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(March 2008)

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Mission

The cooperative agreement **Health Systems 20/20** (HS 20/20), funded by the United States Agency for International Development (USAID) for 2006-2011, assists countries who receive USAID support in addressing access barriers to life-saving priority health services. HS 20/20 works to strengthen health systems using an **integrated approach** to improving **financing, governance, operations, and sustainable capacity** of local institutions.

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ANALYSIS OF THE CURRENT FEE SCHEDULE AND PAYMENT MECHANISM OF THE INTEGRAL HEALTH INSURANCE IN PERU AND RECOMMENDATIONS FOR THEIR ADJUSTMENT

DISCLAIMER

The opinions expressed by the authors of this report do not necessarily reflect the opinion of the United States Agency for International Development (USAID) or the United States Government.

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ACRONYMS

DIRESA/DISA	Regional Health Office
DRGs	Diagnosis-Related Groups
HS 20/20	Health Systems 20/20
MINSA	Ministry of Health of Peru
MINSAL	Ministry of Health of Chile
ODSIS	Decentralized Office of the Integral Insurance Program
PRAES	Promoting Alliances and Strategies Project
SIS	Integral Health Insurance
USAID	United States Agency for International Development

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EXECUTIVE SUMMARY

The Integral Health Insurance (SIS) is a decentralized entity under the Ministry of Health of Peru (MINSA) that finances a predefined set of services for its target population. SIS pays providers for insured services via retrospective, invoiced payments as established by MINSA, i.e., a fee-for-service system. SIS is currently expanding its target population through enrollment campaigns. It is also broadening coverage to include more complex services. As SIS grows in its financing role, it will need a new fee and provider payment system that better fits with its mission and objectives. The development of SIS is the main public policy expression of Peru's universal insurance initiative.

This report provides conceptual and methodological background for recommending a new evaluation and fee system for SIS. Our recommendations are intended to support SIS's provider payment system restructuring within the Peruvian public health system.

The report begins with a conceptual framework for allocating health resources as relevant to Peru's health system, including common problems and solutions. It also describes international experiences and lessons learned with provider payment mechanisms from countries with more advanced health reforms.

We then present a diagnostic analysis of SIS's current resource allocation mechanisms, focusing on how resources are distributed, what the current distribution produces, what services are being provided and who benefits from the resources. Finally, we make recommendations for the level of care and types of programs towards which SIS should target its resources, presenting proposals to prioritize these areas.

We include proposals or alternatives assessed for SIS. These proposals are to be implemented consecutively; that is, the next cannot be initiated until the previous is complete. Therefore, these recommendations represent long-term strategies. The report describes attributes of a good payment system and simulates alternative systems, using SIS data.

SIS represents an important advance in channeling resources toward the poorest citizens of Peru, ensuring greater access to health care. The reform essentially separated the public sector's health financing into two sections, MINSA and SIS. Notwithstanding, to ensure efficient spending in the long term, the analysis suggests placing financing into the hands of a single entity, especially for transfers and related items. A single payer will facilitate consecutive, integral, and complete integration of the new mechanisms.

Peru should apply existing international experience in developing its new transfer mechanisms. The mechanisms should support the country's health and equity goals. Payment mechanisms should promote equity and inclusion in health care, as is the case in systems that use mixed payment mechanisms. The use of mixed payment mechanisms, hospital case mix studies and risk-adjusted morbidity can improve management of health systems. In addition, SIS should improve its information, management, and monitoring systems. Established tools such as WinSIG may help homogenize and implement cost accounting systems within health facilities. Such information systems are an important prerequisite for implementing payment systems.

This project, and in this initial stage, presents a simulation of immediately implementable recommendations that will help develop conditions favorable for the medium- and long-term recommendations. This is achieved through the presentation of an adequate methodology.

Intrasectoral coordination is essential to the success of this plan, as are institutional definitions regarding financing concepts.

The recommended changes should be implemented consecutively and gradually, beginning with pilot programs where conditions are more favorable.

This study simulates a series of territorial capitation systems to illustrate recommended methodology. The first simulation encompasses all SIS spending; the second includes only primary-level care spending. All simulations are neutral in terms of total resources; that is, they imply neither an increase nor a decrease in total SIS annual spending.

If all individuals had the same expected health spending needs, which is the assumption behind a fixed per capita, the budgets should change significantly. This study's simulations show the differences in allocation across individuals and regions, as well as the differences in utilization rates. Where observed per capita spending is higher, we can assume that utilization of services per person is higher as well. Above all, these differences reflect higher hospital spending in regions with installed capacity and referral centers such as Lima and Callao. There are major differences between the simulated fixed cost capitation and the observed per capita allocation that are very revealing. Puno and Lima are extreme cases, because spending in the former should increase 70% and in the latter decrease 74%.

