. Costing teams that include the cost of land in their unit cost calculations should not consider land to be a depreciable asset because it does not necessarily lose value over time.

The cost of buildings can be challenging to calculate because price data on the original construction and subsequent renovations may be limited. In such cases, costing teams have several estimation options:

- Determine the cost of a recently built facility that has a similar structure—size and construction materials—and adjust the cost for inflation and any major differences between the buildings.
- Estimate the cost of constructing a new facility of similar structure and adjust for inflation.

- Use a standard local market construction quote (e.g., \$500/square meter), adjust it for inflation, and multiply it by the facility size.
- Obtain the annual lease rate of a facility of similar structure from a real estate agent and use it as a proxy for annual depreciation. (This cost should be treated like a recurrent cost.)

There is always uncertainty in measuring and valuing capital assets because it is difficult to forecast the useful life of an asset. A good practice is to present cost results with capital costs included as well as excluded.

ADJUSTING FOR INFLATION

Adjusting for inflation is an important part of data analysis, particularly in volatile local markets. Adjusting for inflation is called for in these scenarios:

- When data span more than one year
- When calculating capital depreciation
- When provider payment policy will be set long after the cost results are obtained

A common technique for adjusting for inflation is using a GDP deflator. Using the Consumer Price Index (CPI) or Medical CPI are alternative methods, although these indexes are often not

available or are not relevant to low- and middle-income countries. There is some risk in using the CPI because general inflation does not always track health sector inflation.

ALLOCATING COSTS

Top-down cost allocation techniques are required to first apportion indirect costs and then apportion department costs, in order to calculate the unit costs of health services. Direct allocation is recommended for allocating indirect costs, and step-down cost accounting is recommended for allocating department costs.

Direct allocation is used to apportion indirect costs to different departments (i.e., cost centers). For example, the cost of utilities is directly allocated to various departments based on estimated utility use by department. This estimate is often based on a proxy measure such as the floor area (e.g., square meters) of the department.

In contrast, four primary methods are available for allocating costs from Administrative and Clinical Support departments (i.e., nonrevenue cost centers) to the Clinical departments (i.e., revenue cost centers):

- **Direct distribution.** This method allocates nonrevenue center costs only to revenue centers. For example, the Housekeeping department costs are allocated using square meters as the allocation base to revenue cost centers only.
- **Step-down method.** This method allocates nonrevenue center costs to both nonrevenue and revenue centers in a step-wise fashion, whereby costs from nonrevenue centers that provide services to the greatest number of other cost centers are allocated first.
- **Double distribution.** Using this method, each cost center distributes costs to all other cost centers, after which some cost remains in the nonrevenue cost centers. The step-down method is then used to allocate the remaining costs in the nonrevenue cost centers.
- **Reciprocal distribution.** Using this method, each cost center distributes costs to all other cost centers, after which some cost remains in the nonrevenue cost centers. Algebraic equations are used to distribute the remaining costs, yielding a result similar to an infinite number of distributions.

The step-down method is the traditional and most commonly used top-down cost allocation method in costing for provider payment. This method addresses some of the problems with distortion caused by direct distribution and is considered adequate and easier to perform than double or reciprocal distribution. The step-down method is described in detail in the appendix.

CONDUCTING SENSITIVITY ANALYSIS

Sensitivity analysis is useful for testing assumptions and considering possible scenarios and their impact on results. In particular, when assumptions are made, a sensitivity analysis can show how much the results would change if a different assumption were used. Because cost accounting for provider payment relies on estimates and assumptions, sensitivity analysis is useful for testing those estimates and assumptions and getting a sense of how much they affect the final estimates.

Sensitivity analysis is also helpful for testing the robustness of the results, providing greater understanding of the relationship between inputs and cost estimates, and identifying inputs that have limited or no effect on the cost

estimates. It is also a helpful tool for improving communication between policymakers and analysts. Both parties can determine assumptions to test and scenarios to explore, and the analysis can reveal how the results would change. Microsoft Excel has built-in sensitivity analysis tools through the “what-if” scenario feature.

The case examples used sensitivity analysis to examine results after changes were made to the inputs based on different assumptions, estimations, or exclusions. Specifically, they explored the following scenarios:

- With and without depreciation cost of capital (Indonesia Health Facility)
- Cost differences between health facilities in urban vs. rural locations (Indonesia Health Facility)
- Cost differences between hospitals of different types and sizes (Indonesia Health Facility)
- With and without cost of land (PHFI Hospital)
- With and without depreciation cost of expired capital (Vietnam Primary Care)
- With and without centrally financed recurrent costs of staff salaries and allowances, training costs, and research costs (Vietnam Primary Care)

- Equivalence scale (bed-day to outpatient visit) of 1:1 vs. 1:3 (Vietnam Primary Care)
- Different assumptions about health center staff time spent on curative vs. preventive activities (Vietnam Primary Care)

COMPARING AND VALIDATING RESULTS

Costing teams should compare unit cost results across departments and providers and validate the results with providers. In Step 8, costing teams verify data values with providers that appear incomplete, inconsistent, or improbable based on a review of their logical consistency and a comparison with similar providers. Following the data analysis in Step 9, costing teams should assess whether the average unit costs are intuitive and reasonable and whether there is logic behind the variability in unit costs across departments and across providers. Providers can help validate the results by checking them for reasonableness.

CHECKLIST

STEP 9: ANALYZE AND VALIDATE DATA

- ✓ **USE** the cost accounting model to analyze the data.
- ✓ **DOCUMENT** each step of the analysis so the iterations can be retraced, assumptions and extrapolations are transparent, and data gaps or other limitations are specified.
- ✓ **DETERMINE** whether additional data need to be collected or verified.
- ✓ **ADDRESS** unreliable, invalid, or missing data by making assumptions, estimates, and extrapolations.
- ✓ **DECIDE** when the analysis is complete and then document any limitations in the analysis.
- ✓ **VALIDATE** results with the facilities involved to ensure that the results make sense and to correct any residual errors.

RESOURCES

Conteh, Lesong, and Damian Walker. "Cost and Unit Cost Calculations Using Step-Down Accounting." *Health Policy and Planning* 19, no. 2 (2004): 127-35.

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LESSONS LEARNED

"The step-down method is the traditional and most commonly used top-down cost allocation method in costing for provider payment."

"It is a challenge to finally stop cleaning and analyzing the data."

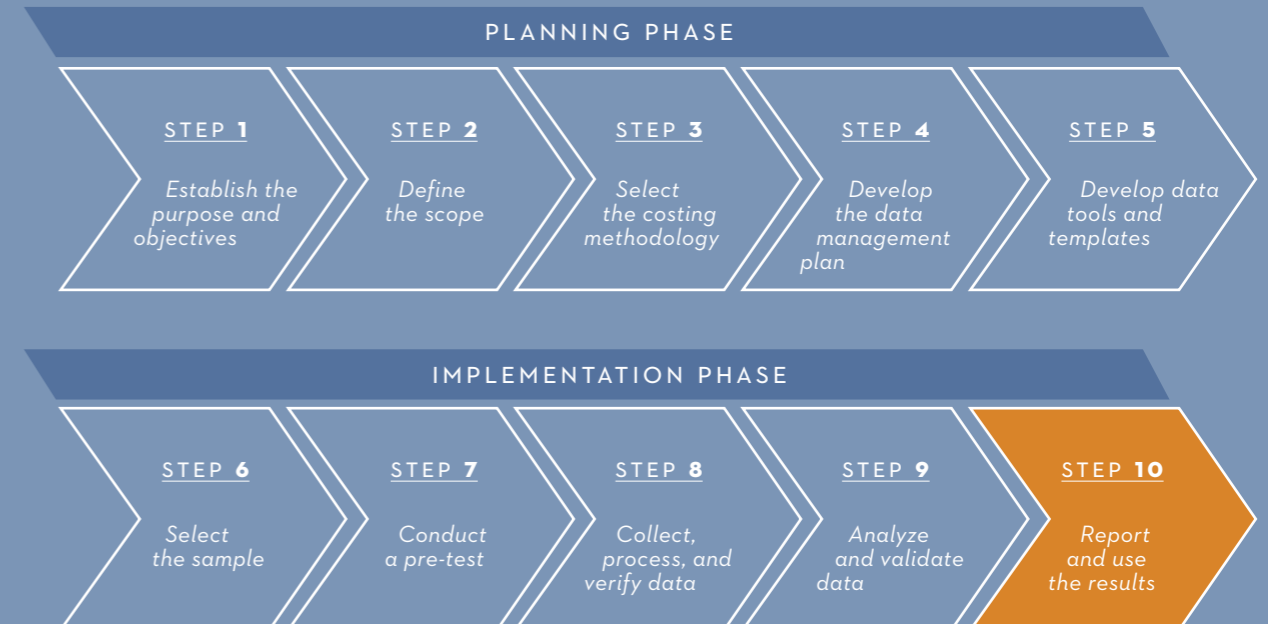
"EXTRAPOLATIONS AND ASSUMPTIONS FOR MISSING DATA ARE INEVITABLE."

PART 3.

FROM COSTING TO PROVIDER PAYMENT

PART 3 of this manual covers Step 10 of the costing exercise: reporting and using the results. This manual focuses on using the results of a costing exercise to design and implement provider payment policy, and specifically to set payment rates.

TEN-STEP PLAN FOR A COSTING EXERCISE



THE ROLE OF COST INFORMATION IN PROVIDER PAYMENT POLICY AND RATE-SETTING

Cost information is only one consideration in provider payment rate-setting, but it can help stakeholders better understand and weigh the other considerations. As noted in the introduction to this manual, provider payment rate-setting is a balancing act for the health purchaser.

The purchaser is responsible for keeping payments within available resources while paying providers enough to deliver high-quality care and creating incentives for efficiency, ongoing quality improvement, and responsiveness to patients. To meet these objectives, the purchaser must balance four considerations: policy objectives, available resources, the average cost to providers of delivering services, and negotiation with providers and other stakeholders. (See **FIGURE 8.**)

The objective of provider payment rate-setting is to pay providers the average expected cost for an efficient provider to diagnose and treat a case or manage the total care of a patient in a given category. The actual costs to providers of treating individual cases will exceed the payment rate in some cases and fall below it in others, depending on the clinical characteristics of the cases and the incentives to

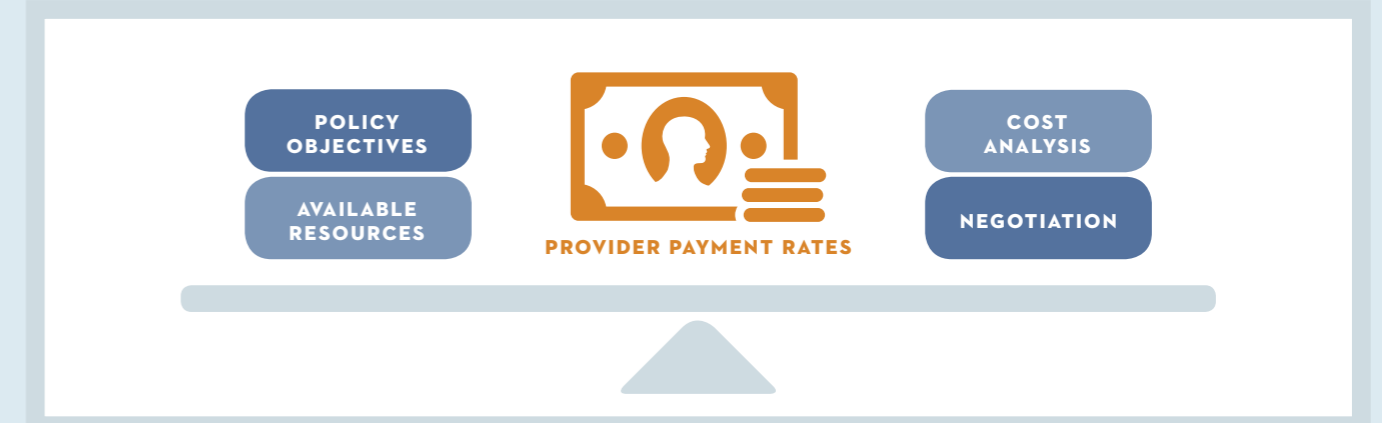
providers to be more efficient. The cost to providers of delivering services therefore is not necessarily the primary consideration in rate-setting, but cost information can provide an evidence base for the other three factors. For example, if strengthening primary care is a policy objective, a cost analysis can demonstrate that primary care is underfunded, which can provide a basis for higher payment rates for those services. The results of the cost analysis can be used to plan health coverage expansion and ensure that adequate resources are available and are managed well through appropriate provider payment systems. That information can, in turn, lend more transparency to negotiations between the purchaser and providers.

Relative costs are more important than absolute unit costs for provider payment policy. Providers generally deliver more services that are relatively more

“profitable”—that is, those for which they are paid higher rates relative to the cost of delivering them. If relative prices do not reflect relative costs, providers may benefit from delivering more of the services with lower relative costs and higher relative prices. This is often the case with high-tech diagnostic services, which have a low marginal cost after the equipment is purchased but often are paid at high relative rates. Overuse of high-tech diagnostic services is common for this reason. Furthermore, sicker patients are more costly to treat, so payment rates should ensure that providers are not underpaid for treating severely ill patients.

Understanding absolute costs is also important, however. If payment rates are significantly and chronically below the costs of delivering services, quality will eventually suffer because providers will reduce the amount and quality of inputs they use or patients will be

FIGURE 8. Considerations in Setting Provider Payment Rates



asked to contribute more out of pocket to the cost of their care. Monitoring the absolute costs of delivering health services and the gaps between costs and payment rates can help guide strategies for increasing or redistributing funding in the health system and identifying ways to improve efficiency.

Costing results can be used in a number of ways for provider payment policy:

- To inform or serve as a basis for provider payment rates and adjustments

- To validate and/or cross-check payment rates
- To facilitate greater transparency and fairness in negotiations over payment rates
- To enable continuous revision or refinement of provider payment rates
- To improve planning and budgeting
- To simulate alternative scenarios for expanding coverage
- To monitor progress on policy objectives

TABLE 43 describes how the costing results were used to inform provider

payment policy and rate-setting in the case example countries.

How costing results are used will ultimately depend on the country context. Each purchaser must find a way to balance policy objectives, available resources, the cost of delivering services, and negotiation with providers.

TABLE 43. Use of Costing Information in Provider Payment Rate-Setting

USE OF COSTING RESULTS	CASE EXAMPLE	TYPE OF PAYMENT SYSTEM
To set payment rates (using cost information as the main input)	INDONESIA CASEMIX	Case-based hospital payment
	GHANA G-DRG	Case-based hospital payment
To calculate relative case weights	CENTRAL ASIAN REPUBLICS DRG	Case-based hospital payment
To calculate adjustment coefficients	CENTRAL ASIAN REPUBLICS	Capitation
	INDONESIA HEALTH FACILITY	Capitation
	GHANA G-DRG	Case-based hospital payment
	VIETNAM PRIMARY CARE	Capitation
To cross-check payment rates calculated from other sources	AAROGYASRI HOSPITAL	Case-based hospital payment
	GHANA G-DRG	Capitation
	PHILHEALTH CASE RATES	Case-based hospital payment
	VIETNAM PRIMARY CARE	Capitation

STEP 10.

REPORT AND USE THE RESULTS

COMMUNICATING COSTING RESULTS TO STAKEHOLDERS

Because provider payment rates affect the financial sustainability of health financing systems as well as provider income, a range of stakeholders will be interested in the costing results and how they are used. All of these stakeholders should be included in reviewing and interpreting costing results at various stages before and during the rate-setting process.

As mentioned in Step 1, it is important at the outset of a costing exercise for policymakers and costing teams to discuss what type of costing results are needed to inform provider payment policy. Anticipating these needs up front can help ensure that all stakeholders are aligned and have similar expectations about the results.

Costing teams should determine which stakeholders to communicate with, what information is most relevant to them, and how to convey the information. TABLE 44 describes the information that key stakeholders typically need.

The best way to present costing results will depend on the richness of the

data collected and what is needed for provider payment policy decisions.

TABLE 45 presents guidance on topics to address when communicating costing results to stakeholders. Costing exercises may include a few final deliverables, including a longer descriptive report (see examples in the toolkit on the companion flash drive), presentations

TABLE 44. Key Stakeholders and the Costing Results They Need

STAKEHOLDER	RELEVANT RESULTS
<i>Policymakers</i>	Summary results and interpretation for rate-setting and provider payment reform
<i>Purchasers (insurers, employers, MOH, etc.)</i>	Summary results and discussion of potential implications for their purchasing practices
<i>Provider payment technical teams</i>	Detailed results and interpretation for rate-setting and provider payment reform
<i>Analysts and technical groups (peer reviewers)</i>	Detailed costing methodology, results, and limitations
<i>Provider associations</i>	Summary results with average facility results disaggregated by key factors (e.g., level of service of facility, public/private ownership)
<i>Providers</i>	Facility-specific results benchmarked against peer facilities, highlighting cost drivers and potential areas for improving management operations and performance
<i>Civil society, members, and patients</i>	Summary results with discussion of implications for their benefits and out-of-pocket payments

TABLE 45. Information to Communicate to Stakeholders

TOPIC	WHAT TO COMMUNICATE	PURPOSE
<i>Background on the purpose and objectives of the costing exercise</i>	<ul style="list-style-type: none"> Provider payment purpose (e.g., to revise capitation rates) Specific objectives (e.g., to estimate unit costs of primary care services) 	<ul style="list-style-type: none"> To put the costing exercise into the context of larger health system changes and objectives.
<i>Methods</i>	<ul style="list-style-type: none"> Scope of the costing exercise, especially provider types and cost categories (Step 2) Sample selection (Step 6) and pre-test approach (Step 7) Costing methodology (Step 3) Data collection details (time frame, involved parties) Data sources Limitations of the costing exercise 	<ul style="list-style-type: none"> To clearly describe and be transparent about the process. Avoid being overly descriptive, but give enough information so people understand and trust the thoroughness of the process. To convince policymakers and providers that the methodology meets global standards and is appropriate for provider payment (rather than research) purposes. To explain any major limitations or analysis choices that stakeholders will care about. Try to anticipate questions about limitations and assumptions used for the analysis.
<i>Key findings</i>	<ul style="list-style-type: none"> Clear visuals, charts, and tables to convey costing results Relevant calculations to make analyses transparent Explanation of how to interpret the results Conclusions and (if applicable) recommendations on improvements or policy implications 	<ul style="list-style-type: none"> To present the results in a simple and clear way—tailored to the specific audience—for maximum impact and to convey the most important messages. Avoid presenting more detail than stakeholders can absorb and interpret. More detail can always be provided in response to specific requests.

tailored to several different audiences, and policy notes. Costing results can be organized and presented in a number of ways, such as across geographic areas, providers, departments, patients, and time. The following sections offer some options for communicating the results.

Presenting Average Unit Costs

The first set of results to present is the average unit costs, which are used to calculate base rates (explained later). Average costs are presented per bed-day, per discharge, per outpatient visit, per surgery, per lab test, and so on. Comparative cost charts are useful for showing the range of unit cost results across facilities.

When explaining observed variations in unit costs (across geographic areas, providers, or departments, for example), costing teams should explain the factors underlying those variations, which generally include:

- Unit prices for inputs (e.g., salaries, drug prices)
- Staffing (quantity, skill level, and mix)
- Availability of drugs and supplies
- Access to different kinds of medical equipment
- Service mix
- Severity of cases (case mix)
- Productivity/efficiency
- Utilization

- Sophistication of accounting systems used for data capture

Inherent differences between health facilities, such as geographic location and ownership status, can also contribute to variation, as can the clinical characteristics of their departments. That is, the same department can have a different cost profile in different facilities depending on the case mix, treatment protocols, and access to inputs.

Costing teams should present average unit costs as a weighted average across facilities in the sample. That is, rather than having the average unit cost for

BOX 13. Presenting Costing Results to Highlight Potential Efficiency Gains in India

Costing studies in Meghalaya and Chhattisgarh states in India revealed that unit costs varied greatly across hospitals when some hospitals purchased services or goods at retail market prices and other hospitals directly produced them. Some hospitals, for example, purchased the services of consulting physicians and outsourced pharmacies and diagnostic services at market prices, leading to

higher average unit costs than those observed for hospitals that directly managed their own pharmacies and delivered their own diagnostic services. The costing teams were able to analyze the effects of the outsourcing practices on unit costs based on consultations with experts, and they made adjustments to simulate potential efficiency gains. For the costing study in Chhattisgarh, the retail drug prices

were discounted by 40 percent to make the costs consistent with the likely bulk purchase prices. With the costing results presented in this way, the purchaser could then decide whether to use the higher, unadjusted average unit cost (driven by paying retail prices for drugs) as an input into payment rates or whether to refuse to build these inefficiencies into the payment rates to the hospitals.

each provider (or department) contribute equally to the final average, they should give greater weight to providers (or departments) with higher utilization.

It can be helpful to group facilities by key characteristics that affect efficiency—such as level of service, geography, or ownership type—so stakeholders can see how these factors can explain variations in unit costs. These comparisons can provide a basis for discussions about efficiency and whether the payment system should compensate for some of these factors. In India, for

example, unit costs can vary greatly across hospitals when some hospitals outsource certain inputs or services (such as pharmacies and diagnostic tests) and pay retail prices for them. The purchasers have to decide whether to compensate for these cost differences in payment rates. (See **BOX 13.**)

FIGURE 9 shows an example of the weighted average unit costs for facilities grouped by ownership type. **FIGURE 10** shows an example of the weighted average unit costs for facilities grouped by geographic area.