When the per capita allocation is adjusted demographically and individuals are not assumed to have identical expected health spending needs, but rather needs that vary by gender and age, the differences between the simulated demographic risk-adjusted capitation and observed per capita allocation are smaller than the gaps with a fixed per capita. This finding can be explained by the composition of the population. That is, if a region with a higher total budget allocated through a fixed per capita has a smaller budget when using an adjusted per capita, it means that the higher-cost population is a relative minority or the lower-cost population is relatively large. The adjusted per capita exercise is hence superior to the fixed per capita one.

In most cases analyzed, that is, in 26 of the 29 departments, the health efficacy of demographic risk-adjusted capitation behaves as expected. In the departments where infant mortality is higher than the national average, the simulated per capita budget is higher than the observed budget. Where infant mortality is lower than average, the opposite is true.

When poverty is included as a risk adjustment factor, gaps between simulated and observed resource allocation is lower still than in the above cases, because of the high correlation between poverty and infant mortality (correlation coefficient = 0.90). Hence, this simulation is better adjusted for health status, meaning that the resources are better targeted. Therefore, this option is superior to the previous two examples.

When this exercise is repeated for the three types of capitation (fixed per capita, demographic risk-adjusted per capita, and poverty and demographic risk-adjusted per capita) but for primary care alone, the gaps between simulated and observed per capita spending are reversed. A clear example is Lima, which goes from a positive gap (that is, it hypothetically receives more resource transfers than necessary) to a negative gap of 63.5% (that is, it hypothetically lacks this percentage of financing for primary care). In Callao, on the other hand, the result is in the same direction for both simulations; that

is, in both scenarios it hypothetically receives more resource transfers than necessary, but the magnitude of the difference is markedly smaller when considering primary care spending alone.

The simulated risk-adjusted capitations with and without hospitals are both significantly different than the observed 2006 regional allocations. However, for regions with greater installed hospital capacity, these differences invert or change in magnitude when hospital expenditure is not considered. For Lima, for instance, the disparity between observed and simulated allocations is greater in the second than in the first exercise. If in the first simulation we would have to take away a hypothetical 74% of its 2006 observed allocated resources, in the second –without hospital expenditures– we would have to add an additional 77.6% to its budget.

Correcting for poverty further lessens the differences between simulated and observed regional allocations, when considering only primary care expenditures. This is advantageous when considering a real application of the illustrative exercise. Once again, the simulation using only primary care services yields significantly different results in comparison to the previous exercise that adjusts for demographics and poverty. Poverty is a key factor that explains the differential allocation of resources to Lima, where the poverty level below the national average, much lower than in certain regions. Gender and age factors alone fail to take into account poverty levels or associated health needs. Therefore, a model lacking a poverty correction factor only partially reflects the health needs of the population.

“That any sane society, having observed that you could provide for the supply of bread by giving bakers a pecuniary interest in baking for you, should go on to give a surgeon a pecuniary interest in cutting off your leg, is enough to make one despair of political humanity.”

George Bernard Shaw (1856-1950)

I. INTRODUCTION

I.1 BACKGROUND

Health Systems 20/20 is a five-year (2006-2011) cooperative agreement funded by the United States Agency for International Development (USAID). The project provides technical support to countries who receive USAID support, to address issues with governance, financing, operations, and technical capacity within the health sector. HS 20/20 works to strengthen health systems in developing countries to facilitate their population’s access to life-saving priority health services.

HS 20/20 focuses on developing technical capacity to support sustainable, long-term health system growth. The project provides leadership, technical assistance, research, professional networks, and information.

Abt Associates leads the project’s collaborators, including the Aga Khan Foundation, BearingPoint, Bitrán & Asociados, BRAC University, Broad Branch Associates, Forum One Communications, RTI International, Training Resources Group and Tulane University School of Public Health.

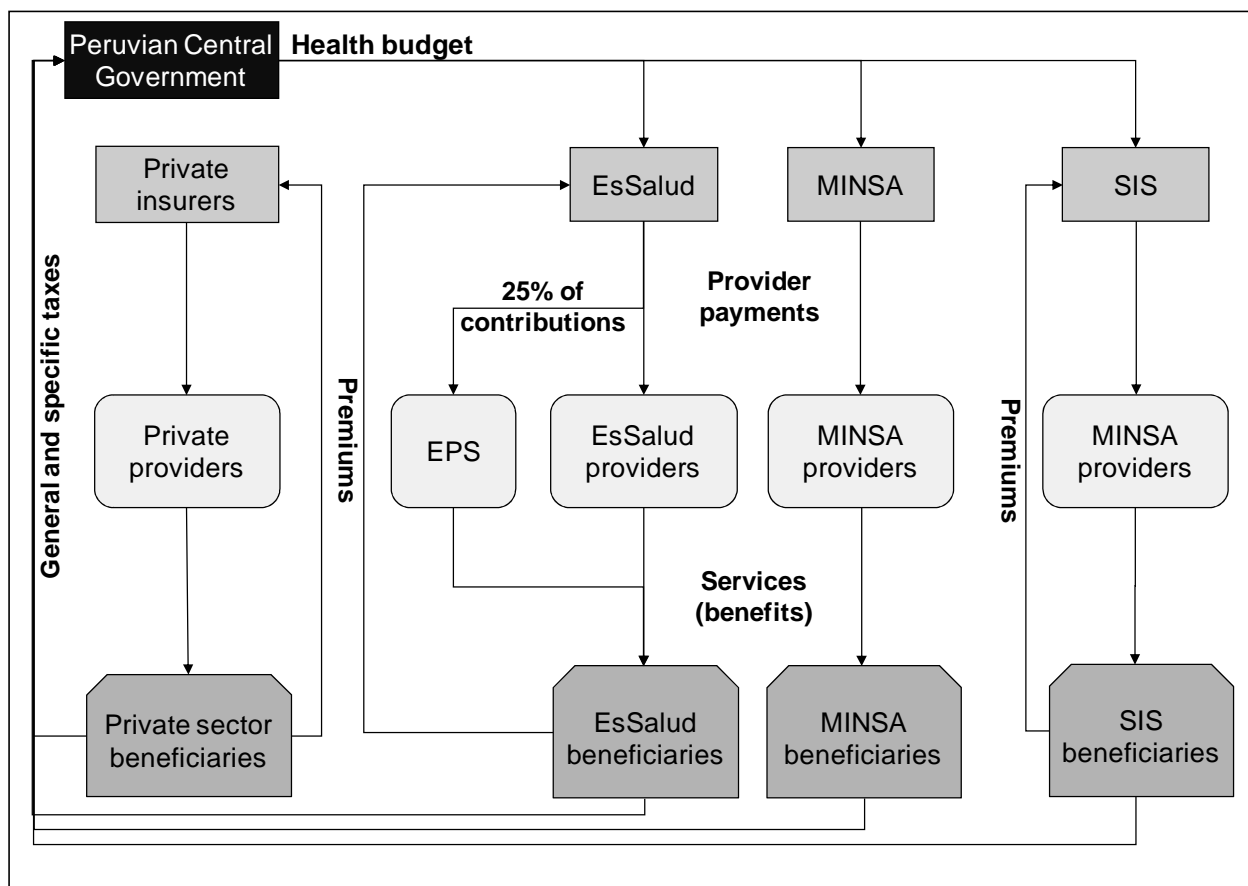
The guiding principles of the HS 20/20 project are:

- Promote institutionalization;
- Seek out and promote collaboration and strategic partnerships;
- Build on existing knowledge and focus on the concept of “better purchasing,” using an evaluation-based approach;
- Optimize intersectoral focus;
- Make decentralization work;
- Partner with the private sector;
- Develop solutions to reconstruct, develop, and transform governments;
- Reach out to the poor;
- Support developing countries’ acquisition of knowledge, capacity, and tools; and
- Exploit technological innovation for information and communication systems

1.2 SIS AND THE TECHNICAL SUPPORT PROVIDED

Figure 1 presents a simplified scheme of Peru’s current health system. A significant portion of its financing comes from central government taxes. Another portion comes from direct payments from patients to providers. A third source is insurance premiums paid by individuals and employers (in the case of social security) to private insurers, Health Service Providers (EPS), and social security (Peruvian Social Security Institute, or EsSalud). The system includes the following types of insurers or financers: the Ministry of Health (MINSA), social security (EsSalud), the Integral Health Insurance (SIS), and private insurers. They system also includes four types of healthcare providers: MINSA facilities, EsSalud facilities, private facilities, and EPS—which provide mainly low-complexity services.

FIGURE 1: THE PERUVIAN HEALTH SYSTEM



Source: Authors.

SIS is a decentralized entity under MINSA. It finances a predefined set of services for its target population. It pays providers for covered services under a fee for service system, according to a fee schedule set by MINSA. SIS is currently expanding its target population through enrollment campaigns. It is also broadening coverage to include more complex services. As SIS grows in its financing role, it has shown greater interest in a new provider payment system that better fits its mission and objectives.

The development of SIS is the main public policy expression of Peru’s universal insurance reform initiative. Currently, its mission is to increase enrollment of targeted populations.

In this context, the first goal of our technical support was to improve SIS's capacity to implement costing exercises for health problems, through an application of an observed costs methodology for 3 health problems in 3 different regions (9 facilities, including about 320 case histories). Next, we reviewed SIS's current fee schedule and proposed adjustments to the provider payment system. A final goal was to make recommendations for the creation of an Economic and Financial Analysis Unit within SIS.

Information on costs provides background helpful in defining sustainable fees for services, although other factors –like planning decisions– are important in the price-setting process as well. For the health system as a whole, fees apply to providers, social security, and consumers. Within SIS, fees mainly apply to providers.

The discussion presented in this report is specific to SIS but takes into account the global framework for resource allocation to providers within Peru's public health sector. That is, it takes into account the various financing sources, including MINSA, SIS, and the copayments that cover part of the cost of selected health interventions.