The volume of services provided by facilities is also important when comparing cost results. Health facilities with high volume will typically have lower unit costs than facilities with lower volume. Higher utilization may be related to efficiency and quality or possibly factors such as geography, and these should be considered in payment rate-setting. Costing teams can communicate to stakeholders how unit cost results relate to facility size and utilization (see **FIGURE 11**) or other operating characteristics such as bed occupancy rates.

FIGURE 9. Illustrative Chart of Unit Costs by Facility Ownership

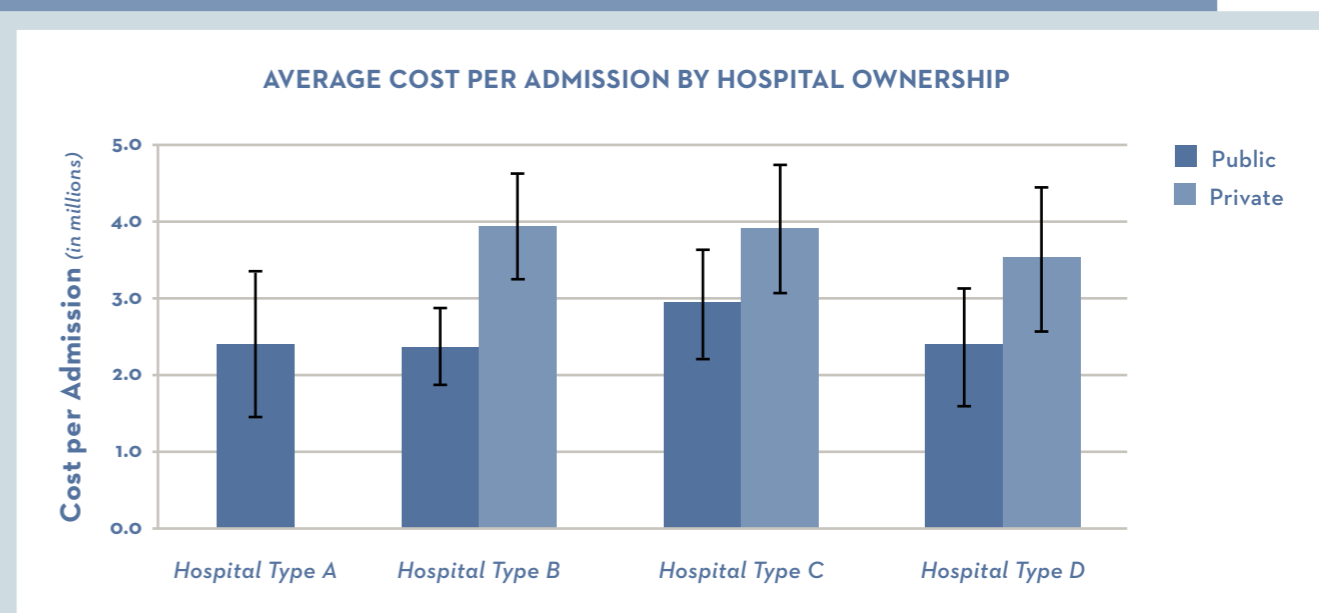


FIGURE 10. Illustrative Chart of Unit Costs by Geographic Category

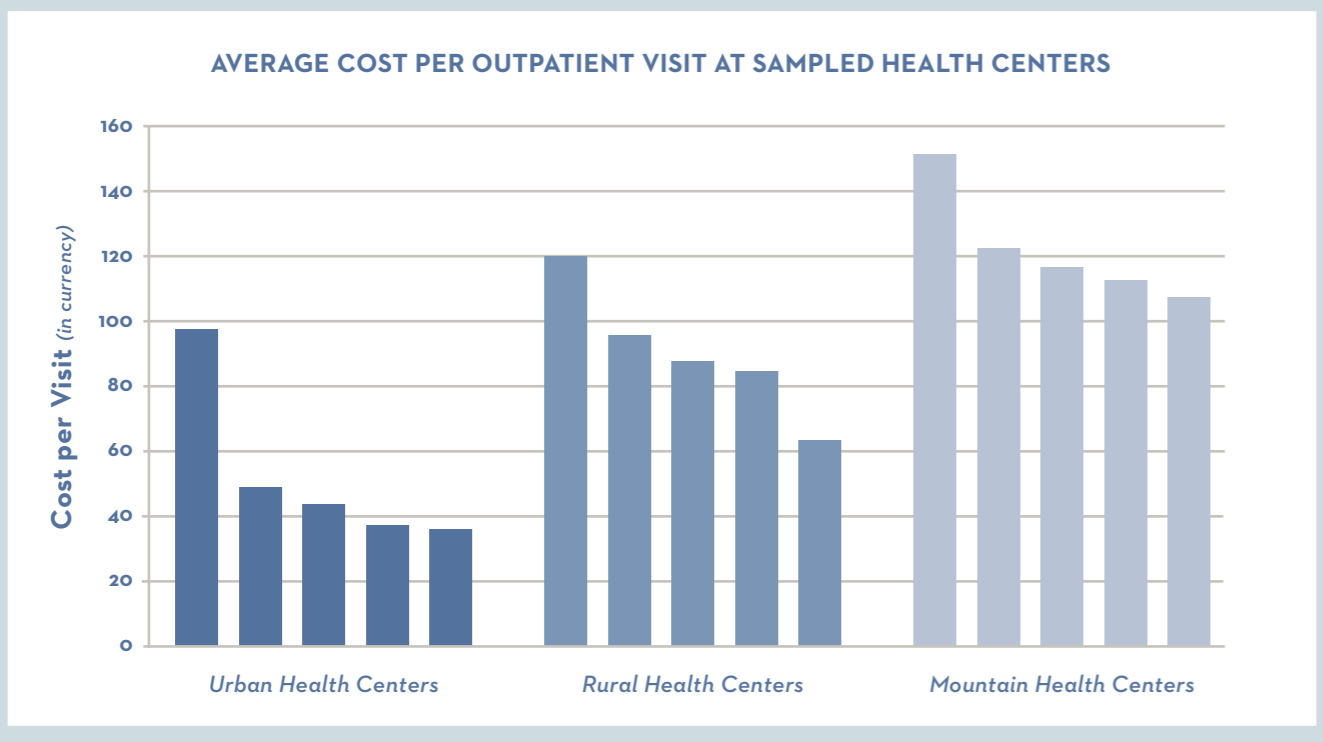


FIGURE 11. Illustrative Chart of Unit Costs by Facility Size and Utilization

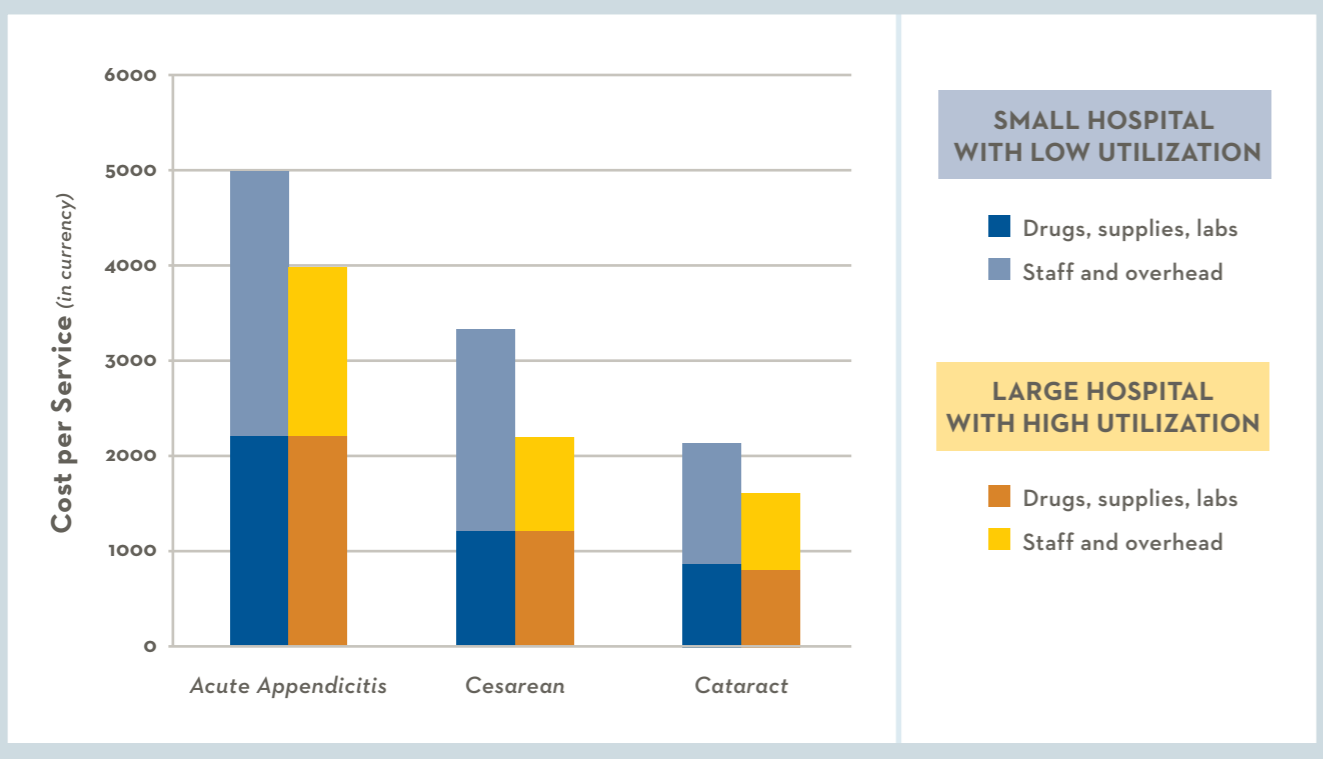
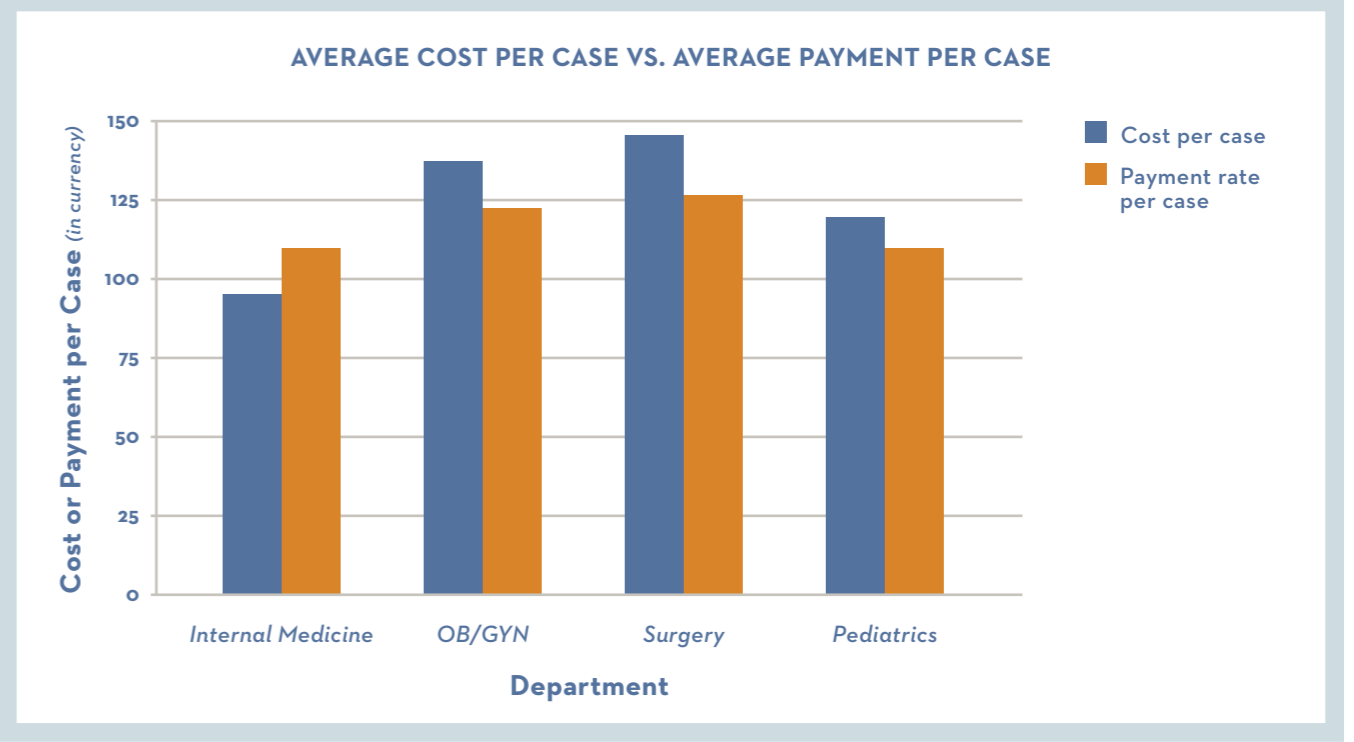


FIGURE 12. Illustrative Chart Comparing Unit Costs and Payment Rates



Costing teams can also present cost information to highlight gaps between costs and current payment rates. Quantifying the gaps may inform higher-level discussions about resource allocation to and within the health sector. FIGURE 12 shows an example of how the differences between unit costs and payment rates can be presented to facilitate conversations with stakeholders about how to close those gaps.

When costing results are obtained from multiple costing exercises or using multiple methodologies, costing teams can use triangulation to validate the results. Costing teams should cross-check the unit cost results obtained using different methodologies and explain any significant differences. They should also compare the results with the payment or average value per claim over the same period as a cross-check. (See TABLE 46.)

Presenting Relative Costs
Stakeholders are typically most interested in absolute unit costs, but relative costs are more important for provider payment. There is no such thing as “real cost” or “true cost,” so absolute unit costs should serve only as a guide, particularly for provider payment policy. Absolute unit costs are strongly affected (more so than are relative costs) by the management

TABLE 46. Illustrative Comparison of Results from Different Methodologies

RESULTS	PNEUMONIA	CATARACT	ASTHMA
Average unit cost (bottom-up)	8,047	14,319	7,065
Average unit cost (top-down)	7,723	13,695	5,989
Average value per claim	6,301	19,376	5,106

TABLE 47. Illustrative Comparison of Relative Cost Estimates

HOSPITAL DEPARTMENT	WEIGHTED AVERAGE COST PER CASE	WEIGHT COEFFICIENT
Internal Medicine	\$104	0.75
OB/GYN	\$116	0.84
Cardiology	\$129	0.94
Surgery	\$148	1.10
Intensive Care	\$172	1.25
Weighted Global Average (across all departments and all facilities)	\$138	1.00

practices of purchasers and providers, which are not always efficient or effective, and they are more affected by any problems with the quality of the data. Absolute unit cost estimates are also quickly outdated because they are based on utilization and expenditure during a particular time period.

Relative costs reflect how much more or less the average unit cost is for a specific type of patient, service, department, or provider than the average unit cost across all types of patients, services, departments, or providers. TABLE 47 shows one option for presenting relative cost estimates. The cost weight is calculated by dividing the weighted average cost per case in a department by the global average cost per case. In this example, the results show that cases discharged from the Internal Medicine department are on average only 75 percent as costly as all cases on average, whereas cases discharged from the Intensive Care department are 25 percent more costly than all cases on average.

Presenting Cost Structures

Stakeholders often want to know which cost items drive the unit costs,

so presenting the cost structure results may be useful. The cost structure results show the share of each cost category in the total average unit cost. Comparing cost structures across facilities or services can inform discussions about where efficiency gains may be possible.

FIGURE 13 shows two types of charts that can be used to communicate the cost structure. The chart on the top compares the unit cost structure across facilities using a percentage format; the chart on the bottom compares the unit cost structure across services using monetary units.

Presenting Facility-Specific Results

Although provider payment policy is built on average cost estimates across providers, costing teams should share the results of the costing exercise with individual providers for their own internal use. Providers find it informative to see the results for their individual facility—across departments or across time—for the purposes of improving management and performance. Providers can also benefit from seeing their results benchmarked against those of the other facilities in the same cohort.

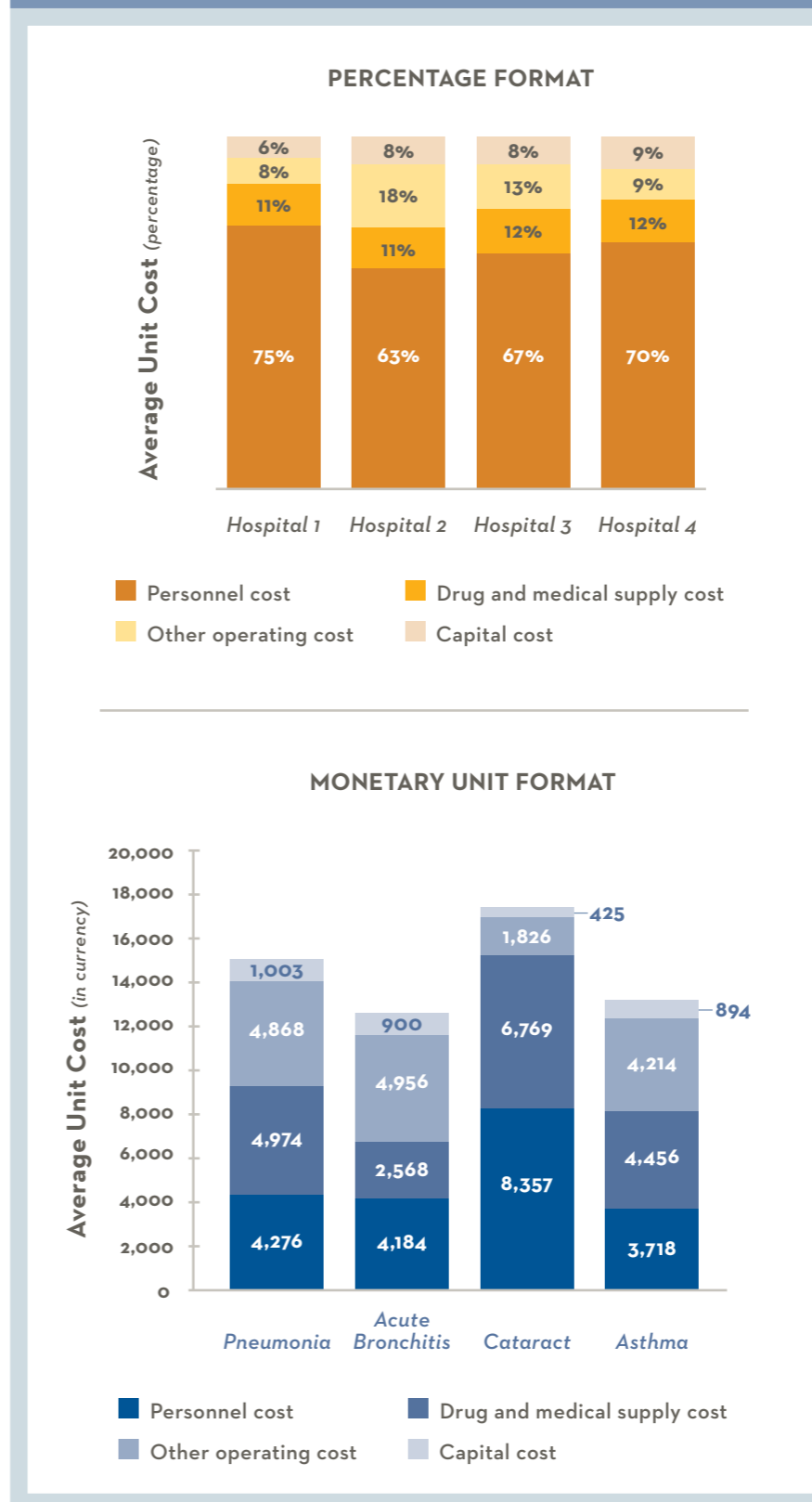
FIGURE 14 shows examples of facility-specific charts for the average cost per department and the average cost for all departments across time. FIGURE 15 shows an example of a comparative unit cost chart, where unit costs per bed-day are compared across the hospitals in the sample. The horizontal line denotes the weighted average cost per bed-day for all of the hospitals.

Communicating Results to Policymakers

Costing teams should communicate information to policymakers in an easily digestible format that addresses their key concerns and policy questions. Policymakers are likely to have limited time to absorb the full details of the costing results, so the costing team should present only the top-level results and main messages. Here are some guidelines for effectively communicating the results of a costing exercise to policymakers:

- **Understand the policymakers' needs and concerns.** What issues are most important to them? Are they trying to manage rising inpatient costs, increase funding for primary care, reduce patients' out-of-pocket

FIGURE 13. Illustrative Charts Comparing Average Unit Cost Structures



payments, or achieve other objectives? The presentation of the costing results should clearly address these questions.