Within SIS, payments are a fee-for-service provider payment mechanism to cover variable costs, combined with a fixed fee payment for selected complex, specialized hospital-level interventions (in national hospitals and specialized facilities). SIS's fee system is organized by type of service and the providing facility's complexity level. Payments are defined as "... the maximum amount to be paid for services delivered in the providing health facility that are not financed by any other source. They are to cover the variable expense and not the medical service..."

The proposals contained in this document are proffered with the long view in mind. Each proposal can be considered separately; however, the steps are meant to be part of a continuous path. If SIS opts to implement these proposals, it should do so gradually. Therefore, we will present only one simulated case that can be implemented quickly.

This report was developed in collaboration with designated SIS personnel from the financing and operations departments as well as various decentralized offices (West Lima, Huancavelica, La Libertad and Amazonas). We set up this relationship intentionally, to facilitate the staff's internalization of the proposed ideas and methodologies and to advance SIS's economic and financial management capacity.

I.3 GENERAL OBJECTIVE

This report's objective is to analyze the conceptual and methodological background for an evaluation system and fee adjustment recommendations for SIS. The recommendations are intended to support SIS's restructuring of its provider payment system within the Peruvian public health system.

I.4 SPECIFIC OBJECTIVES

The specific objectives are:

- Provide SIS with a conceptual framework for fees and payment mechanisms as applicable to the Peruvian health system.
- Describe international experiences with payment mechanisms and systems, in terms of advantages, disadvantages, and contexts of different systems.

- Develop methodological proposals for SIS to undertake in the future, along with a timeline and prerequisites for each.
- Apply the methodology to a proposal and analyze gaps between current fees and the simulated payment mechanism.

I.5 STRUCTURE OF THE REPORT

This report is organized into 5 chapters. Chapter 2 presents a conceptual framework for allocating health resources as relevant to Peru's current health system and SIS, including common problems and solutions. It also provides a general description of international experiences and lessons learned regarding provider payment mechanisms from countries with more advanced health reforms.

Chapter 3 presents a diagnostic study of SIS's current resource allocation and use, with the goal of establishing how the system distributes its resources, what results these resources produce, and who receives said resources. Finally, we explore the level of care at which resources are concentrated in order to make recommendations for these priority areas.

Chapter 4 presents our proposals for SIS. These recommendations are consecutive, that is, one cannot be initiated until the previous is complete. Therefore, these represent long-term strategies, although SIS can begin some applications in the short-term. This chapter also describes attributes of a good payment system and simulates alternative systems, using SIS data.

Finally, Chapter 5 summarizes our conclusions and recommendations based on the data presented in the previous chapters.

2. PUBLIC SECTOR RESOURCE ALLOCATION CONCEPTUAL FRAMEWORK

This chapter presents a conceptual framework for allocating health resources. The chapter highlights concepts relevant to Peru's current health system and SIS in particular, rather than providing an exhaustive theoretical framework.

For clarity, Table I defines some of the technical terms used in this report.

TABLE I: GLOSSARY OF TECHNICAL TERMS

Term	Definition	Example
Health resource allocation	Manner in which health sector resources are distributed to respond to health needs	Allocation of financial resources according to historical budgets for territorial health offices
Cost	Economic value of the resources used in producing a good or service	The cost of a delivery is \$1,000
Unit cost	Total cost divided by the quantity produced over a given period	The unit cost of a hospital admission is \$500
Standard cost	Expected cost, given ideal conditions and production efficiency	The standard cost of a physician visit is \$20 for 20 minutes of the physician's time
Observed cost	Average observed cost of resources used as measured in-situ with appropriate tools	The observed cost for treating acute cholecystitis among a group of facilities is \$700
Fixed cost	Cost that does not vary according to quantity produced; will not vary in the short term	Cost of renting a site for a vaccine campaign
Variable cost	Cost that varies according to quantity produced; may vary in the short term	Cost of syringes for a vaccine campaign
Total cost	Fixed cost plus variable cost	Sum of all costs for the vaccine campaign, including rent for the site, nursing salaries, syringes, etc.
Installed capacity	Fixed assets, technology, and workforce available in a facility or production center	The buildings, machines, equipment, and salaried personnel in Cayetano Heredia Hospital
Supply	Quantity of goods or services that providers are willing to supply for the market price	A health center would produce 200 visits if the co-pay is \$13
Demand	Quantity of a good or service that individuals want to consume given their budgetary restrictions	If the price of a visit is \$13, demand would be 200 visits

TABLE I: GLOSSARY OF TECHNICAL TERMS

Term	Definition	Example
Access to health services	A population's economic, geographic, legal, cultural, or organizational opportunity to receive a health service	Rural populations face geographic barriers to access, so the government implements rural posts
Incentives	Mechanism to induce individuals or entities to adopt a given behavior	Major increase in fees for births induce hospitals to screen expectant mothers for need for hospital delivery
Price	Monetary value for which a good or service is bought and sold	Price of medications
Provider fee	Value reimbursed by the funding source for a provider's product or service	An office visit costs \$7
User fee	Value that a provider charges for delivering a good or service, implying a co-payment for the user	An office visit is reimbursed at \$5 with copayment of \$2
Payment mechanism	Form in which the funder monetarily reimburses the health provider	Capitated payments for primary care
Payment system	Set of payment mechanisms that a funder uses to reimburse health providers	Primary care services are reimbursed per capita while secondary- and tertiary-level services are fee-for-service, according to the global budget
Monopoly	Market characterized by a single supplier of a given good or service	The only hospital in a province
Fee for service	Payment mechanism that reimburses per activity carried out	The health center receives \$2 per dental extraction
Fee per day	Payment mechanism that reimburses a set amount per day	A hospital receives \$700 per day, regardless of its activity level
Fee per patient	Payment mechanism that reimburses a set amount per patient seen	A hospital receives \$100 per patient admitted
Capitated payment	Fixed payment per person in the population for whom the provider is responsible	The southern health region receives \$50 per enrolled person in its territory
Risk-adjusted capitation	Payment per person in a population, adjusted for the population's characteristics	A health region receives \$65 per man over the age of 65 and \$55 per woman of childbearing age
Prospective payment	Payment for expected activity	Cost of a hospital's expected case mix
Retrospective payment	Payment for completed activity	Cost of a hospital's installed capacity
Mixed payments	Combination of prospective and retrospective payments	Calculated average of the installed capacity and case mix for a hospital
Budget	Global projected and planned spending	MINSA's 2008 budget is \$3500 million

TABLE I: GLOSSARY OF TECHNICAL TERMS

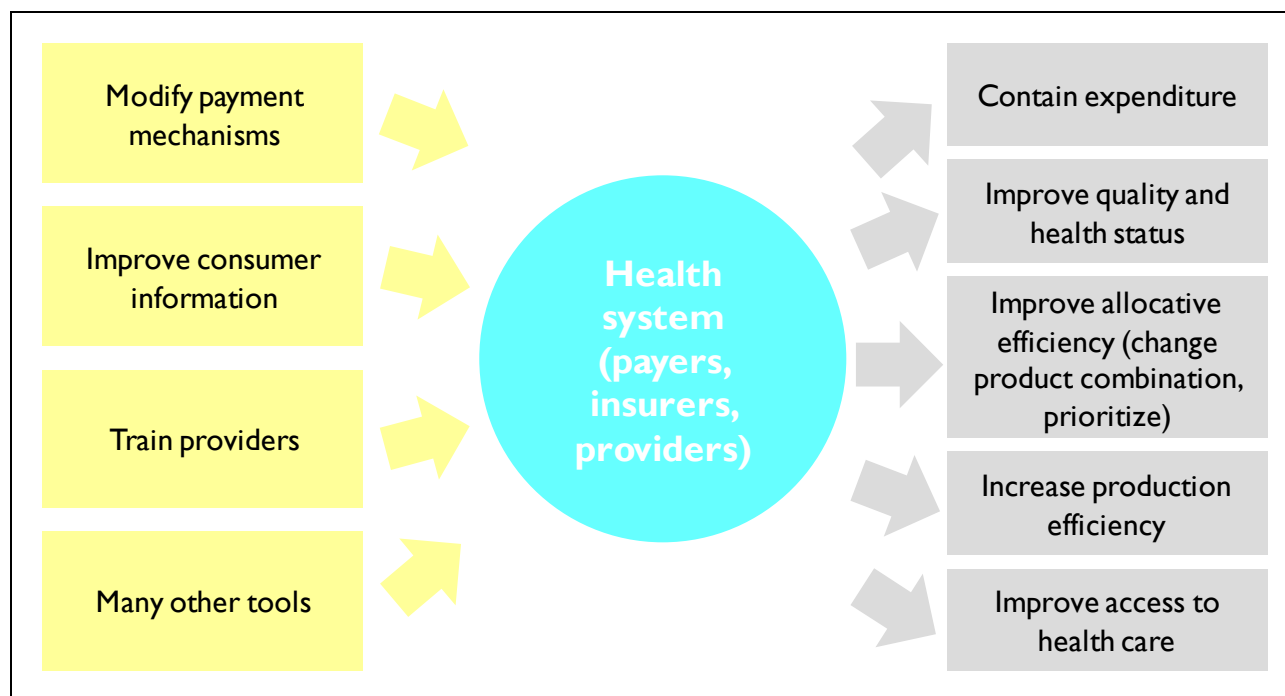
Term	Definition	Example
Asymmetric information	Unequal distribution of information available to providers vs. users of a health good or service. Generally, one agent has more information about certain characteristics of the good or service.	The physician proposes procedures and treatments, and the patient has no way of comparing their relative benefits
Moral hazard	Opportunistic behavior resulting in an excess demand for health services that occurs when users do not directly and immediately assume costs of care.	The user increases consumption of health exams after obtaining insurance
Adverse selection	Opportunistic behavior that emerges when one party has private information that negatively affects the other party in a contract, resulting in expected gains (or losses) that are greater (or less) than expected costs (income)	The provider benefits from choosing users that pose the lowest expected costs
DRG– Diagnosis-Related Groups	Categories of health conditions for hospitalized patients expected to use similar levels of resources	A hospital has a case mix index of 1.5
DCG– Diagnosis-Cost Groups	Diagnostic groups adjusted for demographic characteristics with similar expected levels of future medical needs and costs	The population group of women aged 40 to 44 hospitalized with cholecystitis has an expected cost index of 3
ACG– Ambulatory Cost Groups	Similar to DCGs, but specific to ambulatory care	The population group of men aged 60 to 64 with hypertension has an expected cost index of 3.5