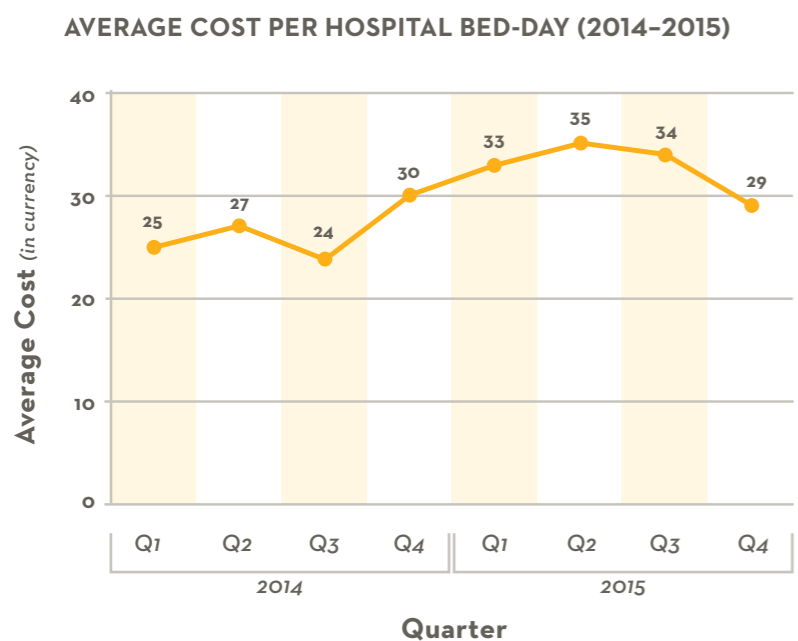
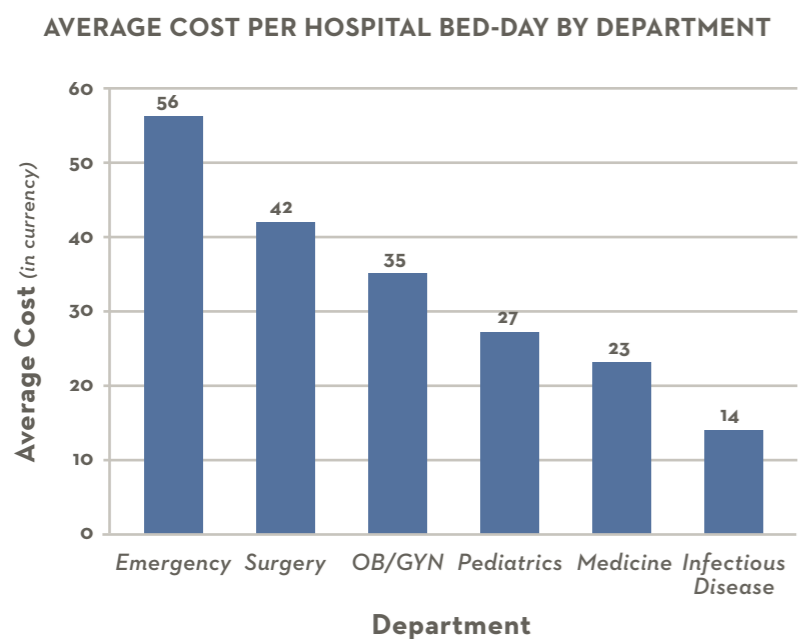
- **Explain the strengths and limitations of a costing exercise.** It is important that policymakers understand exactly what a costing exercise can and cannot do so they will use the information correctly and align their goals appropriately. Even with the limitations, it is important to convey to policymakers that the results of a small costing exercise are better than having no cost estimates.
- **Explain the importance of relative cost estimates.** Policymakers should understand that absolute unit cost estimates quickly become outdated. They also reflect historical cost structures, which may be inefficient, and funding levels in the system, which may be inadequate. The costing team should explain that relative cost estimates are likely to be a more stable and accurate reflection of current resource use by providers.
- **Explain how the costing results can be used in negotiations with providers.** In many countries, determining payment rates ultimately comes down to negotiation with providers, who often have the upper hand in terms of data and information. Policymakers should understand that a costing analysis based on globally accepted standards can make negotiations over payment rates more transparent and objective.
- **Provide results of the analysis in a clear and simple format.** Presenting costing results to policymakers is different from presenting the results to fellow analysts. Costing teams should keep it simple, focus on results rather than on the intricacies of methodology, and avoid overwhelming policymakers with details.

Communicating Results to Providers

Providers have a unique role in the costing process because they control much of the data and new payment rates affect them more directly than other stakeholders. Providers should have access to the costing

results that relate to their health facility as well as the broader results. Seeing their own cost data in the context of the average across all providers is valuable not only for their internal management but also for placing the results in a broader policy context.

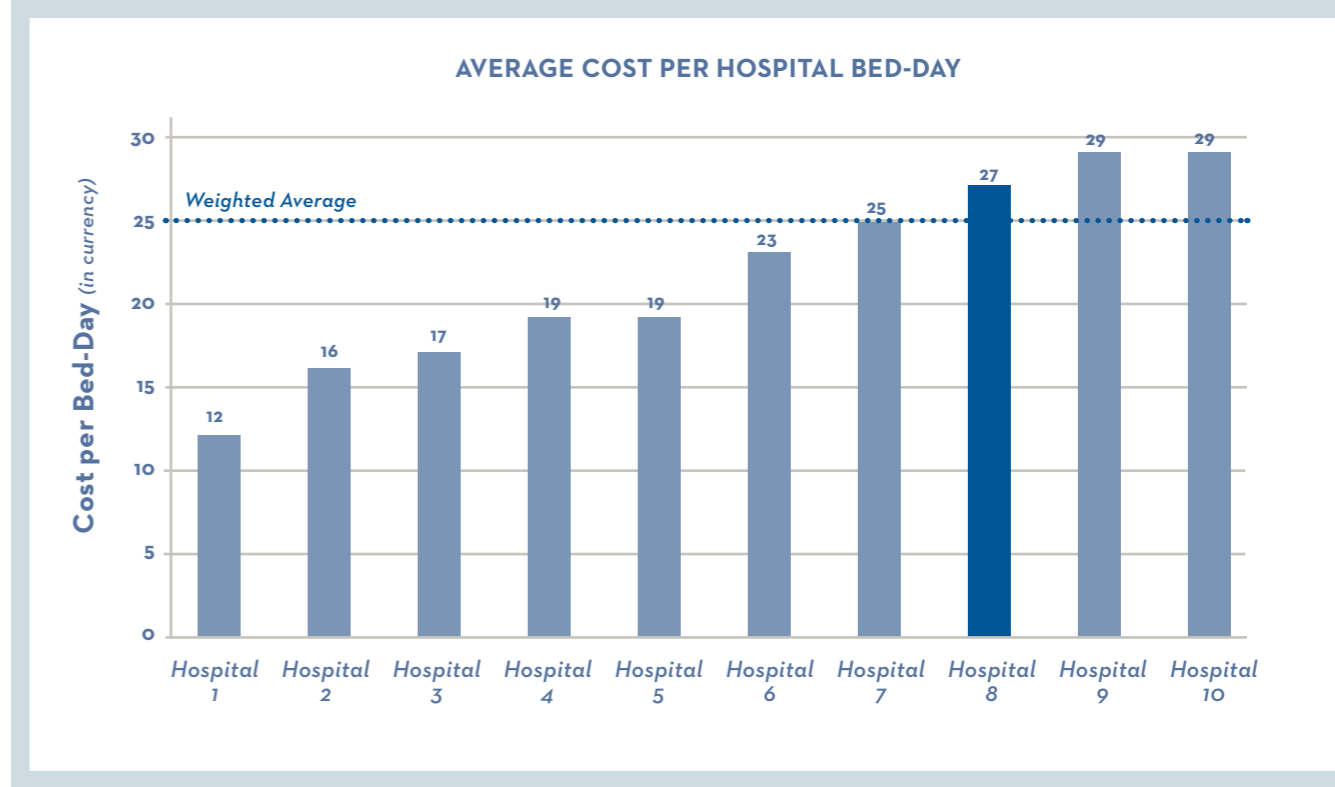
FIGURE 14. Illustrative Facility-Specific Unit Cost Charts



Here are some guidelines on communicating costing results to providers:

- **Connect the costing results to larger system reforms.** In many countries, costing exercises are initiated in connection with larger system reforms, such as the transition from fee-for-service to case-based payments. It is important to explain to providers that the information they provide can help this transition be more successful.
- **Understand the needs of providers.** Providers in low- and middle-income countries are faced with the challenge of delivering high-quality services in generally underfunded environments. Cost information that quantifies the gaps between payment rates and costs can help them advocate for additional funding or make adjustments so they can deliver more and better services within current funding levels.
- **Discuss the results in the context of the purchaser's resource constraints.** Unit cost estimates tend to be lower than providers expect, and sometimes providers focus on the gap between the cost estimates and current payment rates. In several of the case example countries, the MOH or purchaser discussed the costing results with providers in the context of total available funding. This helped focus the discussion on how best to use available resources, given that the funding is set at higher political levels.
- **Protect sensitive data.** A primary concern among providers is how the data they provide will be used, especially sensitive data such as salaries and benefits. When presenting the costing results, costing teams should ensure that all data are anonymous and that particularly sensitive data are excluded or presented only in aggregate form.

FIGURE 15. Illustrative Unit Cost Chart for Facility-Specific Benchmarking



USING COST INFORMATION TO INFORM PROVIDER PAYMENT POLICY AND RATE-SETTING

Cost information is used to develop the three main components of provider payment systems: base rates, relative case weights, and adjustment coefficients. (These are described in TABLE 48.) Most countries use a combination of these components to develop payment systems that are acceptable to providers and are sustainable within available funding levels.

The starting point for most provider payment systems is a *base rate*, or average payment rate per unit of service or registered individual. In a fee-for-service system, the base rate is the fee attached to a particular service. In a capitation payment system, the base rate is the average payment rate per enrolled or registered person before any adjustments. In a case-based payment system, the base rate is the average payment rate per hospital case before relative case weights or adjustment coefficients are applied. (See FIGURE 16.)

Relative case weights and *adjustment coefficients* are used in payment systems to construct relative payment rates. Relative case weights and adjustments compensate providers for systematic cost variations and financial risk factors associated with certain services, populations, or provider characteristics. TABLE 49 presents a summary of how cost information is used to construct the components of provider payment systems.

The following sections describe the three main options for using cost information in provider payment rate-setting:

- As the main input for calculating base rates
- To inform relative case weights and adjustment coefficients
- To cross-check payment rates derived from other information, such as claims data

TABLE 48. Components of Provider Payment Systems

PAYMENT SYSTEM COMPONENT	DEFINITION
<i>Base rate</i>	Average payment rate per unit of service, bundle of services, or registered individual.
<i>Relative case weight</i>	A coefficient (between 0.0 and 1.0) applied to the base rate to adjust the payment to reflect the cost of treating cases in a particular group relative to the average cost per case for all cases. The relative case weight reflects the resource intensity of diagnosing and treating cases in the case group relative to the average.
<i>Adjustment coefficient</i>	A coefficient (between 0.0 and 1.0) applied to the base rate to adjust the payment to reflect the cost of meeting the health service needs of different population groups or legitimate cost differences related to specific provider characteristics (e.g., being located in a rural or remote area or serving as a teaching facility).

FIGURE 16. Components of Payment Rates for Capitation and Case-Based Hospital Payment Systems

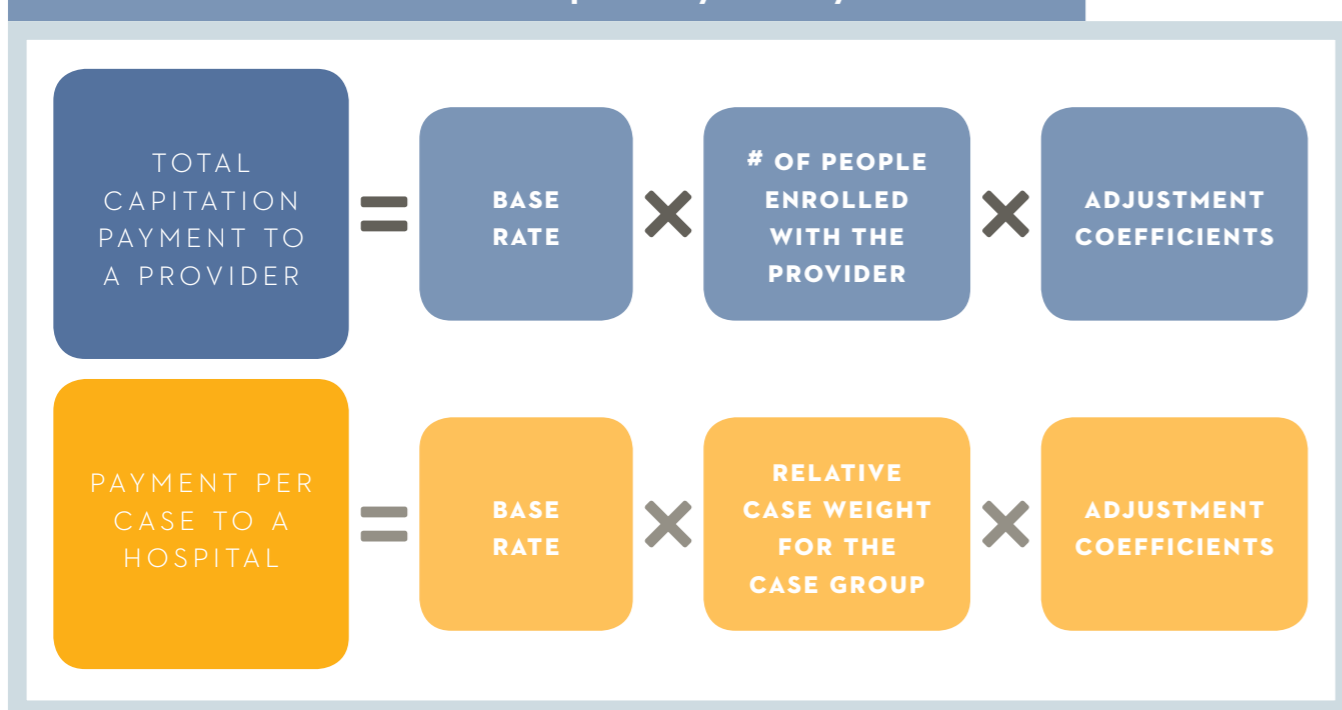


TABLE 49. Using Cost Information to Inform Payment System Components

PAYMENT SYSTEM ELEMENT	PAYMENT SYSTEM	USE OF COST INFORMATION	OTHER DATA REQUIREMENTS	
<i>Base rates</i>	CAPITATION	Base per capita rate	As a starting point for calculating base rates (but other considerations are almost always more important in final calculations)	
	CASE-BASED HOSPITAL PAYMENT	Base payment rate for a hospital case		
	FEE-FOR-SERVICE	Payment rate for a specific service		
<i>Relative case weights</i>	CASE-BASED PAYMENT SYSTEM	Weights for payment of cases in each case group (applied to the base rate)	To calculate the average cost per case in each case group relative to the global average cost per case	<ul style="list-style-type: none"> Average length of stay by department Typical department of discharge for cases in the case group
<i>Adjustment coefficients</i>	ALL PAYMENT SYSTEMS	Weights for payment for specific population groups or provider characteristics	To calculate the average unit cost within a population group or provider characteristic relative to the average unit cost	<ul style="list-style-type: none"> Utilization of different services by different population groups Possibly other information such as poverty rates for geographic adjustment coefficients

Using Cost Estimates to Inform Base Rates

Base rates should reflect the average cost to efficient providers of delivering the services covered by the payment system. Average cost across providers is used as the basis for rate-setting because the cost for individual providers will reflect variation in the clinical needs of individual patients as well as provider decisions that may include inefficiencies, such as use of outdated technology or overreliance on physicians and specialists for routine care.

Unit cost estimates are typically just a starting point for calculating base rates, however, because they often reflect

distortions in the current system. For example, chronic underfunding of the health system may generate unit cost estimates and resulting base rates that are artificially low. When an imbalance exists between primary and tertiary care in the system, hospital unit cost estimates may be artificially high, with primary care cost estimates artificially low. The purchaser should take these factors into account when using cost estimates to inform the calculation of base rates.

Basing payment rates directly on unit cost estimates has intuitive appeal but is typically not feasible or advisable for the following reasons:

- Basing payment rates on the cost of inputs or historical expenditures assumes that it is appropriate and desirable to maintain the provider's current cost structure. Current expenditure patterns rarely reflect efficient use of resources, and the volume and composition of cases being treated are rarely appropriate. The purpose of provider payment reforms may be to change the overall health system cost structure (e.g., to strengthen the primary care system or shift to a more cost-effective primary care system) or to change the cost structure for specific services by introducing evidence-based standards for clinical practice (e.g., for malaria treatment).

- This approach almost always leads to payment rates that are higher than available resources can sustain—sometimes dramatically higher. Policy goals must be achievable using available resources, so the calculation of base rates should always take into account the estimated pool of available resources.
- Estimates of absolute costs quickly become outdated, so payment rates derived solely from unit cost calculations must be updated frequently. Routine costing data are rarely available for this purpose in low- and middle-income countries.

Cost information can be useful for highlighting gaps between costs and available resources, however, and it can inform higher-level discussions about resource allocation to and within the health sector. When the gap between cost estimates and feasible payment rates is excessive, cost information can be used to argue for increasing available resources or reallocating resources from other parts of the budget.

For example, stakeholders in Vietnam engaged in such discussions after the costing exercise revealed that payment rates had covered less than 20 percent of the cost of delivering primary care services at the community level. That gap is currently being closed by out-of-pocket payments from patients. The cost analysis has led to discussions about sharing responsibility for closing the gap through a combination of greater government allocations to the health sector, shifting of some resources from other parts of the system, and more efficient service delivery by primary care providers.

Using Cost Estimates to Inform Relative Case Weights and Adjustment Coefficients

Unlike with calculating base rates, cost information is critical for calculating relative case weights and adjustments. The consequences of incorrect relative payment rates can be serious, so cost information is often a prominent factor in calculating relative case weights and adjustments. For example, if the cost differences of providing all necessary services for children are not accurately reflected in adjustment coefficients for capitation rates, providers may have an incentive to avoid or underserve this population, with potential consequences for child morbidity and possibly mortality. Relative payment rates can also relate more broadly to ensuring that service delivery priorities are met (e.g., for malaria, family planning, maternal and child health, TB, HIV, and noncommunicable diseases).

If calibrated properly, relative case weights and adjustments will not affect the total payments by the purchaser, so resource constraints will not affect these calculations.

Relative case weights are coefficients applied to the base rate to adjust payment for the cost of treating cases in a particular group relative to the average cost per case for all cases. Relative case weights are calculated for groups of cases that are considered to have similar clinical characteristics and similar resource requirements to diagnose and treat. Diagnosis-related groups (DRGs) are an example of a system of case groups and relative case weights. (See **FIGURE 17.**)

Relative case weights should be calculated directly from the relative

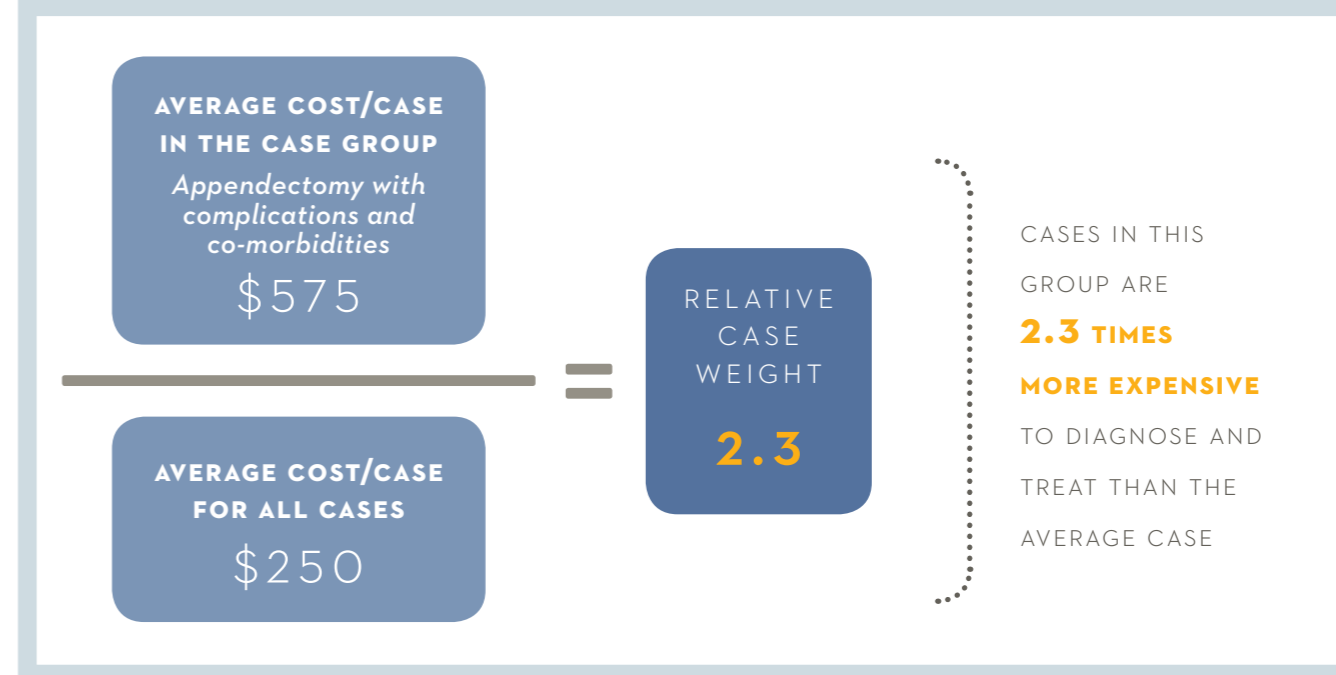
cost per case in each case group in the hospital payment system. Cost information is critical for setting accurate case weights that determine relative prices paid to providers. Costing teams can use expert opinion or case weights drawn from international sources to validate the results derived from the cost analysis.

Policy considerations will still affect final relative case weights, however. By weighting payment for some services above or below their estimated relative costs, the purchaser can direct providers toward priority services and away from services that are less cost-effective. For example, a higher weight than is suggested by cost information may be applied to payment for normal childbirth deliveries and a lower weight applied to cesarean sections to encourage a reduction in what may be considered an excessive cesarean section rate.

If relative case weights are based on valid cost information, there should be no need to set higher base rates for facilities with more clinical capacity. It can be tempting to set higher payment rates for higher-level hospitals because they have higher average costs due to more skilled staff and better technology. But higher-level facilities also tend to treat a larger proportion of complex cases, and those cases will have higher relative case weights, so facilities with more capacity and higher costs will naturally receive higher payments from the payment system.

Adjustment coefficients are applied to the base rate to adjust payment for the cost of meeting the health service needs of different population groups or for legitimate cost differences related to

FIGURE 17. Calculating a Relative Case Weight



specific provider characteristics. While weights are an integral part of some payment systems (e.g., relative case weights in a case-based hospital payment system using DRGs), adjustments are a largely optional way to help ensure that groups with more health needs or that require costlier services are not underserved and that providers have incentives to serve those populations.

Capitation base rates may be adjusted using coefficients that reflect the cost differences of providing services for different population groups (for example, to capture varying health needs by age and sex). Case-based hospital payments may be adjusted to uniformly increase payment rates for teaching hospitals or hospitals that serve a disproportionate share of poor and socially vulnerable patients. In Ghana, the G-DRG case-based hospital payment system includes an adjustment coefficient to increase payment rates for private facilities because they do not

receive subsidies for staff salaries and benefits and other inputs that public and faith-based providers receive.

Adjustment coefficients can include:

- **Age/sex adjustments** to capitation payments to compensate for the extra costs of providing care for certain population groups (e.g., infants, the elderly, women of reproductive age)
- **Urban/rural/geographic adjustments** to compensate providers for challenges of delivering services related to population density (e.g., long-distance travel to a facility) or geography (e.g., mountainous regions, islands) and compensate for the burden of spreading fixed costs across fewer patients
- **Public/private adjustments** to compensate for additional costs related to being a public or private facility, notably when trying to bring both under the same payment system
- **Teaching hospital adjustments** to compensate for additional costs

related to the educational functions of the hospital

- **Wage index adjustments** to compensate providers in areas with systematically higher wages

Adjustment coefficients can also be used to address policy priorities or transition gradually to a new payment system. Introducing a new payment system with prospectively determined average payment rates can significantly alter the distribution of resources across providers, and it is risky to do this too quickly without giving providers (particularly potential “losers”) time to adapt. Purchasers can use facility-specific adjustments to, for example, gradually apply a single base rate to all hospitals over time. They can also use adjustment coefficients to promote certain policy priorities, such as increasing access for underserved populations by paying providers relatively more to care for those populations.

Adjustment coefficients should reflect accurate estimates of cost variations across populations and certain provider characteristics. Adjustments to payment rates are applied across all payments to compensate providers for systematic and predictable cost variations and financial risk factors associated with certain populations or provider characteristics. Accurate cost estimates are therefore necessary to adequately and fairly compensate providers that face systematically higher costs for reasons outside of their control.

Adjustment coefficients often require more information than is generated by most costing exercises, however. For example, adjustment coefficients for capitation require utilization data at the individual level. And adjustment coefficients for geography (e.g., rural/urban) may require additional information to capture what is driving the observed cost difference, such as poverty rates, remoteness, or other factors beyond a simple rural/urban classification. In addition, estimated cost differences may reflect inefficiencies, and policy (or political) considerations may be more important than cost differences. Therefore, adjustment coefficients are often developed based on expert opinion or are driven by policy considerations.

In the Central Asian Republics, for example, costing results showed that, based on utilization rates and the unit cost of services, children under age 1 were more than four times as costly to care for than the average patient. (See **FIGURE 18.**) Final adjustment coefficients adopted by the purchaser did not fully compensate for the cost differences because the differences were

viewed as reflecting some inefficiencies and because doing so would have been politically unacceptable.

Adjusting payment upward for some providers means either adjusting payment downward for other providers to keep within the total budget (remain budget neutral) or increasing the total payments in the system. As in the Central Asian Republics, adjustment coefficients are sometimes not fully implemented (or not implemented at all) because it is politically difficult or against policy objectives to increase payments for some providers while reducing payments to others, and it is not possible to increase the total budget to support higher total payments in the system. In Indonesia, cost information showed that the total cost per capita of delivering primary care services was 30 percent higher for rural providers than for urban providers, but adjustment coefficients have not been implemented. It would be politically unacceptable to shift resources from urban to rural providers by that magnitude, and there are not enough available resources to increase total payments in the system. (See **BOX 14.**)

Although adjustment coefficients may be necessary to compensate for legitimate cost differences across population groups and provider characteristics, there are risks associated with overusing this tool. Too many adjustments, particularly adjustments related to provider capacity and volume, can make the incentives of the payment system unclear or inappropriate. In particular, if payments are adjusted upward for health facilities with higher volume or more bed capacity, providers will have

an incentive to generate additional volume and capacity, which may lead to unnecessary services. This will also put smaller facilities that serve smaller populations at a further disadvantage in the system. Facility-specific adjustments can be useful in the transition to new payment systems, but there is a risk of maintaining inefficient and unfair historical allocations when providers resist movement away from facility-specific adjustments.

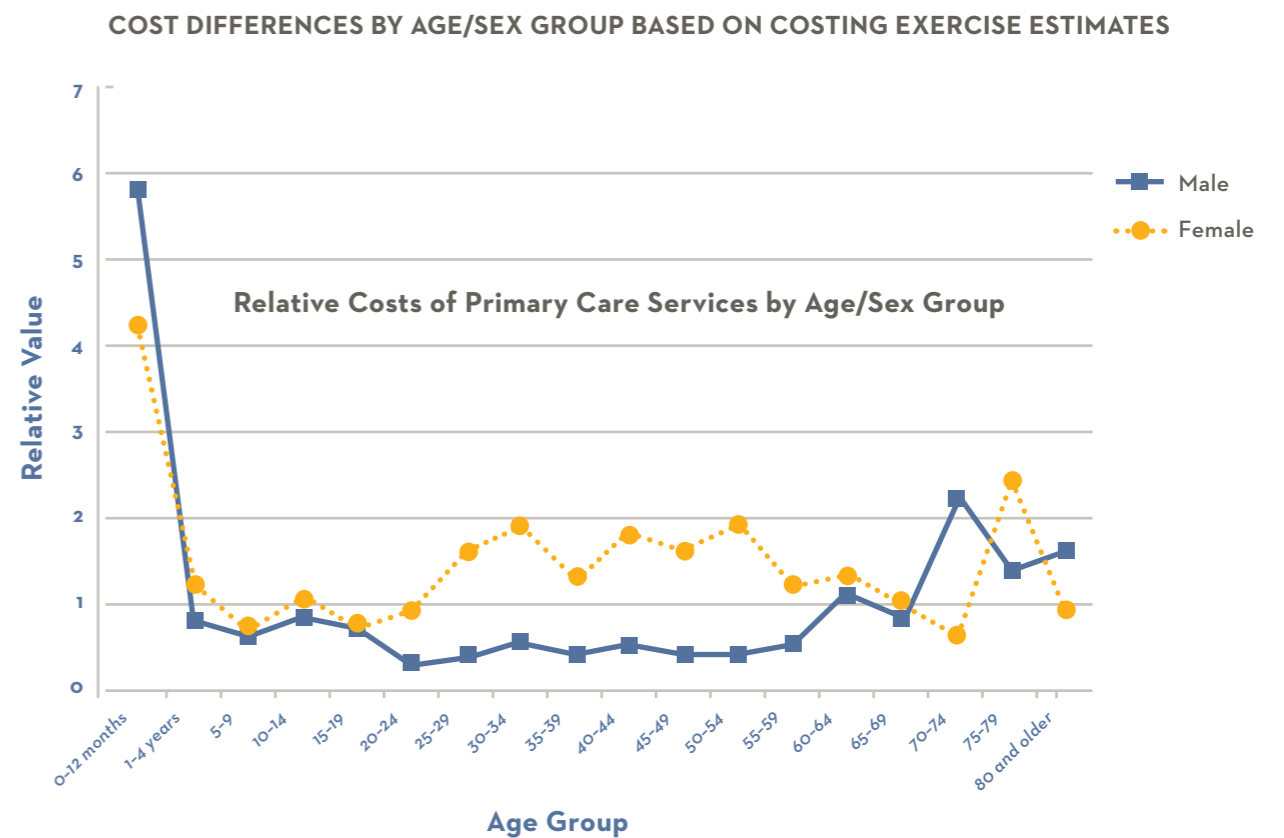
USING COST INFORMATION TO CROSS-CHECK PAYMENT RATES DERIVED FROM OTHER SOURCES

Although deriving payment rates for provider payment solely from cost estimates is not recommended, cost information is important for cross-checking rates developed from other sources. Two common sources of information for developing payment rates are historical claims data and the total annual resources available to the purchaser. Payment rates can also be derived by using normative costing, by adapting relative case weights used in other countries, or by consulting with experts.

Payment Rates Derived from Claims Data

Historical claims can be a useful starting point for determining payment rates. Claims data—data from bills that providers submit to purchasers in order to receive payment—can provide information about the services provided per case for different diagnoses or per period of time for different population groups. The purchaser can get a picture of which services to cover and their expected volume. In the Philippines, for example, PhilHealth developed payment rates for its case-based hospital payment system by analyzing the average value

FIGURE 18. Age/Sex Adjustment Coefficients for Capitation Payments in the Central Asian Republics



CAPITATION ADJUSTMENT COEFFICIENTS ADOPTED BY THE PURCHASER

	Children <5	Children 5-14	Women 15-49	Men 15-49	Adults 50>
Coefficient	3.0	0.8	1.3	0.8	1.2

An expert panel used both data and policy considerations to develop the final set of adjustment coefficients.

The coefficients were used as a policy tool:

- The coefficient for children 0-1 was adjusted downward to stimulate more efficient delivery of well-baby care.
- The coefficient for adult men was adjusted upward to increase utilization, particularly for chronic conditions.

BOX 14. Calculating Geographic Adjustment Coefficients in Indonesia

Indonesia launched a new nationwide social health insurance scheme in 2014 that merged multiple existing schemes.

The provider payment systems under the largest existing scheme, Jamkesmas, are being updated for use under the new integrated scheme. The payment systems include capitation for primary care and a case-based hospital payment system (INA-CBGs). Because of the enormous geographic diversity of Indonesia, the cost of delivering primary care

varies significantly across the country. Therefore, extending the capitation payment system nationwide will require adjustments for geographic factors.

The Indonesian MOH analyzed a number of variables that could lead to cost variations in delivering primary care across the country. It used multiple data sources and the costing exercise results to identify the most significant variables and quantify their impact on the total cost per capita of primary care services.

Regression analysis showed that only the urban/rural variable was a significant driver of cost differences, with the total cost per capita of primary care services in rural areas being 30 percent higher than in urban areas. The rural adjustments have not yet been implemented because it would not be politically acceptable to shift resources from urban to rural providers by that magnitude and not enough resources are available to increase total payments in the system.

VARIABLE	METHOD OF QUANTIFYING
Urban vs. rural	Population by type, using accepted definitions of urban and rural
Population density	Population/km ²
Accessibility	Likert score: 1 = easy to reach; 4 = very difficult to reach
% poor population	Percentage of the population meeting criteria for poverty at the district level
Bed availability	Number of primary care facilities with and without beds

per claim paid for services or sets of services under the fee-for-service payment system. PhilHealth added a percentage top-up to encourage provider participation in the new payment system.

However, claims often reflect little if any cost information and should be cross-checked. The payment and utilization rates in claims data can be inaccurate because they are likely to reflect historical expenditures rather

than actual costs, and they also reflect provider responses to incentives in existing payment systems. In Ghana, for example, claims data are often inflated because the G-DRG payment system rewards providers for delivering more services, particularly those that are unbundled and paid through itemized fee-for-service. Therefore, it is important that payment rates calculated using claims data are cross-checked with some costing results. Even small costing exercises can provide useful benchmarks

and help a purchaser decide whether the payment rates derived from claims data are too low or too high to meet the system objectives.

Payment Rates Derived Directly from Available Resources

To manage the total expenditure in a system, some countries derive payment rates directly from the pool of available resources to create a budget-neutral payment system. (See BOX 15.) They begin with the available funding for

the system or the service category (e.g., primary care) and divide it by either the population (e.g., for a capitation base rate) or the expected volume of services (e.g., for case-based hospital payment). Relative case weights and/or adjustment coefficients must be calibrated to 1—that is, any adjustments upward must be offset by adjustments downward—to keep total payments budget neutral. Cost information can be used to cross-check payment rates calculated in this way.

A budget-neutral payment system calibrates payment rates so total payments to providers (after any weights and/or adjustments are applied) are less than or equal to the total budget of the purchaser.

Some countries have found that calculating payment rates using historical claims data adjusted to fit within available resources can yield realistic payment rates that are understood by providers and do not drastically shift resource allocation patterns initially. However, these payment rates should be cross-checked against cost information for the reasons discussed earlier. In Ghana, the base rate for a new primary care capitation payment system was developed using this combined approach. (See FIGURE 19.)

BOX 15. Calculating Budget-Neutral Base Rates in the Central Asian Republics

When the Central Asian Republics introduced new mandatory health insurance systems in the mid-1990s, the governments used the opportunity to introduce new provider payment systems to move away from the highly inefficient input-based budget system inherited from the Soviet era. The new funds from the insurance systems represented only marginal new revenue for hospitals (only 20 percent over existing budget resources), so the new purchasers, the Mandatory Health Insurance Funds (MHIF), sought to get the most out of the new incentives.

In Kyrgyzstan, the payroll tax revenue for health insurance was highly unpredictable when the system was implemented, so the MHIF was unwilling to commit to unsustainable payment rates and introduced a budget-neutral payment system. It calculated the base rate for the new case-based hospital payment system directly from the portion of the total projected MHIF budget set

aside for hospital services divided by the historical volume of cases. It also reserved the right to adjust the base rate downward during the year if actual revenue was less than projected or if the volume of cases increased beyond historical levels. But because the insurance funds added new money to the system, no provider would get less revenue overall. The mid-year base rate adjustment was included in the payment formula as an adjustment factor and was called an “economic indicator” for transparency and to signal the purpose and intent to providers. The MHIF used costing information to develop relative case weights to differentiate payment rates for different types of cases.

In the first few years, the MHIF adjusted the base rate twice a year because revenue did not come in as expected. Over time, as the revenue stabilized and providers adjusted to the incentives of the case-based payment system, mid-year adjustments to the base rate were driven more by volume increases.

Relative Case Weights and Adjustments Adapted from Other Systems

When sufficient cost information is not available for developing case weights and adjustment coefficients, countries can adapt relative case weights and adjustments from other systems. This method is often used for DRG-based hospital payment systems because the cost and clinical information required to develop case groupings and relative case weights (together known as the *grouper*) can take years to develop. An imported grouper may not align exactly with the country's health service delivery system, burden of disease, clinical practices, and cost structures, so cross-checking against country cost data is helpful. Purchasers

should also ensure that supporting systems (e.g., information systems, financial systems) are functioning and appropriate processes and procedures are in place to refine the grouper and payment system over time. The INA-CBG system in Indonesia was adapted from an imported grouper, but the relative case weights are cross-checked with country costing results to better align the system with service delivery structures and patterns in Indonesia.

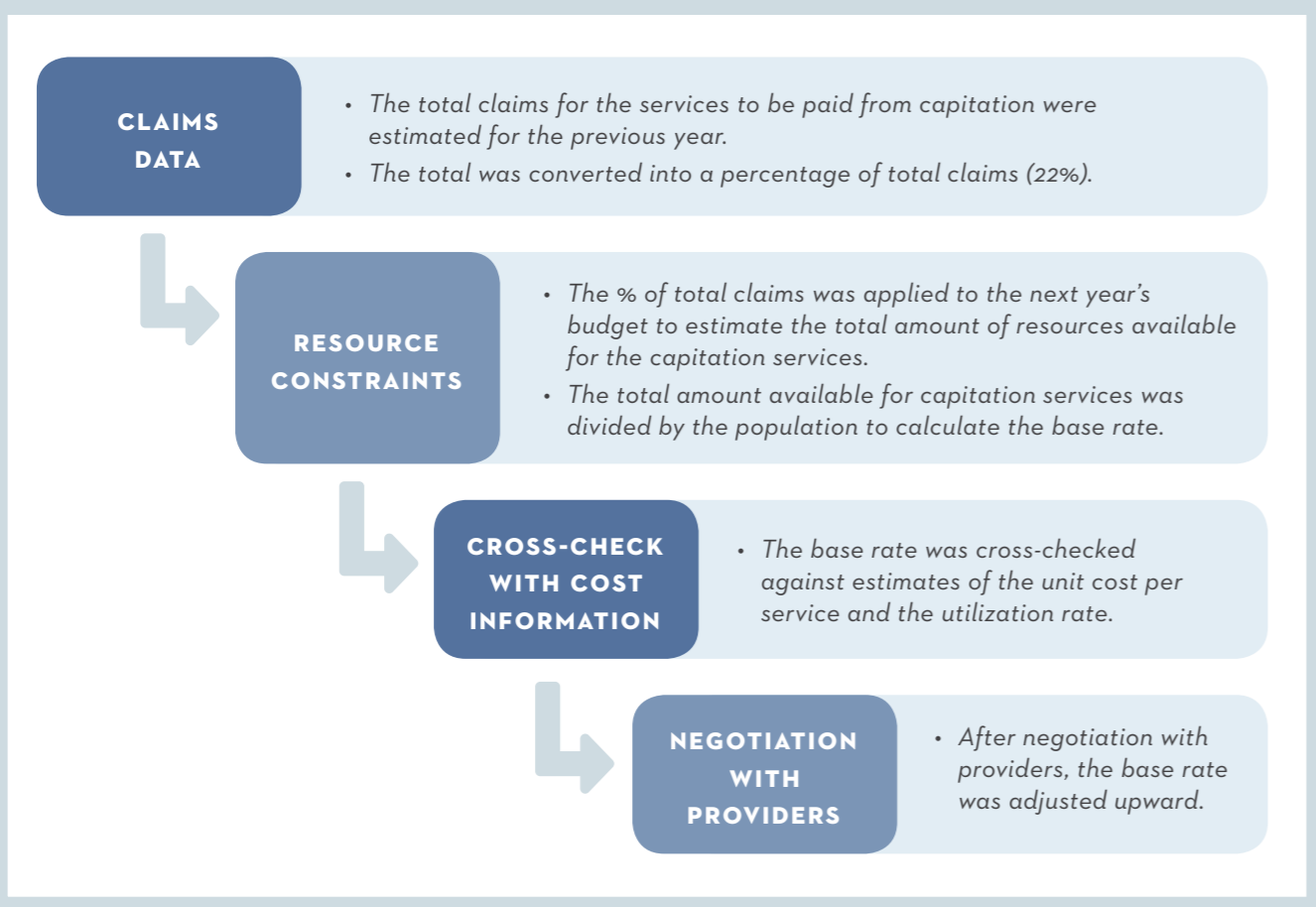
Payment Rates Derived from Normative Costing and Expert Opinion

Some countries attempt to calculate payment rates and develop benchmarks for relative case weights by using

normative costing (described in Step 3). This approach generates the estimated cost of inputs (staff time, supplies, medications, etc.) needed to follow standard treatment guidelines for a type of case. Despite its intuitive appeal, normative costing is feasible only for a small number of high-cost or high-priority services and is not a reliable basis for setting the majority of payment rates. (See **BOX 16.**)

Normative costing has many shortcomings for informing provider payment policy. First, standard treatment guidelines typically exist for only a small subset of conditions, while payment systems need to

FIGURE 19. Setting the Capitation Base Rate in Ghana's National Health Insurance Scheme



BOX 16. Using Normative Costing to Develop Benchmarks for Package Rates in India

The Government of India's Rajiv Aarogyasri insurance program uses a case-based payment system that pays hospitals package rates for inpatient procedures, such as bypass surgery. A package rate is a fixed payment for the entire episode, including the inpatient stay and outpatient procedures related to the admission. Payment rates are typically determined through negotiation with providers, but more cost information is being introduced into the process. For example, Aarogyasri conducted a small costing exercise to examine the relative costs of various procedures. The purchaser worked with a panel of

clinicians to translate cost information and calculate benchmark package rates for 2,000 bundled procedures. Final payment rates were adjusted downward from the benchmarks using claims and utilization data to attempt to stay within Aarogyasri's budget constraints. Aarogyasri used some normative costing to develop package rates for several procedures with widely accepted clinical guidelines. The quantity of each clinical input required by the guidelines was multiplied by the market or negotiated price, taking into account the costing data to

determine the total normative cost of the procedure. Although the package rates were developed by a consensus of the practitioners and doctors, Aarogyasri required that they be based on standard treatment guidelines. This approach was time-consuming because it required developing standard treatment guidelines for 2,000 procedures. (It took more than two years to develop guidelines for just 20 of the procedures.) Furthermore, there were concerns that standard treatment guidelines could include inflated resource use and inefficiencies.

produce payment rates for all services covered by the purchaser. Second, most guidelines are flexible and allow for a large degree of clinical judgment, which makes it difficult to assign exact input requirements. Furthermore, standard treatment guidelines may include inflated resource use and inefficiencies.

THE NEGOTIATION PROCESS

Except in the most tightly controlled bureaucratic health systems, some form of negotiation among policymakers, purchasers, and providers is a key step in arriving at final provider payment rates. The negotiation process should lead to a consensus about what services will be delivered, how they will be delivered, and how much providers will be paid to deliver them. The negotiation process should also result in agreement about

what the purchaser is committing to in terms of timeliness of payments and other aspects of implementing the payment system. The negotiation process is also an opportunity to educate providers about the objectives of the new payment system and what changes they may need to make to succeed in the new environment.

The role of negotiation in payment rate-setting, the way negotiation is carried out, and the relative power of policymakers, purchasers, and providers will vary significantly by country. Purchasers may have more power in negotiations than providers, or vice-versa. In some countries, the MOH or other policymaking body will have the power to set provider payment policy and even payment rates, and the

purchasers and providers must operate within those constraints.