Source: Authors.

2.1 FEES AND PAYMENT MECHANISMS

Health systems pursue many objectives, including improved health status, equitable access to quality care, and optimal (i.e. efficient) investment of resources. By the same token, many tools are available for achieving these objectives, including resource allocation mechanisms.

FIGURE 2: HEALTH POLICY OBJECTIVES AND TOOLS



Source: Bitrán et al, 2004.

Producing health services requires resource allocation mechanisms that promote cost containment and to promote efficiency with equity. This is the reason behind the vast international research from both the academic and institutional perspective. Here we will present some state-of-the-art mechanisms that have emerged from this research, that we believe meet SIS's needs.

A first point to keep in mind is that when planning mechanisms with health economic incentives, in the public sector, even well-planned efficiency incentives will become weaker by the time they reach the provider (Ibern et al, 2007). In fact, a contract, program, or agreement between the public provider and public financier will reflect their willingness to make defined resource allocation explicit. However, it will not effectively transfer risk, since the public sector is the residual creditor for the health system. In a public sector context and public property, the public financier ultimately insures funding, according to budgetary restrictions. Hence, the provider knows how much money it stands to receive in a year, and therefore financing mechanisms associated with periodic transfers will weaken its incentives. For Peru, MINSA sets the budget and SIS must adjust accordingly. From the outset, the provider knows the amount budgeted for the year and the amount of transfers from SIS and MINSA to expect (plus income for other sources), and adjusts its spending accordingly. So, even though SIS has a fixed and known fee schedule for all its providers, this system does not have the influence that one might expect.

The role of a payment system in a public context, such as SIS, is to allocate resources optimally, for the insurer, the provider, and the regulatory entity, in this case, MINSA. That is, it should ensure adequate financing of incurred costs for services covered. This requires a health planning process based on real data that goes beyond the supply of and demand for health care services relationship.

Therefore, it is important to keep in mind the non-market context in which public health institutions operate, especially the providers financed by SIS in Peru, in which the payment system does not operate in the same way as prices (fees) in a competitive market. In a competitive market, prices guide supply

and demand decisions. In the public health sector, the payment system must indicate the target services, based on MINSA's health policies and expected costs for each provider, which in part reflect planning for installed capacity. Thus, the health planning process must consider supply decisions, capital increases, technology updates, and covered services at the same time. These decisions fall outside the scope of payment mechanisms. Policy decisions then, clearly determine the supply of health services before resources are allocated, and the financing system must respond to these realities.

As detailed below, the international experience with these issues has evolved away from systems that relate performed activities with incurred costs. Instead, mixed payment systems are becoming more common, combining prospective and retrospective features. The retrospective elements mainly represent installed capacity for supply (buildings, equipment, etc.). Prospective elements represent the impact on health status that those facilities are capable of producing with their planned capacity for their assigned population's needs. Peru has an installed supply that must be recognized and financed. However, this supply can reach greater efficiency, if given adequate incentives.

In the public health sector, a financier-insurer like SIS has inarguable advantages in terms of pooling risks for its target population. However, it also hides the real cost of care from users, which inhibits them from making decisions based on optimal information, as would be economically desirable. In effect, in a competitive market, final prices are linked to observed costs and demands. In health, there are no prices, and insurers like SIS carry out a single purchasing function. Because the consumer (user) does not see the costs directly, a collaborative contract among public providers and public insurers is needed to guarantee the best health value for the planned or budgeted expenditure, which does not necessarily mean a greater production of services.

Two other factors are relevant to health resource allocation, for the health sector in general and for Peru in particular. Problems with public provision of care arise where there is only one provider in a given territory, as happens with the regional hospitals and primary care facilities. Although it is desirable that such entities function as a natural, publicly subsidized monopoly, it gives rise to problems like adverse selection and moral hazard that limit its efficiency. In Peru, as in many other countries, it is not unusual to find a single provider for a geographic area, especially in the regions. The fee system, therefore, must be carefully designed to mitigate rather than encourage adverse selection and moral hazard in these cases.

Another general problem in health care is that the product is not homogeneous, which is a requirement for the market to function efficiently. This heterogeneity comes from patients being heterogeneous and the treating physician deciding on a case-by-case basis which procedures or treatments to use based on asymmetric information. Furthermore, the government likely makes errors when estimating expected costs as it lacks complete knowledge of the productive process and real costs.

Newhouse developed a theoretical response to this problem of non-market health systems. The "Yardstick Competition" concept (Newhouse, 1996) involves internal competition mechanisms among providers (hospitals) with similar capacities, with financial incentives. Pilot programs such as the one in Cataluña (Ibern, Ortún) and theoretical studies in Chile (Castro et. al., 2006; Cid, 2007) have applied these concepts. In Peru, yardstick competition would require grouping homogenous hospitals, independent of geographic location, with common parameters for comparison. Then, administrators would measure their comparative health problems, that is, the types and costs of similar activities performed by facilities that should have more or less the same level of productivity. They would then use the indicators yielded from these comparisons to allocate part of the resources.

Providers at different levels of care for an assigned territorial population also need transfer mechanisms to support intra-network integration. That is, multiple providers within a population area or health region must coordinate with one another to maximize efficiency and ensure access to care for its population. This concept is called integration of care. Incentives are required to support such integration. The concept has been developed in Europe (Ortún, Ibern, Lopez, et. al.), and particularly in Spain. These authors have proposed a risk-adjusted capitated payment system, in which integration of care is induced via a morbidity-adjusted, capitated-spending ceiling for the set of providers within a given area. The ceiling is the maximum expected spending for an area in which citizens will receive a set of health services, and whose consumption represents a financial risk.

For this incentive to support integration of care, there must be a responsible entity over the health territory with sufficient scope and power to coordinate effectively. The existence of DIRESAS is an advantage in this sense. However, Peru's global decentralization process may affect the health care network. It is important that any changes take the need for integration of care into consideration.

Even after adjusting these concepts to fit Peru's circumstances, there will still be justifiable cost differences across providers. That is, there will be cases or exceptions that can be treated differently, for example, traveling health care teams or emergency cases.

To design a payment system, one must understand the reasons for cost variations such as: production volume, supply costs (due to distance, accessibility, and cost of transport, for example), case mix or complexity of cases, intensity of productive resource use, efficiency of a product, and non-homogeneous providers. The financing mechanism must address all of these issues. In Peru, location is clearly an important factor in justified variability of costs among providers, and therefore calculations must include corrections for this variable.

On an international level, various supporting tools have been implemented to manage the necessary information and calculations for a payment system. These tools generally measure productivity and evaluate risks, classifying care or morbidity as associated with costs. Examples are Diagnosis-Related Groups (DRGs), Cost-Related Groups (CRG), Diagnosis Cost Groups (DCG), and Ambulatory Cost Groups (ACG). A lesson learned is that tools should be evaluated and defined specifically for each case or country. These classification systems depend on information systems and technological support capacity. Furthermore, to apply these tools, the administration must have good data on costs; integrated information systems based on a minimum basic data set (MBDS), and adequate coding systems (for diagnostic services, procedures, medications, supplies, etc.). Therefore, when a system such as SIS prepares to apply these tools, it should start by mounting adequate information systems and/or evaluating the capacity of existing systems. Implementing a payment system and associated tools is by nature a long-term process, taking several years. Various sequential steps lead to the projected goals, including the important step of improving information systems.

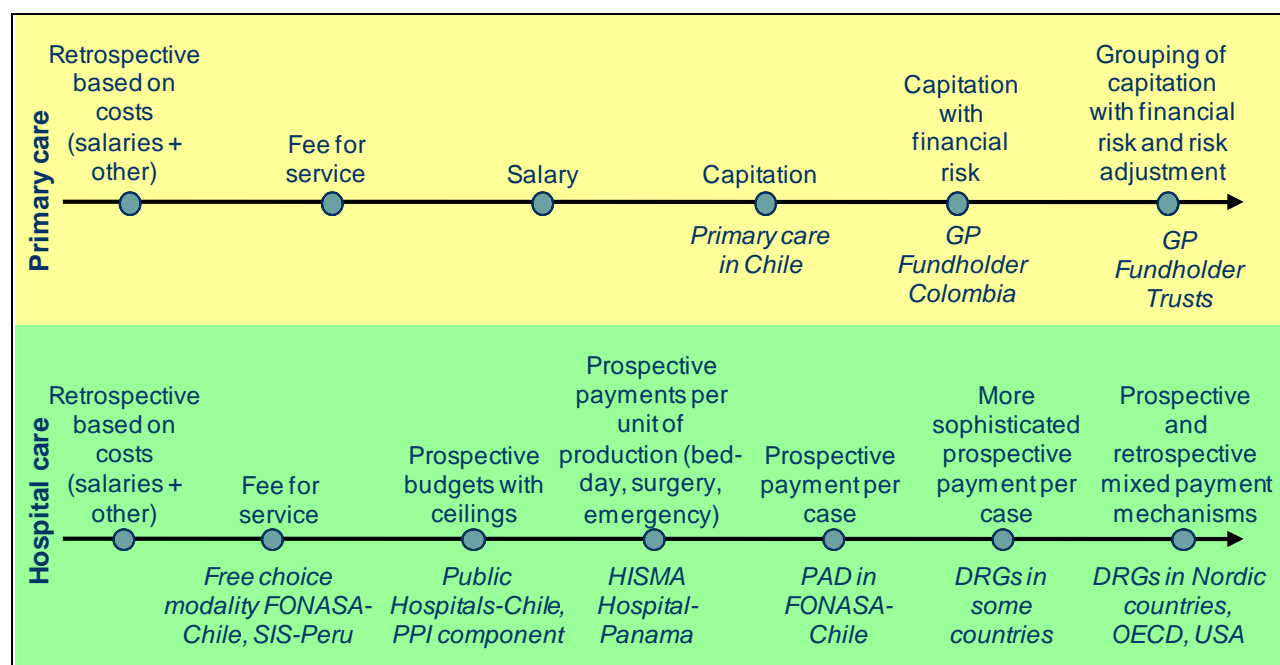
Finally, a system must decide if the tools and payment system are to be used to adjust the budgets and allocation, to establish contracts and payment mechanisms, or to do both over time. In the last case, it must then define the stages of the process with a timeline for gradual implementation. For Peru, this implies reflecting and deciding on the financing role and responsibilities of both MINSAs and SIS, as MINSAs currently formulates the budget for provider payments while SIS finances part of these payments.