Major power imbalances in the negotiation process can have negative consequences for the health system. When purchasers have the power to completely override providers' demands, payment rates may be set so low that quality of care is compromised or patients are forced to contribute key inputs to their care (such as medicines). When providers wield excessive power through the threat of strikes or pulling out of public insurance systems, purchasers may be forced to pay rates they cannot sustain. When policymakers dictate rules that purchasers and providers are forced to implement, the payment rates are less likely to reflect the realities of the system.

The negotiation process should allow all stakeholders to have a voice. The most systematic and transparent negotiation processes include formal representation of stakeholder groups and formal forums for negotiation.

In practice, negotiation processes range from highly informal processes to formal processes governed by legislation. Each country will adopt a different forum and process that reflect its own priorities and the power balance among stakeholders.

Here are some of the approaches taken in the case examples:

- **Aarogyasri Hospital:** The ongoing negotiation process is not governed by law or regulation and is largely informal. Payment rates are negotiated at two levels: (1) the technical level (between providers and the pricing committee of the purchaser) and (2) the political level (between the purchaser's governing board and the provider organization). Negotiations are video recorded to avoid accusations of favoritism.
- **Indonesia Casemix:** In Indonesia, the National Casemix Center—the unit within the MOH that is responsible for calculating hospital payment rates—develops rate options from the cost analysis, taking into account the available budget. The MOH (rather than the purchaser) takes the lead in discussions between the purchaser and provider representatives to reach the final payment rates.
- **PhilHealth Case Rates:** The negotiation process in the Philippines is not governed by law or regulation, but the meetings, public hearings, and

discussions between PhilHealth and provider societies are formalized.

- **Vietnam Primary Care:** In the absence of any laws regulating the negotiations, the negotiation process has been a mix of formal and informal. Before introducing a pilot capitation payment system for primary care, the MOH held a series of formal meetings with stakeholders and also conducted informal negotiations through personal relationships. The cost information introduced into the process needed to serve both the official and unofficial negotiation processes and provide objective information to help gain the trust of stakeholders.

If all key stakeholders are formally represented in the negotiation process, the final payment rates are more likely to be accepted by all parties. Some combination of policymakers, purchasers, and providers are typically at the negotiation table, and each key subgroup should have a representative voice. For example, in countries with weak or relatively new provider associations, the associations may represent only a very narrow segment of providers, such as those from urban areas or those from highly paid specialties. Bringing a wider range of providers to the table to represent primary care, rural areas, and so forth will help give more voice to providers. Negotiation may need to be flexible—if some of the parties who need to be influenced and agree are not in the room, informal relationships can help build trust and generate more information.

Access to objective information by all parties can improve the fairness and

transparency of the negotiation process. Countries use a range of analyses and tools to bring objective information into the negotiation process. Simulation and impact analyses can show the potential impact of provider payment changes on the system as a whole and who would be the winners and losers when payment rates are adjusted. (See **BOX 17.**) In the Philippines, PhilHealth gave providers information on the total budget of the insurance system to show that higher payment rates simply could not be supported by the available resources in the system. The results of pilot reforms also can inform the discussion by showing specific changes that may occur and how payment rates may need to be adjusted to prepare for those changes.

Costing results in particular can improve the transparency of negotiations. When purchasers and providers sit down to negotiate, purchasers tend to view payment rates at a high level, from the perspective of policy priorities and overall budgets, whereas providers tend to view payment rates from the perspective of facility-level priorities and expected revenue. Costing results can help bridge this gap by providing better data and highlighting where compromises may be possible. In India's Aarogyasri scheme, providers have traditionally had the most power in negotiations—because of their volume of claims data and their stronger lobbying body—while purchasers have had little influence on rates. With the growing availability of costing information, more negotiating power has shifted to purchasers and negotiations have simultaneously become more transparent.

BOX 17. Using Simulation Analysis to Inform Negotiations in Vietnam

Vietnam is currently considering a revision of its 2008 Health Insurance Law, including the regulation of provider payment methods. The MOH and the purchaser, Vietnam Social Security (VSS), used a simple spreadsheet-based simulation model to analyze the potential effects of different provider payment reform scenarios on resource allocation across health care providers in three provinces in Vietnam, as well as on the total expenditure of the

provincial branches of VSS. The results showed that more than 50 percent of VSS spending is currently concentrated at the provincial level, with the remaining amount at the district level. District hospitals also assume a high level of financial risk under the current arrangement.

Results of the simulation model showed that several alternative scenarios for provider payment reform could improve the current payment system by

reducing the financial risk assumed by district hospitals without dramatically shifting the level and distribution of VSS expenditure. The results of the simulation analysis provided an empirical basis for health policymakers in Vietnam to assess and negotiate over different provider payment reform options and make decisions that are more likely to advance health system objectives.

Compromising with Providers

When new provider payment systems are adopted, providers often have less control over their revenue or bear more financial risk. To gain provider acceptance of new payment methods, purchasers often compromise on payment rates. The compromises have potential consequences for the health system, such as introducing inefficiencies or higher total payments to providers (which have to come from new funds or will require shifting funds from other parts of the system). If the higher costs jeopardize the objectives of the health system, the compromises have gone too far.

The case examples used a variety of approaches to compromise with providers and move forward:

- **Holding providers “harmless.”** Some countries have ensured that

new provider payment methods and rates will not initially result in many, or any, losers among providers, by maintaining or increasing total payments in the first year. In Ghana, when the National Health Insurance Authority (NHIA) introduced capitation payments for primary care, the base rate was set so the total payments to providers for primary care services would not be less than in the previous year, even though the distribution across providers would depend on subscriber enrollment. When providers claimed that some of them would be losers in this new system because of variations in enrollment, the NHIA agreed to review the G-DRG tariffs that were used to calculate the capitated rates. The results led to higher G-DRG tariffs, which in turn led to higher capitated rates and higher overall NHIA expenditures.

- **Rounding up payment rates.** When providers are dissatisfied with proposed rates, some countries “round up” payment rates to the upper bound. PhilHealth has used this approach in its case-based payment for hospital cases. Case rates were set at three levels, based on the severity of the case—low, average, and high. To gain provider buy-in, PhilHealth set the baseline payment rates to “high” for all cases. Subsequently, some providers have suggested lowering some case rates to create a more honest working relationship based on relative costs.
- **Ad hoc top-ups for special cases.** Countries will sometimes use ad hoc top-ups for special cases to help support providers in the transition to new payment systems and rates. These top-ups can come in the form of increased payment rates for expensive treatments (e.g., cancer) or geographic

location (e.g., rural), for example. In the Central Asian Republics, little outright negotiation has occurred, but the purchaser uses ad hoc top-ups to ease provider concerns when they implement new payment methods and rates. In Indonesia, given that the current rate for some procedures and treatments is still considered to be too low, the INA-CBG payment system allows top-up payments for special cases, such as chemotherapy, prosthesis, and some other expensive procedures.

• **Pilots or phased implementation.**

Pilots or phased implementation can be useful for testing payment models and setting provider expectations before a nationwide rollout. In Vietnam, a thorough assessment of the existing payment system showed the need for design improvements. Providers who recognized the need for change but had no way to know the full implications supported pilot implementation of the new system and even volunteered to participate. This compromise allowed Vietnam to test the new design and prepare the country for broader upcoming changes to the payment system.

The negotiation process does not end when payment rates are decided. As payment systems are implemented and providers adapt to new payment rates, discussion will continue. Providers may request adjustments or other modifications to the payment systems and rates. If a well-structured negotiation platform is in place, supported by objective cost information, these issues are more likely to be handled systematically and decisions are more likely to be based on evidence rather than made in an ad hoc way.

TYING IT ALL TOGETHER

How policy objectives, available resources, cost information, and negotiation come together in the setting of provider payment rates depends on many factors in the given country at that point in time. When systems are just beginning and revenue flows are uncertain, as in the Central Asian Republics in the mid-1990s, resource constraints may be the dominant consideration in setting rates. As more cost information becomes available, that consideration may have greater influence. Once systems mature and providers adapt to the payment systems, policy considerations may emerge as the most important factor. And as

the balance of power stabilizes across stakeholders in the system, negotiation may emerge as the dominant factor in the rate-setting process, as it has in many high-income countries. The case examples varied greatly in the relative importance of these factors. **TABLE 50** shows how these countries rated the importance of each factor, using the scale shown below.

A full moon indicates strong influence, while an empty moon indicates weak influence. It is not a zero-sum game among these four factors. For example, four full moons would indicate that all four factors play an equally strong role in the rate-setting process.

Despite the variations, some patterns emerged among the case examples:

- Cost information was typically not the most important factor, but all of the countries tried to incorporate at least some cost information in the rate-setting process. The role of cost information depends in part on its availability. Even when it is available, as in the Central Asian Republics, Indonesia, and Malaysia, it is almost always overshadowed by other factors.

- The dominant factor was almost always resource constraints. All of the public purchasers in the case examples had a mandate to operate within the budgetary constraints of public funds available to them. Their main task was to allocate available resources to achieve the objectives of the health system. Although the systems depend on the satisfaction and cooperation of providers and payment rates that are sufficient to fund good-quality care, financial sustainability is ultimately a constraint.
- The capacity of the purchaser and providers to generate and use information can strongly influence the rate-setting process. The capacity of the primary actors in the rate-setting process affects who has more data at their disposal and possibly the upper hand in negotiations. In India's Aarogyasri scheme, the providers historically had greater capacity to generate information for negotiations and used this information to get higher rates. When the Aarogyasri scheme increased its capacity to generate cost information, the relationship became more equal.

- The relative influence of factors other than cost information may reflect the balance of power between purchasers and providers. In countries with strong purchasers, such as the Central Asian Republics and Indonesia, policy objectives and available resources are generally more influential, whereas negotiation generally plays a greater role in countries with strong and well-organized providers, such as Ghana and India.
- All of the case example countries are taking steps to incorporate more cost information into provider payment policy design, implementation, and rate-setting. Although cost information is not the dominant factor for provider payment rate-setting, the countries all agree that access to better cost information leads to better overall decisions. In Vietnam, for example, costing is being built into the monitoring and evaluation process for the pilot of the primary care capitation payment system to continuously improve the design and implementation of the system. In Malaysia, negotiation may become more important as private

providers are brought into the public health financing system, so data on the costs of services in the public sector will be critical for establishing benchmarks for the negotiation process.

The balance of factors will change over time. As health systems evolve, payment systems mature, and as more information becomes available, the factors that drive provider payment rates also will change. Several of the case example countries are in the midst of such changes. As purchasers and providers gain more experience with payment systems and payment rates, they will often seek better information for ongoing refinement of the payment systems, which also may shift the balance. Strong monitoring and evaluation systems can help keep the process more systematic and objective.

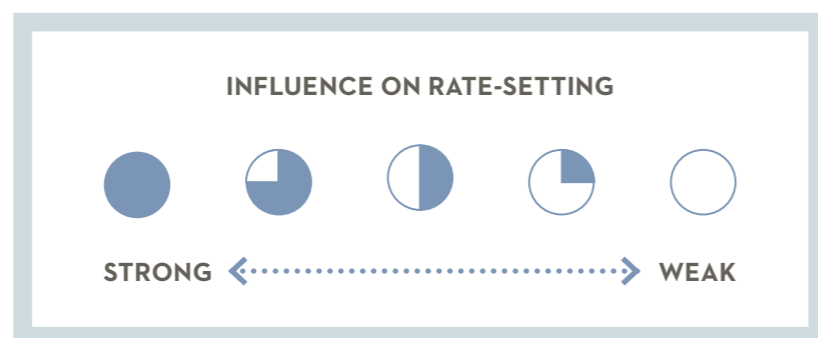


TABLE 50. Influence of Key Factors on Rate-Setting

CASE EXAMPLE	RATE-SETTING PLATFORM	PROVIDER ROLE	PURCHASER ROLE	INFLUENCE OF POLICY OBJECTIVES	INFLUENCE OF COST INFORMATION	INFLUENCE OF AVAILABLE RESOURCES	INFLUENCE OF NEGOTIATION
<i>Aarogyasri Hospital</i>	Two levels of negotiations, technical and high-level; videotaped for evidence	Providers traditionally dominate in the rate-setting process because they have more cost information than the purchaser.	Purchaser is gaining a stronger role in rate development due to the availability of costing and market information.				
<i>Indonesia Casemix</i>	MOH discusses results of technical work done by the National Casemix Center with purchasers and providers; MOH issues a decree after the rates are agreed upon	Providers respond to the rates proposed by MOH.	Purchaser has limited influence on rate-setting and is focused more on operational procedures.				
<i>Indonesia Health Facility</i>	Capitation costing team established by MOH	Providers give input on factors that influence the rate.	Purchaser is not actively involved; MOH has majority of power.				
<i>Central Asian Republics DRG</i>	Payment rates set by MOH; no formal platform for negotiation with providers	Providers try to influence rates in an unofficial, informal way.	MOH has majority of power.				
<i>Ghana G-DRG</i>	Agreement required between MOH and provider representatives	Rates cannot be instituted without consultation with, and agreement from, providers.	Purchaser leads the process of developing rates.				
<i>Malaysia COMPHEC</i>	Policy meetings on rate setting	Providers try to convince purchasers that the rate can be used as a basis for fund allocation.	Purchaser tests the rate to see whether it is appropriate and improves efficiency and quality.				
<i>PhilHealth Case Rates</i>	Meetings, public hearings, discussions between purchaser and societies to explain how/why they arrived at decisions	Providers are brought in to comment on case rates.	PhilHealth has ultimate decision-making authority.				
<i>Vietnam Primary Care</i>	Internal meetings, public meetings, impact analysis	MOH defines the policy for calculating payment rates, and VSS performs the calculations of the rates.	Providers respond to the rates proposed by MOH and VSS.				



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CHECKLIST

STEP 10: REPORT AND USE THE RESULTS

- ✓ **DETERMINE** the information needed from the costing results for each stakeholder group and how best to communicate it.
- ✓ **DEVELOP** the core analytical charts for presenting the costing results by the total sample as well as disaggregated by key variables.
- ✓ **COMMUNICATE** the costing results in a simple and clear way and in appropriate formats for different audiences.
- ✓ **INCLUDE** in the presentation the purpose and objectives, methodologies, and key findings of the costing exercise.
- ✓ **USE** visuals where possible and provide appropriate context to interpret the results.
- ✓ **MAKE** the costing results available in formats that will facilitate their appropriate use to inform provider payment policy and rate-setting.

LESSONS LEARNED



RESOURCES

Langenbrunner, Jack, Cheryl Cashin, and Sheila O'Dougherty. *Designing and Implementing Health Care Provider Payment Systems: How-To Manuals*. Washington, D.C.: World Bank, 2009.

Tan, Siok Swan, and Lisbeth Serdén, Alexander Geissler, Martin van Ineveld, Ken Redekop, Mona Heurgren, and Leona Hakkaart-van Roijen. "DRGs and Cost Accounting: Which Is Driving Which?" in *Diagnosis-Related Groups in Europe: Moving Towards Transparency, Efficiency and Quality in Hospitals*, edited by Reinhard Busse, Alexander Geissler, Wilm Quentin, and Miriam Wiley, 59-74. *European Observatory on Health Systems and Policies Series*. New York: Open University Press, 2011.

TOWARD A SUSTAINABLE ROUTINE COSTING SYSTEM

As countries move further along in designing new provider payment methods that support universal coverage goals and increasingly pay for outputs rather than inputs, they face the challenge of establishing a cost basis for payment rates for different services and packages of services. Many countries find that their existing health financing systems have not generated the expertise or data needed to use many of the well-established costing methodologies available, so they start with one-off costing exercises.

These initial exercises serve three purposes: to provide experience to a critical body of experts in the country and begin the payment system design process, to provide initial data on the cost of providing services, and to demonstrate the processes and confirm the feasibility of costing to stakeholders. These one-off exercises frequently provide an initial set of base rates and relative case weights to initiate new payment systems. This manual provides guidance for a standardized process that can improve the validity of one-off costing exercises.

Using one-off costing exercises for provider payment rate-setting can be problematic, however. These exercises often are based on small samples and do not generate routine information that is accepted and can be used by all stakeholders. Furthermore, costing analyses become quickly outdated because health systems, utilization rates, provider behavior, and technology are constantly changing. It is therefore important to create a routine costing system that is timed around the rate-setting process, provides information that stakeholders can draw from as needed, and is accepted by all stakeholders. Such a system should generate cost information in a standardized way on a routine—usually annual—basis.

Policymakers need routine cost information to develop and advocate for health sector budgets and to make investment decisions. Health purchasers need cost information to develop and negotiate payment rates for health services. Health care providers need accurate cost data so they can better manage their resources to deliver high-quality services efficiently and negotiate fairly with purchasers.

The guidance on planning and implementing a costing exercise provided in this manual also can be used to build the foundation for a routine system of health services costing.

KEY ELEMENTS OF A ROUTINE COSTING SYSTEM

Stakeholders need to have confidence in the routine costing system and a clear understanding of the accuracy and rigor of the results produced. The following elements are critical to a credible routine costing system.

- **Centrally managed data collection guided by standards and review processes.** The costing system should include centralized collection of cost data from a representative sample of providers. Data collection should be governed by an institution with regulatory authority, such as

the MOH or government health purchaser. Data should be collected according to an established cycle, with clearly understood milestones and action points and timely feedback to providers. A convenient way to deliver this feedback is via a benchmarking tool supplemented by a report that includes questions that need to be addressed.

- **Standardized cost data elements and accounting methods.** A routine costing system should be based on standard templates and guidelines for data collection that are agreed to by policymakers, purchasers, and providers. The standard templates need to be flexible, however, to account for variations in structure and cost centers among providers. The key elements that must be standardized include:
 - Method of aligning expenditures with services and outputs
 - Allocation bases for distributing indirect costs
 - Chart of accounts to use as a reference point by all providers and to map costs to standard accounting cost centers
 - Coded identification of cost items and outputs

The data and reporting templates should start with the structure and level of complexity of the current data and reporting systems in the health system. It is best to start simple and let the costing template and standards evolve as payment systems evolve and become more complicated. The 10 steps presented in this manual can be followed to generate the standard data templates and guidelines for routine analysis.

- **An information technology platform that can be accessed by all stakeholders (policymakers, purchasers, and providers).** Information system standards should be developed so individual providers can adapt their existing internal management information and cost accounting systems while still being compatible across the system.
- **Data analytics and reporting tools that allow cost data to be analyzed for multiple purposes.** The information systems of the purchaser and providers must be equipped to draw on cost data to benchmark costs and quality in clinical processes. The ability to compare patterns of input use for particular patient types is a powerful tool for health service managers to manage costs. It allows them to achieve the most value for patients from the available resources. Data analysis also allows purchasers to measure compliance with best practices and monitor the impact of provider payment systems on efficiency and patient care.

- **A mechanism for generating total expenditure and utilization data across the system.** Total expenditure and utilization data across all providers in the system is needed so costing results can be reconciled with total expenditure in the system. At a minimum, the data should include basic measures of expenditure and utilization by all major output types (e.g., primary care, hospital discharges). These data are a critical requirement after the new provider payment methods or rates are implemented because payment system changes in any part of the system will create an incentive to shift costs. These data are also critical when strategic plans include specific goals to integrate care across service areas at the patient level (for example, to integrate preventive and curative services at the primary care level) or shift services from inpatient care to early intervention or prevention.

Several of the case example countries are initiating routine costing systems to improve the generation and use of cost information for provider payment policy and other purposes. This has been facilitated by the increasing leverage of government purchasers and the movement toward output-oriented payment systems, particularly hospital payment systems based on DRGs.

- In Indonesia, the law requires that rates paid to hospitals through the case-based payment system be revised periodically, so a routine costing

system has been in place for six years based on a template developed by the MOH.

- In Ghana, the MOH is leading a joint process between providers and the NHIA to implement a unified cost accounting system for health services. This system will institutionalize the routine collection of cost accounting data from a sample of health care providers on an ongoing basis for use by the MOH, NHIA, providers, and other stakeholders.
- In the Philippines, the process of moving toward case-based hospital payment using DRGs is creating a need for routine costing. PhilHealth has developed a costing template and tools and will request that providers produce ongoing cost reports as part of their contractual obligations. Regulatory changes also allow PhilHealth to require the submission of cost data because the purchaser was recently authorized to review the financial and clinical data of providers.

These countries are at the early stages of developing their routine costing systems and do not yet have all of the key elements in place. But they have taken the important step of moving from one-off costing exercises to institutionalized costing systems.

APPENDIX

COST ACCOUNTING HOW-TO

This appendix describes in detail how to perform step-down cost accounting—the process by which direct costs are assigned and indirect costs are allocated to health facility cost centers to calculate the unit costs of health services. (See [FIGURE 20.](#))

The process is called “step-down” cost accounting because the total costs of higher-level cost centers (those further from direct patient care, such as Administrative and Clinical Support

departments) are apportioned to lower-level cost centers (those closer to direct patient care, such as Clinical Support and Clinical departments) in a stepwise process. While this process is primarily

carried out during data analysis (Step 9), the costing team must make several cost accounting decisions much earlier, during the costing exercise design phase.

FIGURE 20. Cost Assignment and Allocation

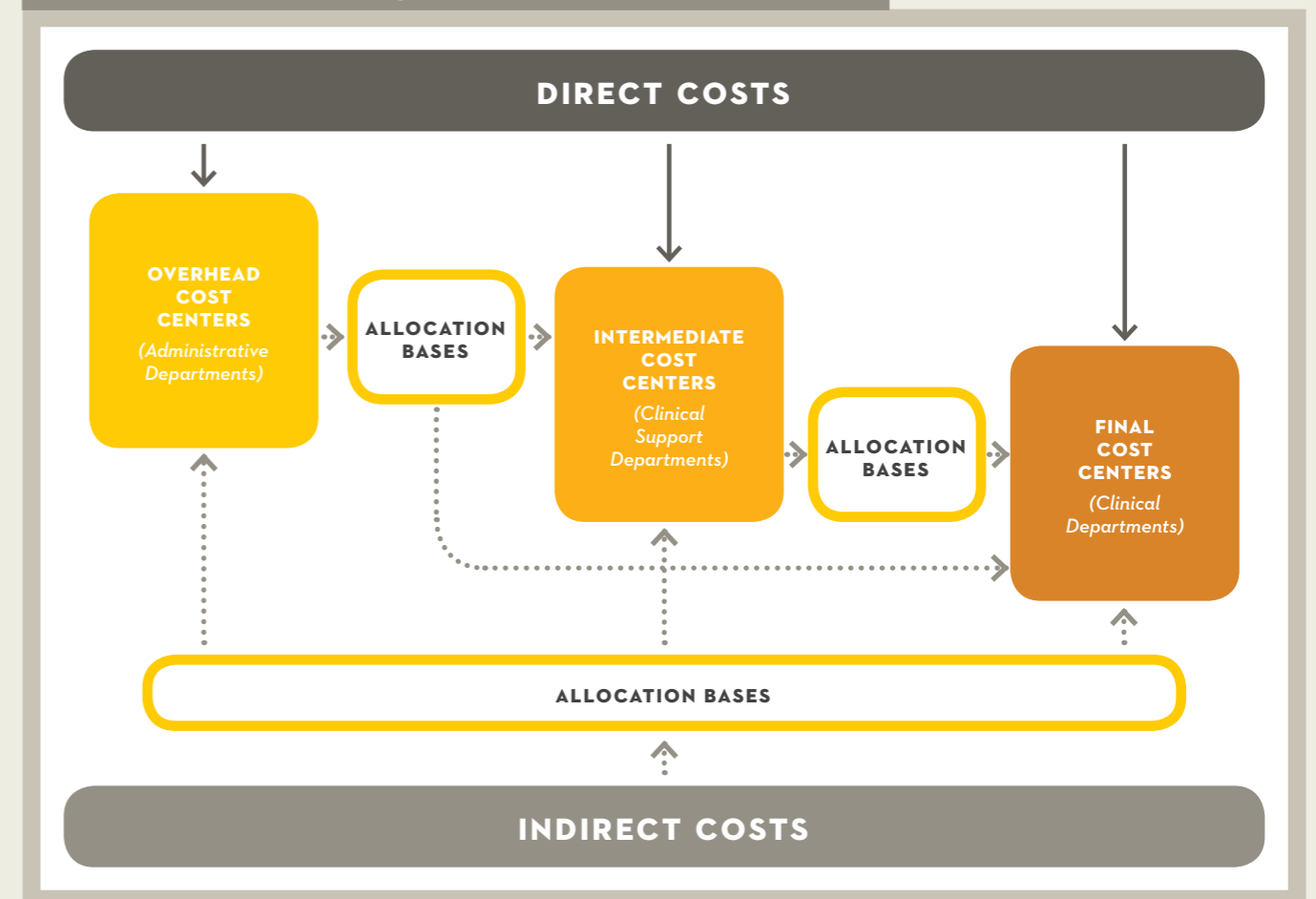


TABLE 51. Cost Accounting Steps

STEP	DESCRIPTION
I	Develop a standard list of health facility cost centers.
II	Assign departments to one of the following cost center groups: <ul style="list-style-type: none"> • Administrative departments • Clinical Support departments • Clinical departments
III	Calculate the total cost for each input.
IV	Assign direct costs to cost centers.
V	Specify allocation bases—criteria that will be used to allocate both indirect costs and total costs from higher-level to lower-level cost centers.
VI	Allocate indirect costs to cost centers and total costs from higher-level to lower-level cost centers: <ul style="list-style-type: none"> • Allocate indirect costs to each department (Administrative, Clinical Support, Clinical). • Allocate Administrative department costs (direct + indirect) to Clinical Support departments and Clinical departments. • Allocate Clinical Support department costs (direct + indirect + allocated Administrative department costs) to Clinical departments.
VII	Calculate and cross-check unit costs.

The cost accounting process—used for both the top-down and bottom-up approaches—follows this sequence:

- Identify the total resources used by a cost center (i.e., a well-defined organizational or management unit or entity for which costs are accumulated and to which direct costs are assigned and indirect costs are allocated). (See Step 2 for more detail on selecting the cost centers.)
- Measure the total resources used by a cost center. Some resources, such as staff hours spent treating patients or drugs consumed by patients, can be measured directly. Other resources, such as overheads, can be measured only indirectly.
 - Calculate the cost of resources used *directly* by all cost centers and assign those costs to each individual cost center.
 - Calculate the cost of resources used *indirectly* by all cost centers and allocate a share of the cost to each cost center based on its estimated use of the resources.
- Derive average unit costs using data on costs and units of service (e.g., discharged patients, bed-days, or outpatient visits).

To allow for assigning of direct costs and allocation of indirect costs to the cost centers, the costing exercise design must specify standard cost centers as well as criteria for cost allocation.

TABLE 51 lists the seven steps of the cost accounting process. The following section describes each step using the example of hospital departments.

THE COST ACCOUNTING PROCESS

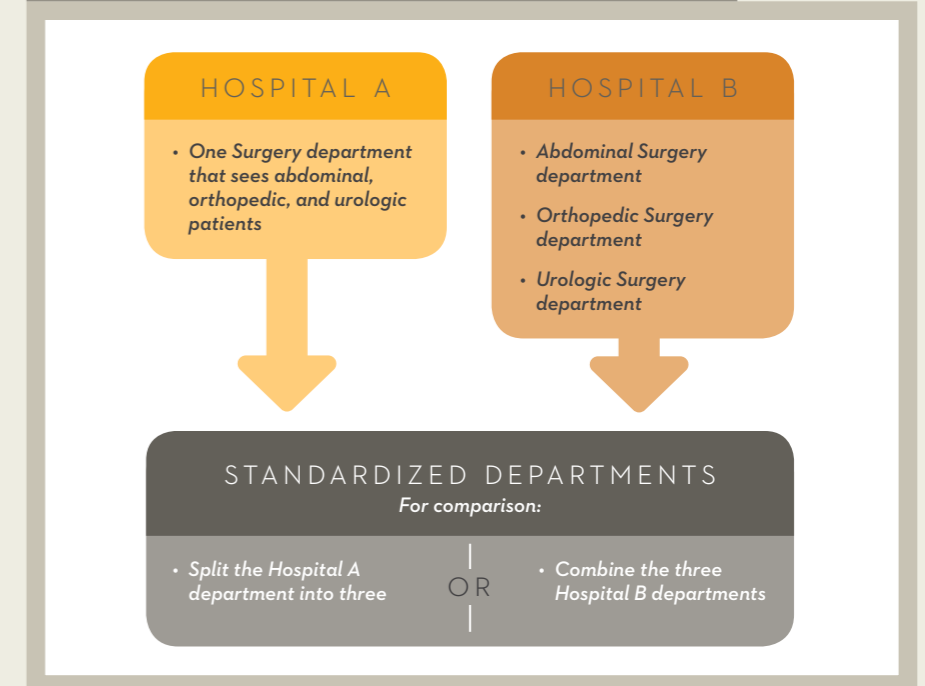
Step I. Develop a Standard List of Health Facility Cost Centers

Estimating average unit costs for provider payment rate-setting requires calculating unit costs for multiple health facilities, so costing teams should standardize the cost centers to ensure that the calculated unit costs can be fairly and accurately compared across facilities. Facilities within the same health system may have different organizational structures, particularly at the tertiary level, which can make standardization difficult. For example, the clinical and operational profile of an Internal Medicine department at one hospital may differ from that of the same department at another hospital. Similarly, a diabetes checkup at one clinic may differ significantly from that at another clinic.

Costing teams should avoid forcing the standardization of departments, however, and should take into consideration the reality of health facilities. For example, if Hospital A has a combined surgery department for abdominal, orthopedic, and urologic patients but Hospital B has three distinct departments for these patients, the standardization for comparison purposes could either combine the three Hospital B departments or split the Hospital A department into three. (See FIGURE 21.)

To determine whether departments are comparable, it can be helpful to understand how the following clinical

FIGURE 21. Illustrative Department Standardization



and operational characteristics may affect their resource requirements and thus their costs:

- Institutional arrangements
- Facility ownership (public/private) and tax ramifications
- Organizational structure and administration
- Financial/payment systems
- Scope of services
- Clinical service content
- Setting
- Patient case mix
- Standards/treatment protocols
- Legal and compliance environment
- Quality
- Other unique characteristics

For help with standardization, costing teams can consult MOH guidelines, review accreditation applications, examine health information system data, or consult with hospital personnel. Standardization of departments may also happen over time if the cost accounting exercise is routinized, allowing for consistent definitions, a database of reference codes, and cross-walks to compare departments across hospitals.

Step II. Assign Departments to Cost Center Groups

After identifying and standardizing departments, the costing team should classify them into three groups based on

TABLE 52. Country Standardized Department Lists and Cost Center Groups in Three Case Examples

DEPARTMENTS COSTED		
Central Asian Republics DRG	PhilHealth Case Rates	Vietnam Primary Care
<p>ADMINISTRATIVE DEPARTMENTS</p> <ul style="list-style-type: none"> • Finance & Procurement • Laundry • Kitchen • Transport • Security • Other Administrative <p>ANCILLARY DEPARTMENTS</p> <ul style="list-style-type: none"> • Pharmacy • Imaging • Laboratories • Physiotherapy • Operating Theater • Emergency Care • Admission <p>CLINICAL DEPARTMENTS</p> <p>Inpatient Departments</p> <ul style="list-style-type: none"> • Intensive Care • Surgery • Ophthalmology • Therapy (Internal Medicine) • Gynecology • Neonatal • Maternity • Mental Health • Dental • Pediatric • Infectious Diseases • Delivery • Otolaryngology (ENT) <p>Outpatient Departments</p> <ul style="list-style-type: none"> • OPD 	<p>OVERHEAD COST CENTERS</p> <ul style="list-style-type: none"> • Administration • Nursing Administration • Medical Welfare • Maintenance • Cleaning Services • Security • Store & Consumable • IT Center • Library • CSSD • Dietetic • Medical Record • Laundry & Linen • Others <p>INTERMEDIATE COST CENTERS</p> <ul style="list-style-type: none"> • Pharmacy & Drug • Radiology • Laboratory • Physiotherapy • ICU • NICU & PICU • Coronary Care & CRW • Operation Theater • Others <p>FINAL COST CENTERS</p> <p>Inpatient Departments</p> <ul style="list-style-type: none"> • Medicine Department • Surgical Department • Paediatric Department • O & G Department • Orthopedic Department • Psychiatric Department • Others <p>Outpatient Departments</p> <ul style="list-style-type: none"> • Medicine Specialist Clinic • Surgical Specialist Clinic • Paediatric Specialist Clinic • O & G Specialist Clinic • Orthopedic Specialist Clinic • Psychiatric Specialist Clinic • Day Care Center • Others 	<p>SUPPORT DEPARTMENTS</p> <ul style="list-style-type: none"> • Administrative & Organization • Planning • Nursing • Financing • Other support departments <p>PARACLINICAL DEPARTMENTS</p> <ul style="list-style-type: none"> • Pharmacy • Laboratory • Imaging Services • Nutrition • Infection Control • Pathology • Other paraclinical departments <p>CLINICAL DEPARTMENTS</p> <p>Inpatient Departments</p> <ul style="list-style-type: none"> • Emergency and Intensive Care • Internal Medicine • Infectious Disease • Pediatrics • Surgery • Maternity/Gynecology • Operating Theater • ENT/Dental/Ophthalmology • Other inpatient departments <p>Outpatient Departments</p> <ul style="list-style-type: none"> • General Outpatient (OPD)

their functional role within the health facility:

- **Administrative.** Departments that provide overhead support services to other departments.
- **Clinical Support.** Departments that provide diagnostic and clinical support services to clinical departments. (These departments may also be referred to as ancillary or paraclinical departments.) Department units of service include laboratory tests, radiology exams, blood units, prescriptions, surgeries, and so forth.
- **Clinical.** Departments that provide direct patient care and either discharge patients or conduct outpatient or daycare visits. Department units of service include discharges, bed-days, and outpatient visits. The cost accounting process results in unit costs for these units of service in the Clinical cost centers.

How departments are classified may vary based on the country health system context. For example, the Emergency department may be considered Clinical Support in one context and Clinical in another context. The classification will depend on whether patients are discharged from that department. Or, in another example, the Physiotherapy department may be classified as a Clinical Support department in one setting and as a Clinical outpatient department in another setting. Or a department such as Sterilization or Laundry might be classified as Administrative in one context and Clinical Support in another.

To improve the accuracy of the cost accounting process, costing teams

may also choose to include unofficial departments that are not formally recognized by the facility. For example, a facility may subsume all expenditures for Administration, Accounting, Hygiene, and Transport under a single Administration department. For more accurate allocation of these varied costs, the costing team may separate these departments from the general Administration department. The department costs for personnel (e.g., administrators, accountants, cleaners, drivers) and other recurrent items (e.g., cleaning supplies, fuel and oil) can then be allocated to the other departments using a more targeted approach than the one suitable for the Administration department. This separation may add complexity to the data collection and analysis, so costing teams should first discuss its merit. TABLE 52 provides three case examples, using their unique nomenclature, of standard department lists and their classification into cost center groups.

Step III. Calculate the Total Cost for Each Input

This step involves determining which cost items will be included in the cost analysis and then measuring the total cost of those items using available data. In costing for provider payment, it is critical to capture all costs that are relevant to the payment method or that may be included within the time horizon of the costing exercise. (See Steps 2 and 8 earlier in the manual for a description of cost items and guidance on how to calculate or estimate their cost.)

Costing teams should separate total health facility costs by inpatient,

outpatient, and other services so the costs can be assigned and allocated to the right departments. Due to lack of uniformity in the units of service associated with each type of patient care, it is best to conduct cost accounting for each type separately. This means, for example, that determining total health facility costs just for inpatient services will allow calculation of the unit costs of discharges or bed-days. Likewise, determining facility costs just for outpatient services and other services (e.g., daycare visits, health promotion activities) will allow calculation of the unit costs of outpatient visits and other services. (See Step 9 earlier in the manual for guidance on parsing aggregate facility costs into these categories.)

Step IV. Assign Direct Costs to Cost Centers

This step assigns direct costs to Administrative, Clinical Support, and Clinical departments based on actual data on each department's use of those cost items. Direct costs are those that can be directly attributed to a cost center. The cost items classified as direct costs can differ from facility to facility or from country to country, depending on locally used accounting procedures, the sophistication of the data systems, or the extent to which facilities budget and track expenses by department. Typical examples of direct costs include salaries, wages, benefits, drugs, and medical supplies. In the example shown in TABLE 53, salaries, benefits, overtime, fuel and oil, and lab reagents are directly assigned to the departments, but uniforms, electricity, and cleaning supplies cannot be directly assigned.

TABLE 53. Illustrative Direct Cost Assignment

LINE ITEM	TOTAL COST	ADMINISTRATIVE		CLINICAL SUPPORT		CLINICAL	
		Admin	Transport	Pharmacy	Lab	Medicine	Outpatient
Salaries	\$ 100,000	\$ 20,000	\$ 5,000	\$ 10,000	\$ 15,000	\$ 25,000	\$ 25,000
Benefits	\$ 20,000	\$ 0	\$ 0	\$ 3,000	\$ 4,000	\$ 5,000	\$ 8,000
Overtime	\$ 55,000	\$ 12,000	\$ 3,000	\$ 8,000	\$ 8,000	\$ 12,000	\$ 12,000
Uniforms	\$ 20,000	—	—	—	—	—	—
Electricity	\$ 120,000	—	—	—	—	—	—
Fuel and Oil	\$ 18,000	\$ 0	\$ 18,000	\$ 0	\$ 0	\$ 0	\$ 0
Cleaning Supplies	\$ 9,000	—	—	—	—	—	—
Lab Reagents	\$ 60,000	\$ 0	\$ 0	\$ 0	\$ 60,000	\$ 0	\$ 0

Step V. Specify Allocation Bases

This step involves deciding how to allocate costs that cannot be directly assigned. It is not possible to directly attribute some costs to specific departments. These costs are considered indirect costs, which must be allocated based on an estimate of each department's share of the total cost for that cost item. Indirect costs are allocated according to a proxy measure of a department's use of the resources of a cost item: an *allocation base*.

In the absence of a direct measure of resource use (and thus no knowledge of the precise departmental cost), costing teams must use cost allocation techniques to first assign indirect costs to departments and then assign total Administrative and Clinical Support department costs to the Clinical departments in order to calculate the unit costs of Clinical department services. They will therefore need two or three sets of allocation bases,

although the bases they select for the sets will overlap. Most allocation bases are some type of volume measurement, such as number of bed-days or square meters, but other proxies are also used.

Consider, for example, the cost of electricity as an indirect cost item. To assign electricity costs directly to departments, it would be necessary to directly measure departmental consumption through electrical readings, noting kilowatt-hours used. This would likely be the most accurate means of attaching an electricity cost to a department. However, health facilities often do not have these detailed data on electricity usage, and if they do, electrical meters may record consumption for multiple co-located departments. Electricity usage in this example should then be considered an indirect cost, requiring some proxy measure—the allocation base—for its allocation to departments.

For electricity use, a common allocation base for apportioning costs is the floor area (e.g., square meters) within each department as a proxy for electricity consumption. The assumption is that departments that occupy more space also consume more electricity. That is, the electricity cost varies in proportion to the space occupied by a department within a facility. The allocation base of square meters is a proxy for departmental use of electricity resources and is used to apportion the electricity cost.

An *allocation statistic* is the actual number derived from the allocation base that is used to allocate costs to a department. For any allocation statistic, the denominator is the total quantity of resources (the value of the base) and the numerator is the quantity of resources consumed by a department. The following example illustrates how to calculate an allocation statistic using floor area as the allocation base for electricity cost.

CALCULATING AN ALLOCATION STATISTIC

NUMERATOR =

Internal Medicine department floor area = 1,800 square meters

DENOMINATOR =

Total hospital facility floor area = 10,000 square meters

Therefore, $1,800 \div 10,000$ square meters = 0.18 (or 18%). If the total cost of electricity is \$35,000, the Internal Medicine department's estimated share using floor area as a proxy measure is 18 percent of \$35,000, or \$6,300.

The selection of an appropriate allocation base should be guided by the main reason that a particular cost is incurred—its cost driver. The allocation base should reflect the cause-and-effect relationship between resource use and cost. In the above example, the floor area is a cost driver for electricity cost and the measurement of square meters is the proxy for departmental electricity consumption. The allocation base is always an approximation of resource use, however. Using floor area as an allocation base does not capture nuances such as a department's use of equipment that uses more energy (e.g., Radiology) or outpatient departments with large floor areas that use less energy due to limited hours of operation. However, detailed indirect cost data are rarely available, and installing meters for each department to measure electricity use is generally not feasible or cost-effective.

Therefore, selecting an appropriate allocation base to spread indirect costs across departments is usually the preferred approach.

Although there is no perfect allocation base for apportioning costs, costing teams should try to select an allocation base that provides the best estimate of departmental resource use for a country context. A simple approach is best, however: costing teams should consider the trade-off between accurately measuring resource use and feasibly collecting data. The allocation base selected may vary depending on data availability, data quality, and the unique context of the country or facilities. If data on resource use are unavailable or unreliable, costing teams can consult local experts to construct a base for allocation. **Box 18** presents considerations for selecting and validating allocation bases.

BOX 18. Selecting and Validating Allocation Bases

CONSIDERATIONS FOR SELECTING ALLOCATION BASES

- Country context
- Data availability
- Costing exercise objectives and the level of detail required
- Guidance from the costing literature
- Expert opinion
- Need for greater precision for high-expenditure cost items
- Potential benefit of primary data collection over a short period for direct measurement to obtain allocation statistics

WAYS TO VALIDATE ALLOCATION BASES

- Conduct sensitivity analysis using alternative allocation bases
- Check the correlation between allocation statistics and costs
- Validate through bottom-up costing
- Validate by consulting with experts
- Cross-check with standards and treatment guidelines

Costing teams should discuss the allocation bases with stakeholders because allocation is often the most disputed aspect of cost accounting. Stakeholders sometimes perceive allocation bases as being arbitrary or based on inaccurate assumptions, so it is worthwhile to invest time in explaining the methodology and the rationale for assumptions. Policymakers and costing practitioners should reach a consensus on the appropriate allocation bases, and those allocation bases should be applied across all facilities. A sensitivity analysis is recommended to examine how much the unit cost estimates would change if different allocation bases were to be used.

Step VI. Allocate Costs to Cost Centers

Costing teams can allocate indirect and department costs in two separate actions or allocate department costs with

indirect costs included in one action. In the latter case, all indirect costs are often assigned to an Administration department for the allocation. In the former case, indirect costs are allocated to cost centers before the department cost allocation. TABLE 54 lists typical indirect cost items and provides examples of different allocation bases selected to apportion them to departments. If the same allocation base is used for multiple indirect cost items (e.g., patient food and linens), it is acceptable to allocate the indirect cost items together.

In TABLE 55, patient food and electricity are indirect costs that are allocated to the departments. Square meters are used to allocate electricity costs to the departments. For example, the Administration and Pediatrics departments each occupy 600 square

meters of the 10,000 total square meters of the hospital, or 6 percent of the entire floor area (so 6% is the allocation statistic). Of the \$220,000 total hospital electricity cost, the share for the Administration department and Pediatrics department is estimated at 6 percent of \$220,000 each, or \$13,200.

The next step—the core of the cost accounting process—is allocating costs from higher-level to lower-level cost centers. This generally means allocating from less direct patient care (Administrative departments) to more direct patient care (Clinical departments). It does not mean that a department is more or less important; it means that it is higher up in the step-down cost accounting worksheet and is thus allocated first. This allocation is central to the cost accounting process because the intent is to calculate the

TABLE 54. Illustrative Allocation Bases for Allocating Indirect Costs

COST CATEGORY	INDIRECT COST ITEM	ILLUSTRATIVE ALLOCATION BASE
Personnel	<ul style="list-style-type: none"> Taxes Uniforms 	<ul style="list-style-type: none"> Salary cost Number of clinical staff
Drugs and Medical Supplies	<ul style="list-style-type: none"> Drugs 	<ul style="list-style-type: none"> Number of prescriptions
Utilities	<ul style="list-style-type: none"> Electricity 	<ul style="list-style-type: none"> Floor area (square meters)
Other Recurrent Costs	<ul style="list-style-type: none"> Maintenance Patient food Cleaning supplies Linens Office supplies Phone 	<ul style="list-style-type: none"> Floor area (square meters) Bed-days Number of personnel Number of phone sets
Capital	<ul style="list-style-type: none"> Building depreciation 	<ul style="list-style-type: none"> Floor area (square meters)

TABLE 55. Illustrative Indirect Cost Allocation

HOSPITAL DEPARTMENT	PATIENT FOOD COST BY BED-DAYS			ELECTRICITY COST BY SPACE (FLOOR AREA)		
	Days	%	Allocation	m ²	%	Allocation
ADMINISTRATIVE DEPARTMENTS						
Administration	0	0%	\$ --	600	6%	\$ 13,200
Transport	0	0%	\$ --	200	2%	\$ 4,400
Maintenance	0	0%	\$ --	300	3%	\$ 6,600
Hygiene				200	2%	\$ 4,400
Kitchen				200	2%	\$ 4,400
CLINICAL SUPPORT						
Pharmacy				500	5%	\$ 11,000
Laboratory				300	3%	\$ 6,600
X-Ray				300	3%	\$ 6,600
Echography				200	2%	\$ 4,400
Blood Bank				200	2%	\$ 4,400
Operating Theater				700	7%	\$ 15,400
CLINICAL DEPARTMENT						
Emergency				300	3%	\$ 6,600
Surgery	30,000	30%	\$ 24,000	1,500	15%	\$ 33,000
ICU	5,000	5%	\$ 4,000	1,000	10%	\$ 22,000
Medicine	14,000	14%	\$ 11,200	800	8%	\$ 17,600
OB/GYN	18,000	18%	\$ 14,400	1,200	12%	\$ 26,400
Pediatrics	12,000	12%	\$ 9,600	600	6%	\$ 13,200
HIV/AIDS	5,000	5%	\$ 4,000	400	4%	\$ 8,800
TB	9,000	9%	\$ 7,200	500	5%	\$ 11,000
HOSPITAL TOTALS	100,000	100%	\$ 80,000	10,000	100%	\$ 220,000

$$\frac{600 \text{ m}^2}{10,000 \text{ m}^2} = 6\%$$

↓

$$6\% \times \$220,000 = \$13,200$$

full unit costs of services and these unit costs tend to be contained in Clinical departments, which serve and discharge patients.

First, the Administrative departments' costs are allocated to the Clinical Support and Clinical departments. Much like with the allocation of indirect costs, an allocation base is selected to

apportion these costs to reflect the other departments' use of the Administrative departments' resources. For example, the use of personnel headcount (or full-time equivalents) as an allocation base to apportion costs from the Administration department reflects the time needed by that department to manage staff in the other departments of the hospital. Thus personnel headcount is the main

cost driver of the Administration department. TABLE 56 lists illustrative allocation bases used for assigning Administrative departments' costs to the Clinical Support and Clinical departments.

Many costing teams also allocate Clinical Support departments' costs to the Clinical departments and then

present unit cost results with and without Clinical Support departments' costs allocated. The allocation bases selected for Clinical Support departments should be a best estimate of each Clinical department's actual use of the support resources. To measure resource use, costing teams typically gather data on utilization in the Clinical Support departments over a sample period.

For example, Laboratory department records may list the patients that used laboratory services, the types of tests that were performed, and the departments where those patients were admitted. A

simple tally would yield the number of tests performed for each department, and thus a basic measurement of each Clinical department's use of the Laboratory. Total Laboratory department costs (direct + indirect + allocated Administrative departments' costs) would then be allocated to Clinical departments based on those departments' use of laboratory services, represented by share of total test volume.

This method is limited, however, in that it gives all tests the same weight. Differences in the cost of test supplies or differences in personnel cost related

to staff time or skill level required for certain tests are not accounted for in an allocation based on total volume. Thus, depending on the requirements for accuracy and an assessment of data availability, a more nuanced analysis could include departmental measurement by test type. For settings without any record of the departments where tests were ordered, costing teams can consult with the Laboratory department chief or other experts to determine estimated usage. TABLE 57 lists illustrative allocation bases for allocating Clinical Support departments' costs.

TABLE 56. Illustrative Allocation Bases for Allocating Administrative Departments' Costs

ADMINISTRATIVE DEPARTMENT	ILLUSTRATIVE ALLOCATION BASE	ILLUSTRATIVE ALTERNATIVE ALLOCATION BASE
<i>Administration</i>	Personnel (number or FTE)	
<i>Accounting</i>	Direct costs	
<i>Admission</i>	Admissions/discharges	Minutes spent admitting patient
<i>Security</i>	Admissions/discharges	Total costs
<i>Hygiene</i>	Square meters	Hours of service
<i>Maintenance</i>	Square meters	Number of work orders
<i>Laundry</i>	Bed-days	Weight (kilograms) or number of pieces
<i>Nutrition</i>	Bed-days	
<i>Transportation</i>	Discharges	Mileage
<i>Medical Records</i>	Bed-days	Hours charted

TABLE 57. Illustrative Allocation Bases for Allocating Clinical Support Departments' Costs

CLINICAL SUPPORT DEPARTMENT	ILLUSTRATIVE ALLOCATION BASE	ILLUSTRATIVE ALTERNATIVE ALLOCATION BASE
<i>Pharmacy</i>	Prescriptions	Bed-days
<i>Laboratory</i>	Tests	
<i>Blood Bank</i>	Blood units	
<i>Radiology</i>	Exams/scans	
<i>Operating Theater</i>	Number of surgeries	Minutes of surgery
<i>Emergency</i>	Discharges	
<i>Pathology</i>	Deaths	

TABLE 58. Case Example Allocation Bases

CASE EXAMPLE	ALLOCATION BASES		
	Indirect Cost	Administrative Departments Cost	Clinical Support Departments Cost
Central Asian Republics DRG	<ul style="list-style-type: none"> • Utilities cost by square meters • Patient food by bed-days • Telephone cost by number of telephone sets 	<ul style="list-style-type: none"> • Administration by number of personnel • Accounting by salaries • Security by the total cost of departments • Pharmacy by drug cost • Laundry by bed-days • Kitchen by bed-days 	<ul style="list-style-type: none"> • Operating Theater by number of surgeries • X-Ray by number of x-rays • Laboratory by number of lab tests • Endoscopy by number of procedures • Admission by number of discharges
MNHA Hospital	<ul style="list-style-type: none"> • Electricity cost by square meters • Water cost by square meters • Telephone cost by number of telephone lines 	<ul style="list-style-type: none"> • Cleaning/Sanitation by floor area • Laundry by weight • Kitchen/Dietetics by workload • Physiotherapy, Occupational Therapy, Optometrics, Social Work, and Health Education Work & Counselor Services by workload 	<ul style="list-style-type: none"> • Pharmacy by allocated stock • X-Ray by number of x-rays/procedures • Laboratory by number of lab tests
PHFI Hospital	<ul style="list-style-type: none"> • Electricity cost by square meters • Water cost by square meters • Cost of telephone, Internet, office expenses, printing, and stationery by number of personnel 	<ul style="list-style-type: none"> • Administration by number of staff • Nursing Administration by number of nursing staff • Kitchen by number of meals served • Laundry by number of pieces washed • Central Sterilization by number of items sterilized • Medical Records by number of admissions • Transportation by total distance traveled • Cleaning/Sanitation by floor area 	<ul style="list-style-type: none"> • Resource use data were not available for several Clinical Support departments, so it was not possible to distribute these costs to the Clinical departments
Vietnam Primary Care	<ul style="list-style-type: none"> • Not applicable (allocated in one action with departments) 	<ul style="list-style-type: none"> • Depending on the department, either square meters or number of personnel 	<ul style="list-style-type: none"> • X-Ray by number of x-rays • Laboratory by number of lab tests • Pharmacy by number of prescriptions

Costing teams can allocate department costs by either using a unique allocation base or allocating different cost items according to different bases. For example, suppose the total cost of the Pharmacy department includes the salaries and wages of personnel and the cost of drugs. One could argue for a different allocation base for apportioning drug cost than for apportioning the salaries and wages of department staff to the Clinical departments. Staff might spend a large portion of their time filling low-cost prescriptions. In this case, using the number of prescriptions per department as an allocation base might be appropriate for allocating personnel salaries and wages but not for allocating drug cost. A sample of department drug consumption records linked with drug unit prices might be a better choice for constructing allocation statistics for the drug cost portion. For the sake of simplicity, most costing teams choose a single allocation base to apportion department costs, typically using some volume measurement; however, in some cases, the more detailed option may be preferable.

TABLE 58 lists the allocation bases used by the case examples for allocating indirect costs and departmental costs.

The step-down cost accounting method yields the total cost per Clinical department after allocating Administrative and Clinical Support departments' costs to Clinical departments. The order of the departments is important in the step-down model because costs flow in the model from the top down. Costing teams should list the departments that provide the most services to other hospital departments at the top,

since costs are allocated downward. The Administration department typically comes first because it serves all other departments in the hospital. The Hygiene department provides cleaning services to the Pharmacy but does not receive drugs in return, so it should appear above Pharmacy in the list. Hygiene also provides services to the Administration department, but this cannot be accounted for in the step-down model because there is no two-way resource flow. (Other cost accounting methods can address this reciprocal cost allocation, but they are complex and beyond the scope of this manual.) This inaccuracy would be small in magnitude anyway, because all Hygiene department costs are eventually allocated to Clinical departments. Clinical departments should be listed after Administrative and Clinical Support departments because they produce the final units of service. Their order is inconsequential because they only receive resources from all other departments, so their costs will not be allocated to any other departments.

The step-down process is illustrated in TABLE 59. The models in the toolkit on the companion flash drive show the formulas and help explain the process. For example, the Administration department cost (\$132,141) is allocated to the other departments using the number of staff in each department as an allocation base. The number of staff in each department is divided by the total staff in the hospital to get to a department share, which is the allocation statistic. For example, the allocation statistic for the Transport department is 0.014830508 (about 1.5%), which is calculated by dividing the 3.5 Transport staff by the 236 total

hospital staff. Costing teams should avoid using the rounding function in Microsoft Excel because the full cost will not be allocated and thus the allocation statistic will not be 0.015. Although the hospital actually has 250 total staff, the 14 Administration department staff are subtracted from the total because that department's resources must be excluded from the calculation of the allocation statistics. Thus, the Transport department receives about \$1,960 of the Administration department's cost, or $(3.5 \div 236) \times \$132,141$.

The step-down process continues as illustrated in TABLE 60. The Transport department's total cost is \$42,691, which includes the department cost of \$40,731 plus the \$1,960 allocated to Transport by the Administration department. The Transport department cost is allocated to the other departments using the number of discharges in each department as an allocation base. The number of discharges in each department is divided by the total hospital discharges to arrive at the department allocation statistic. For example, the allocation statistic for the Maintenance department is 0 (or 0%), which is calculated by dividing the 0 Maintenance discharges by the 16,000 total hospital discharges (less the 0 Administration department discharges and 0 Transport department discharges). Thus, the Maintenance department receives \$0 of the Transport department's cost, or $(0 \div 16,000) \times \$42,691$. The step-down process then proceeds for the remainder of the Administrative and Clinical Support departments.

TABLE 59. Illustrative Step-Down Cost Accounting Process (Phase 1)

HOSPITAL DEPARTMENT	ALLOCATION STATISTICS		DEPARTMENT COST			ADMINISTRATIVE DEPARTMENT ALLOCATION	
	Staff	Discharges	Direct	Indirect	Total	Administration	Transport
HOSPITAL TOTALS	250.00	16,000	\$ 1,000,000	\$ 800,000	\$1,800,000	\$ 132,141	
Administration	14.00	0	\$ 112,006	\$ 20,134	\$ 132,141	\$ 236.00	\$ 42,691
Transport	3.50	0	\$ 38,913	\$ 1,819	\$ 40,731	\$ 1,960	\$ 16,000
Maintenance	4.50	0	\$ 9,586	\$ 14,343	\$ 23,929	\$ 2,520	\$ --
Hygiene	23.00	0					
Kitchen	5.00	0					
Pharmacy	8.50	0					
Laboratory	13.00	0					
X-Ray	6.00	0	\$ 9,858	\$ 14,887	\$ 24,745	\$ 3,360	\$ --
Echography	2.50	0	\$ 5,179	\$ 2,516	\$ 7,695	\$ 1,400	\$ --
Blood Bank	4.50	0	\$ 9,892	\$ 8,120	\$ 18,012	\$ 2,520	\$ --
Operating Theater	17.00	0	\$ 52,177	\$ 71,078	\$ 123,254	\$ 9,519	\$ --
Emergency	13.00	1,900	\$ 54,435	\$ 102,271	\$ 156,706	\$ 7,279	\$ 5,070
Surgery	23.00	3,300	\$ 77,360	\$ 114,988	\$ 192,349	\$ 12,878	\$ 8,805
ICU	18.50	900	\$ 54,611	\$ 95,234	\$ 149,844	\$ 10,358	\$ 2,401
Medicine	21.50	3,000	\$ 49,838	\$ 60,753	\$ 110,592	\$ 12,038	\$ 8,005
OB/GYN	24.00	3,700	\$ 92,117	\$ 88,447	\$ 180,564	\$ 13,438	\$ 9,872
Pediatrics	22.50	2,400	\$ 61,784	\$ 88,120	\$ 149,905	\$ 12,598	\$ 6,404
HIV/AIDS	13.50	300	\$ 94,856	\$ 43,646	\$ 138,501	\$ 7,559	\$ 800
TB	12.50	500	\$ 85,492	\$ 22,016	\$ 107,508	\$ 6,999	\$ 1,334

$$\$1,960 = \frac{3.50}{236.00} \times \$132,141$$

TABLE 60. Illustrative Step-Down Cost Accounting Process (Phase 2)

HOSPITAL DEPARTMENT	ALLOCATION STATISTICS		DEPARTMENT COST			ADMINISTRATIVE DEPARTMENT ALLOCATION	
	Staff	Discharges	Direct	Indirect	Total	Administration	Transport
HOSPITAL TOTALS	250.00	16,000	\$ 1,000,000	\$ 800,000	\$1,800,000	\$ 132,141	
Administration	14.00	0	\$ 112,006	\$ 20,134	\$ 132,141	\$ 236.00	\$ 42,691
Transport	3.50	0	\$ 38,913	\$ 1,819	\$ 40,731	\$ 1,960	\$ 16,000
Maintenance	4.50	0	\$ 9,586	\$ 14,343	\$ 23,929	\$ 2,520	\$ --
Hygiene	23.00	0	\$ 18,386	\$ 8,633	\$ 27,019	\$ 12,878	\$ --
Kitchen	5.00	0	\$ 6,798	\$ 2,295	\$ 9,093	\$ 2,800	\$ --
Pharmacy	8.50	0	\$ 94,970				
Laboratory	13.00	0	\$ 71,743				
X-Ray	6.00	0	\$ 9,858				
Echography	2.50	0	\$ 5,179				
Blood Bank	4.50	0	\$ 9,892	\$ 8,120	\$ 18,012	\$ 2,520	\$ --
Operating Theater	17.00	0	\$ 52,177	\$ 71,078	\$ 123,254	\$ 9,519	\$ --
Emergency	13.00	1,900	\$ 54,435	\$ 102,271	\$ 156,706	\$ 7,279	\$ 5,070
Surgery	23.00	3,300	\$ 77,360	\$ 114,988	\$ 192,349	\$ 12,878	\$ 8,805
ICU	18.50	900	\$ 54,611	\$ 95,234	\$ 149,844	\$ 10,358	\$ 2,401
Medicine	21.50	3,000	\$ 49,838	\$ 60,753	\$ 110,592	\$ 12,038	\$ 8,005
OB/GYN	24.00	3,700	\$ 92,117	\$ 88,447	\$ 180,564	\$ 13,438	\$ 9,872
Pediatrics	22.50	2,400	\$ 61,784	\$ 88,120	\$ 149,905	\$ 12,598	\$ 6,404
HIV/AIDS	13.50	300	\$ 94,856	\$ 43,646	\$ 138,501	\$ 7,559	\$ 800
TB	12.50	500	\$ 85,492	\$ 22,016	\$ 107,508	\$ 6,999	\$ 1,334

$$\$0 = \frac{0}{16,000} \times \$42,691$$

TOOLKIT RESOURCES LIST

Step VII. Calculate and Cross-Check Unit Costs

The final step is the calculation of unit costs. After the step-down process is complete, the total cost of each Clinical department will include the direct and indirect costs originally assigned to those departments along with the allocated Administrative and Clinical Support departments' costs. The department unit cost is calculated by dividing the total cost of each Clinical department by its units of service. In

TABLE 61, the total cost of the Internal

Medicine department is \$185,398.

The unit cost of the Internal Medicine department is \$24 per bed-day, which is calculated by dividing \$185,398 by the department's 7,677 bed-days.

Intermediate unit costs are calculated by dividing the total cost of each Clinical Support department by its units of service before allocation of the Clinical Support departments' cost to the Clinical departments. Thus the output could be the cost per prescription, per lab test, per surgery minute, and so forth.

The costing team should conduct a cross-check to confirm that the total costs of the Clinical departments are equal to the total cost of all facility departments before the allocation.

This ensures that all costs have been accounted for and no double-counting has occurred. If there is a discrepancy between the starting total and the final total, it will be necessary to go back through the step-down calculations and identify where the error occurred.

TABLE 61. Illustrative Unit Cost Calculation

HOSPITAL DEPARTMENT	TOTAL DEPARTMENT COST	UNIT COSTS			
		Discharges	Cost per Discharge	Bed-days	Cost per Bed-day
Emergency	\$ 225,519	1,095	\$ 206	3,844	\$ 59
Surgery	\$ 356,715	2,027	\$ 176	15,457	\$ 23
ICU	\$ 210,517	472	\$ 446	2,630	\$ 80
Medicine	\$ 185,398	1,598	\$ 116	7,677	\$ 24
OB/GYN	\$ 316,424	2,615	\$ 121	12,130	\$ 26
Pediatrics	\$ 202,460	1,966	\$ 103	8,155	\$ 25
HIV/AIDS	\$ 170,137	274	\$ 621	4,531	\$ 38
TB	\$ 132,830	560	\$ 237	10,779	\$ 12
HOSPITAL TOTALS	\$ 1,800,000	10,607	\$ 170	63,552	\$ 28

INTERNAL MEDICINE UNIT COST

=

TOTAL INTERNAL MEDICINE DEPARTMENT COST

TOTAL INTERNAL MEDICINE BED-DAYS

THE TOOLS AND TEMPLATES on the companion flash drive are meant for use by countries when they are developing their own costing exercise. They should be adapted to the specific country context rather than used exactly as presented. The files can also be found at www.jointlearningnetwork.org.

TOOL 1. SAMPLE FORMS AND TEMPLATES

FILE	REFERENCE IN MANUAL	DESCRIPTION
1A	–	Sample agenda for participatory planning and design session
1B	Table 9	Scope inclusion and exclusion template
1C	Table 25	Sample data tracking form
1D	Table 30	Sample matrix of variability
1E	Table 37	Personnel time measurement template
1F	Table 38	Capital asset inventory template

TOOL 2. TERMS OF REFERENCE

FILE	COUNTRY	COSTING EXERCISE	DESCRIPTION
2A	India	Chhattisgarh Costing	Terms of Reference for the consultant to provide technical support to the government of Chhattisgarh in costing hospital procedures and developing package prices for the state's health insurance scheme
2B	India	Karnataka Costing	Terms of Reference for the consultant to provide technical support to the government of Karnataka in costing hospital procedures and developing package prices for the state's health insurance scheme
2C	Vietnam	Vietnam Primary Care	Terms of Reference for the consultant to provide technical support to the Vietnamese MOH in designing and implementing a costing exercise for primary care services provided at district hospitals and commune health stations

TOOL 3. DATA REQUEST FORMS

FILE	COUNTRY	COSTING EXERCISE	DESCRIPTION
3A	Cambodia	Cambodia Hospital	Data request provided to costing exercise enumerators, specifying the needed data item, data description, and time period
3B	India	PHFI Hospital	High-level data request for expenditure and output data for top-down costing

TOOL 4. COSTING INSTRUMENTS

FILE	COUNTRY	COSTING EXERCISE	DESCRIPTION
4A	India	Aarogyasri Hospital	Data collection templates for top-down and bottom-up costing with sections for cost categories, departments, patients, personnel, and facility financials
4B	India	PHFI Hospital	Data collection templates for top-down costing with sections for both cost category and cost center
4C	Indonesia	Indonesia Health Facility	Costing instrument for hospitals with sections on facility profile, lab, and radiology
4D	Indonesia	Indonesia Health Facility	Costing instrument for hospitals with sections on facility profile, funds flow and income, expenditures, utilization, human resources, drugs and medical supplies, equipment, infrastructure, patient survey, and drug survey
4E	Indonesia	Indonesia Health Facility	Costing instrument for health centers with sections on facility profile, funds flow, expenditure, utilization, human resources, drugs and medical supplies, equipment, and infrastructure
4F	Indonesia	Indonesia Health Facility	Costing instrument for district health offices with sections on facility profile, expenditure, human resources, equipment, and infrastructure
4G	Malaysia	Malaysian DRG	Data collection templates for top-down costing with sections for cost categories, allocation statistics, and utilization
4H	Malaysia	MNHA Hospital	Data collection templates for top-down costing for completion by personnel categories and for departments
4I	Vietnam	Vietnam Primary Care	Data collection templates for top-down costing of commune health stations with sections on facility profile, utilization, revenue, and cost categories
4J	Vietnam	Vietnam Primary Care	Data collection templates for top-down costing of district hospitals with sections on facility profile, utilization, revenue, and cost categories

TOOL 5. DATA FLOW DIAGRAMS

FILE	COUNTRY	COSTING EXERCISE	DESCRIPTION
5A	Indonesia	Indonesia Health Facility	Diagram of data flow by position and activity
5B	Malaysia	Malaysian DRG	Diagram of data flow by activity

TOOL 6. DUMMY TABLES

FILE	COUNTRY	COSTING EXERCISE	DESCRIPTION
6A	Central Asian Republics	Central Asian Republics DRG	Dummy table with sections for utilization and department expenditures
6B	Philippines	PhilHealth Case Rates	Dummy table with sections for the facility profile and utilization, allocation statistics, and costs by cost center
6C	Vietnam	Vietnam Primary Care	Dummy table with sections on unit costs, cost structure, and fees
6D	Vietnam	Vietnam Primary Care	Dummy table for step-down cost accounting with sections on unit costs, cost structure, and fees

TOOL 7. QUALITY ASSURANCE GUIDANCE

FILE	COUNTRY	COSTING EXERCISE	DESCRIPTION
7A	Indonesia	Indonesia Health Facility	Instructions and detailed tool for spot-checking of enumerator data collection in hospitals
7B	Indonesia	Indonesia Health Facility	Instructions and detailed tool for spot-checking of enumerator data collection in health centers
7C	Indonesia	Indonesia Health Facility	Instructions and detailed tool for spot-checking of enumerator data collection in health agencies

TOOL 8. TRAINING MANUALS

FILE	COUNTRY	COSTING EXERCISE	DESCRIPTION
8A	India	Aarogyasri Hospital	Manual outlining plan of action, roles and responsibilities, and instructions for data entry tools, data analysis and verification, and step-down allocation
8B	Indonesia	Indonesia Health Facility	Manual outlining data collection schedule, surveys, and guidelines for filling instruments by topic and facility type
8C	Malaysia	Malaysian DRG	Manual outlining data collection needs and procedures by cost center, including sample data collection tables

TOOL 9. COSTING MODELS

FILE	COUNTRY	COSTING EXERCISE	DESCRIPTION
9A	Any	JLN	Step-down cost accounting model with instructions on use developed by the JLN Costing Collaborative
9B	Cambodia	Cambodia Hospital	Example of completed step-down model for estimating final unit costs and describing cost structure and funding sources
9C	Central Asian Republics	Central Asian Republics DRG	Example of completed step-down model for estimating cost per case and cost per bed-day and calculating relative weight coefficients
9D	India	Aarogyasri Hospital	Step-down model resulting in cost per admission, outpatient visit, and surgery, as well as cost per minute of each
9E	India	Aarogyasri Hospital	Example of completed step-down model
9F	India	PHFI Hospital	Micro-costing template for surgical procedures, arriving at costs by cost category as well as cost-to-charge information
9G	Malaysia	Malaysia COMPHEC	Template for detailed bottom-up costing of medical procedures, including inflation adjustments for prospective costing
9H	Vietnam	Vietnam Primary Care	Step-down model for district hospitals, arriving at intermediate and final cost center results

TOOL 10. SIMULATION ANALYSIS

FILE	COUNTRY	COSTING EXERCISE	DESCRIPTION
10A	Cambodia	Cambodia Hospital	Template for calculating base rates by inputs and funding sources for multiple hospitals
10B	Cambodia	Cambodia Hospital	Example of completed simulation analysis calculating base rates by inputs and funding sources for multiple hospitals

TOOL 11. COSTING EXERCISE REPORTS

FILE	COUNTRY	COSTING EXERCISE	DESCRIPTION
11A	Cambodia	Cambodia Hospital	Final report presenting the methodology and results of top-down costing of hospital services in Cambodia
11B	India	PHFI Hospital	Journal article published by <i>BMJ Open</i> presenting the costing methodology and results of micro-costing of surgical procedures in India
11C	India	PHFI Hospital	Journal article published by <i>PLoS One</i> presenting the costing methodology and unit cost results of hospital costing in India
11D	Indonesia	Indonesia Health Facility	Final report presenting the methodology and results of the mixed method costing of health services at hospitals and health centers in Indonesia
11E	Vietnam	Vietnam Primary Care	Journal article published by <i>Global Public Health</i> presenting results of costing of primary care visits at commune health stations in Vietnam

GLOSSARY

ABSOLUTE COST. A point estimate cost result that captures the cost of producing a good or service, carrying out an activity, or achieving a goal in units of money.

ABSOLUTE PRICE. The price paid for a good or service in units of money, without adjustment for inflation or price fluctuations over time. Also called *nominal price*.

“ACTUAL COST.” See *“true cost.”*

ADJUSTMENT COEFFICIENT. A coefficient (between 0.0 and 1.0) applied to the base rate to adjust payment for the cost of meeting the health service needs of different population groups or legitimate cost differences related to specific provider characteristics (e.g., being located in a rural or remote area or serving as a teaching facility).

ALLOCATION BASE. A rule (or basis) used to allocate indirect costs to cost centers. The allocation base is an estimate of the resources used by a cost center and is used to allocate the cost of those resources, which cannot be directly assigned. The allocation base is typically a cause, or driver, of the cost being allocated.

ALLOCATION STATISTICS. The data needed to apply the allocation base to allocate indirect costs to cost centers.

AVERAGE COSTING. See *top-down costing*.

AVERAGE LENGTH OF STAY. The average number of bed-days (inpatient days) for each patient discharged from the hospital. The average length of stay can be calculated for an entire facility, a department, or a diagnosis-related group classification.

BASE RATE. The average payment rate paid by the purchaser to the provider per unit of service, bundle of services, or registered individual.

BED-DAY. A day during which a patient stays overnight in a hospital. Also referred to as an *inpatient day* or *patient day*.

BED-DAY ALLOCATION. An allocation method typically used in bottom-up costing in which indirect costs are allocated evenly to all bed-days, regardless of health service.

BENCHMARKING. The process of establishing a standard of performance among health care providers and comparing the performance of individual providers to the standard.

BOTTOM-UP COSTING. A costing method that determines the unit cost of producing a good or service, carrying out an activity, or achieving a goal by summing the cost of all inputs. In health services costing, this method is used to estimate the

cost to deliver a narrowly defined service or to treat a type of patient. This method aims to determine as accurately as possible the observed cost of a service or patient through direct measurement of resource use.

BUDGET-NEUTRAL PAYMENT SYSTEM. A payment system that calibrates payment rates so total payments to providers (after any weights and/or adjustments are applied) are less than or equal to the total budget of the purchaser.

BUNDLED SERVICE PAYMENTS. The allocation of a fixed payment to a health care provider to cover all services, tests, and procedures grouped into a higher aggregated unit (e.g., a service package or hospital discharge) rather than payment for each individual service.

CAPITAL COST. The cost of assets (such as buildings, medical equipment, and non-medical equipment) that have a working life of one year or longer and usually exceed some threshold cost. The cost of capital items (including newly developed or acquired buildings or equipment) is determined by estimating their depreciation.

CAPITATION. See *per capita provider payment*.

CASE-BASED PROVIDER PAYMENT. A hospital payment method that pays hospitals a fixed amount per admission or discharge depending on the patient and clinical characteristics, which may include department of admission, diagnosis, and other factors. The payment rate covers all tests, procedures, and other services provided during the hospital stay.

CASE MIX. The average relative complexity and resource intensity of services required to diagnose and treat patients in a hospital due to diagnosis, disease severity, and personal characteristics such as age.

CLINICAL CARE PATHWAY COSTING. See *normative costing*.

CLUSTER SAMPLING. A sampling method in which the total population is divided into relatively homogenous groups (or clusters) and then a random sample of these clusters is selected. The aim is to capture most of the variation in the population within the groups, not between them.

COST. The value of resources (inputs), expressed in monetary terms, used to produce a good or service, carry out an activity, or achieve a goal.

COST ACCOUNTING METHODS. Methods that use accounting principles to classify and measure all costs incurred in producing a good or service, carry out an activity, or achieve a goal.

COST CATEGORY. A grouping of like cost items into a relevant class (e.g., personnel costs, drug/medical supply costs) based on their qualities in common. Cost categories typically correspond with budget categories used for accounting and reporting.

COST CENTER. A well-defined organizational or management unit or entity for which costs are accumulated and to which direct costs are assigned and indirect costs are allocated.

COST DRIVER. A factor that causes or influences a change in the cost of an activity or process. The driver describes the cost behavior of the activity or process.

COST ITEM. An input, or resource, to which costs are attached. Cost items include both capital and recurrent items.

COST OBJECT. An item or entity whose cost is sought (e.g., a patient, service, department/specialty, or organization). Also called *cost objective*.

COSTING EXERCISE. An exercise to estimate the value of resources used to produce a good or service, carry out an activity, or achieve a goal.

DATA FLOW DIAGRAM. In a costing exercise, a picture of the movement of data between actors (e.g., enumerators, data processors, data verifiers, analysts) that notes the actions taken by each to transform input data into output results.

DATA PERIOD. The period of time for which utilization and costs are measured and valued for a costing exercise.

DEPRECIATION. The amount by which the value of an asset decreases continuously over time due to its use. Depreciation spreads the cost of a capital asset over the duration of its useful life to capture how much of its value has been used up.

DETAILED COSTING. See *bottom-up costing*.

DIAGNOSIS-RELATED GROUP (DRG). 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 co-morbidities. DRGs are an example of a system of case groups and relative case weights. See also *case-based provider payment*.

DIRECT COSTS. The cost of inputs (e.g., labor, medicines) that are directly attributable to production of a good or service and can be traced to a cost object (e.g., organization, department, service, or patient).

DUMMY TABLE. A mock table produced in advance of data collection and analysis that mimics a regular results table but is not populated with data.

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 input costs.

EQUIVALENCE SCALE. An index that converts units of service into comparable measures in order to assign aggregate costs.

FEE-FOR-SERVICE PROVIDER PAYMENT. A payment method that pays providers for each individual service provided. Fees are fixed in advance for each service or group of services.

FIXED-FEE SCHEDULE. See *fee-for-service provider payment*.

FULL COST. See *total cost*.

GLOBAL BUDGET PROVIDER PAYMENT. A payment method that allocates a fixed amount to a provider for a specified period to cover aggregate expenditures to provide an agreed-upon set of services. The budget is flexible and not tied to specific line items for input expenses (e.g., personnel, medicines, utilities).

GROSS COSTING. See *top-down costing*.

GROUPER. An algorithm that assigns hospital cases to groups with associated relative case weights to calculate case mix or final payment rates for each case.

HEALTH PURCHASER. An entity that transfers pooled health care resources to providers to pay for services for a defined population. Purchasers can include health ministries, social insurance funds, private insurance funds, and other entities that manage health funds on behalf of the population.

HEALTH PURCHASING. The allocation of pooled resources to health care providers on behalf of the covered population.

IMPACT ANALYSIS. See *simulation analysis*.

INCENTIVE. An economic signal that directs individuals (e.g., health workers or health care providers) or organizations toward self-interested behavior. The incentives of different health provider payment methods affect provider decisions about the services they deliver, how they deliver them, and the mix of inputs they use for delivery.

INDIRECT COSTS. The costs of inputs (e.g., utilities, administration, overhead) that are difficult to trace directly to specific cost objects (i.e., organization, department, service, patient) and must therefore be allocated.

INPUT. A resource (e.g., personnel time, supplies, equipment) that is used to produce a good or service, carry out an activity, or achieve a goal.

LINE-ITEM BUDGET PROVIDER PAYMENT. The allocation of a fixed amount to a health care provider for a specified period to cover specific input costs (e.g., personnel, medicines, utilities).

MACRO-COSTING. See *top-down costing*.

MARGINAL MARK-UP ALLOCATION. A type of bottom-up costing that estimates unit costs from input requirements to deliver a specific health service according to standard treatment guidelines or expert opinion, and input prices derived from normatives, average market prices, and/or other sources. Also called *clinical care pathway costing*.

MICRO-COSTING. See *bottom-up costing*.

NORMATIVE COSTING. A type of bottom-up costing that estimates unit costs from input requirements to deliver a specific health service according to standard treatment guidelines or expert opinion, and input prices derived from normatives, average market prices, and/or other sources. Also called *clinical care pathway costing*.

OPERATING COSTS. See *recurrent costs*.

OUTPUT. The result of a production process—a good or service, a completed activity, or an achieved goal. See also *unit of service*.

PACKAGE RATE. The payment rate for a bundle of services, such as a surgery and all related pre- and post-surgery services.

PER CAPITA PROVIDER PAYMENT. A payment method in which all providers in the payment system are paid a predetermined fixed rate in advance to provide a defined set of services for each individual enrolled with the provider for a fixed period.

PER DIEM PROVIDER PAYMENT. A payment method that allocates a fixed amount per day to hospitals for each admitted patient. The per diem rate may vary by department, patient, clinical characteristics, or other factors.

PERSPECTIVE. In a costing exercise, the point of view from which costs are estimated. The perspective can be that of the purchaser, provider, patient, or society. The perspective determines which stakeholders' costs to include in the analysis.

POOLING OF HEALTH CARE FUNDS. Accumulation of funds allocated to pay for health goods and services for the covered population or the population of an administrative or geographic area.

PRE-TEST. A pilot study, feasibility study, or small-scale preliminary study that tests the feasibility of the costing exercise methodology and enhances the quality and efficiency of the main exercise.

PROSPECTIVE ORIENTATION. A costing exercise viewpoint in which the events of interest (expenditures and utilization) have not yet taken place when the exercise begins.

PROVIDER PAYMENT. The allocation of resources to a health care provider to deliver the covered package of services to the population.

PROVIDER PAYMENT METHOD. The way in which a purchaser pays health care providers to deliver a service or set of services.

PROVIDER PAYMENT RATE. The amount of money that a purchaser pays to a provider to deliver a service or set of services.

PROVIDER PAYMENT SYSTEM. The provider payment method combined with all supporting systems, such as information systems, accountability mechanisms, and referral rules.

PURPOSIVE SAMPLING. Selecting units (e.g., health facilities) from a population based on a characteristic of interest. Purposive sampling is non-probability sampling and is not representative of the population.

RATE-SETTING. The process of determining provider payment rates.

“REAL COST.” See *“true cost.”*

RECURRENT COSTS. Resources that are consumed within one year or have a working life of less than one year and must be regularly replaced. Also called *operating costs*.

RELATIVE CASE WEIGHT. A coefficient (between 0.0 and 1.0) applied to the base rate to adjust payment for the cost of treating cases in a particular group relative to the average cost per case for all cases.

RELATIVE COST. The cost of a good or service as it compares to the cost of other goods and services, expressed in terms of a ratio between two costs or between one cost and a weighted average of all other goods or services available.

RELATIVE PRICE. The price of a good or service as it compares to the price of other goods and services, expressed in terms of a ratio between two prices or between one price and a weighted average of all other goods or services available.

RESOURCE USE. A measurement of the amount or cost of resources used to produce a good or service, carry out an activity, or achieve a goal.

RETROSPECTIVE ORIENTATION. A costing exercise viewpoint in which the events of interest (expenditures and utilization) have already occurred when the costing exercise begins.

ROUTINE COSTING SYSTEM. A sustainable costing system that is intended to generate cost information in a uniform, standardized way on a routine (usually annual) basis.

SAMPLING FRAME. A list or other device used to define the population of interest (e.g., providers) and from which the sample is drawn.

SCOPE. The bounds or parameters of the costing exercise. Dimensions of scope include the perspective, provider types, cost objects, and cost items.

SENSITIVITY ANALYSIS. An analysis that shows the amount by which different scenarios or assumptions will affect the results of a study or analysis. Also called *what-if analysis*.

SIMULATION ANALYSIS. A mathematical approach that processes a number of different estimates of results of a study or analysis based on a set of parameters and different assumptions.

STEP-DOWN COST ALLOCATION. The process by which direct costs are assigned and indirect costs are allocated in a top-down costing exercise using allocation bases to estimate unit costs. Other, less common allocation methods include direct distribution, double distribution, and reciprocal distribution.

TIME-MOTION STUDY. Direct observation of the specific time spent on an activity or range of activities.

TOP-DOWN COSTING. A costing method that first documents the total expenditure of an entity (e.g., health facility) and distributes it among the cost centers and then to units of output (e.g., bed-days, discharged patients, outpatient visits) to arrive at the average cost of resources used to produce a good or service, carry out an activity, or achieve a goal.

TOTAL COST. The cost of all resources used to produce a good or service, carry out an activity, or achieve a goal, including direct and indirect costs. Sometimes referred to as *full cost*.

“TRUE COST.” A term often used erroneously to describe what is believed to be the underlying cost to produce a good or service, carry out an activity, or achieve a goal. Because that cost depends on many variables, including input prices and decisions made by the producers (e.g., health care providers), there is no such thing as a true cost. The cost of delivering health services is not a single point that can be measured—rather, it is a function of decisions made by providers, which can lead to inefficiencies. Also referred to as *“real cost”* or *“actual cost.”*

UNIT COST. The cost incurred to deliver a single good or service (e.g., laboratory test). The average cost per good or service is the total cost of each good or service divided by the number of goods or services provided.

UNIT OF PAYMENT. The unit of output for which a health care provider is paid under the payment method—per service, per visit, per case, per bed-day, or per person per year.

UNIT OF SERVICE. A unit of output of inpatient or outpatient health care delivery (e.g., bed-day, discharge, visit, lab test, exam, surgery, prescription).

UNIVERSAL HEALTH COVERAGE. Ensured access to essential health services for an entire population without risk of financial hardship or impoverishment.

VERTICAL PROGRAM. A health program that has a separate funding stream, management structure, and service delivery system or approach.

WEIGHTED AVERAGE. An average that is computed so each item being averaged (e.g., unit costs) is multiplied by a weight based on that item's relative importance (e.g., utilization). The result is summed and the total is divided by the sum of the weights.

WEIGHTED SERVICE ALLOCATION. An allocation method typically used in bottom-up costing in which the relative cost of each patient is determined by assigning relative value units to distribute indirect costs.

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TEN-STEP PLAN FOR A COSTING EXERCISE, *continued*

STEP 6. SELECT THE SAMPLE

- ✓ **REVISIT** scope decisions about which provider types to include in the cost analysis.
- ✓ **DETERMINE** which sampling criteria are important for the costing exercise.
- ✓ **UNDERSTAND** the pros and cons of various sampling methods and determine the optimal method for the costing exercise.
- ✓ **OBTAIN** the sampling frame of providers (if available).
- ✓ **FINALIZE** sample strata.
- ✓ **SELECT** the sample.

STEP 7. CONDUCT A PRE-TEST

- ✓ **IDENTIFY** providers for inclusion in the pre-test and decide whether they will be inside or outside the sample.
- ✓ **CONDUCT** the pre-test and take note of changes that should be made to the costing exercise methodology, data collection and analysis plans, costing instruments, and data processing and analysis tools.
- ✓ **MAKE** the necessary modifications to the costing exercise methodology, data collection and analysis plans, costing instruments, and data processing and analysis tools.
- ✓ **DECIDE** whether to include pre-test data in the main costing exercise and determine whether additional data are needed from the pre-test providers.

STEP 8. COLLECT, PROCESS, AND VERIFY DATA

- ✓ **DEVELOP** a plan for working with and providing incentives to providers.
- ✓ **COLLECT** data.
- ✓ **ENTER** data into data entry tools and dummy tables, and follow quality control measures.
- ✓ **CLEAN** the data.
- ✓ **IDENTIFY** irregular data for verification.
- ✓ **VERIFY** data and correct the data set as necessary.
- ✓ **DECIDE** how to address issues of limited availability and poor quality of data from providers.

STEP 9. ANALYZE AND VALIDATE DATA

- ✓ **USE** the cost accounting model to analyze the data.
- ✓ **DOCUMENT** each step of the analysis so the iterations can be retraced, assumptions and extrapolations are transparent, and data gaps or other limitations are specified.
- ✓ **DETERMINE** whether additional data need to be collected or verified.
- ✓ **ADDRESS** unreliable, invalid, or missing data by making assumptions, estimates, and extrapolations.
- ✓ **DECIDE** when the analysis is complete and then document any limitations in the analysis.
- ✓ **VALIDATE** results with the facilities involved to ensure that the results make sense and to correct any residual errors.

STEP 10. REPORT AND USE THE RESULTS

- ✓ **DETERMINE** the information needed from the costing results for each stakeholder group and how best to communicate it.
- ✓ **DEVELOP** the core analytical charts for presenting the costing results by the total sample as well as disaggregated by key variables.
- ✓ **COMMUNICATE** the costing results in a simple and clear way and in appropriate formats for different audiences.
- ✓ **INCLUDE** in the presentation the purpose and objectives, methodologies, and key findings of the costing exercise.
- ✓ **USE** visuals where possible and provide appropriate context to interpret the results.
- ✓ **MAKE** the costing results available in formats that will facilitate their appropriate use to inform provider payment policy and rate-setting.



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