2.2 INTERNATIONAL EXPERIENCE WITH PAYMENT MECHANISMS

The following overview of payment systems derives from international experience on implementing and evaluating these reforms. It is important to take advantage of lessons learned from the existing transfer mechanism and health resource reform projects.

In the past 30 years, there have been significant worldwide changes in provider payment mechanisms for both ambulatory and hospital care. Countries are moving away from the historical cost reimbursement (retrospective payments based on estimated costs) in favor of unit payments for sets of services. Furthermore, there is growing worldwide interest in mixed payment systems, which combine prospective and retrospective features in order to exploit the positive traits of each mechanism and mitigate their weaknesses.

FIGURE 3: HISTORICAL EVOLUTION OF PAYMENT SYSTEMS WORLDWIDE



Source: Adapted from Bitrán et al, 2004.

Payment mechanisms that seek to reimburse providers for their production costs must also induce them to produce needed services at minimal cost, at acceptable quality levels, and without discriminating against patients for non-medical reasons. Providers typically stray from one or more of these objectives. For example, sometimes a provider will let quality deteriorate to minimize efforts or costs, thereby increasing its profit margin. Providers may also favor patients who pay directly or through an insurer (such as SIS, for example), to the detriment of patients who do not increase the provider's income.

Payment methods can help prevent some of these behaviors, but providers commonly respond by acting out another undesirable behavior. For example, to address increasing costs in a fee-for-service system, some payers have resorted to capitation to contain costs. This payment method allows them to transfer part of the risk to the provider, who must subsist on a limited budget per beneficiary. However, under a simple capitated regime, the provider will typically under-provide care to limit costs, as its income is fixed. Under-provision results in limited access and poorer health status. Therefore, it

is crucial to compute expected per capita costs more accurately, using risk-adjusted formulas, and to monitor provider performance.

The above example illustrates a common theme in the payment mechanisms field: performance variables such as price, quality, quantity, and access are all more or less under the provider's control. When the payer attempts to control one of the variables, the provider responds by adjusting another. This is known as the "law of communicating vessels" (Bitrán et al., 2004). If the payer tries to reduce or limit the price of care, the provider increases quantity; if the payer limits the quantity and the price, the provider reduces quality or access, etc.

Financing policies have sought to limit this type of provider behavior, by combining various payment mechanisms to block the providers' strategic game. In some cases, this complicates the financing system and leads to even more convoluted provider behaviors motivated by pecuniary or other objectives.

FIGURE 4: LAW OF COMMUNICATING VESSELS IN HEALTH PROVIDER FINANCING

$$\underbrace{[(\text{Price}) \times (\text{Quantity}) \times (\text{Quality})]}_{\text{Provision expenditure}} = \underbrace{[(\text{Unit Cost}) \times (\text{Quantity}) \times (\text{Quality})]}_{\text{Provider income}} + \text{Profit}$$

Source: Authors.

Ellis (2001) noted that each payment mechanism carries certain incentives. These incentives affect cost of services, quality of care, and risk selection, that is, the provider's disposition to accept more or less complicated cases. The following figure summarizes the incentive associated with each payment mechanism.

Salary is the main payment mechanism for primary care in several countries, including Greece, Finland, Canada, Iceland, Norway (mix of salaries and fee-for-service), Portugal, Spain (with some capitation), Sweden (with some capitation), and Turkey.

Capitations, usually demographic risk-adjusted, are used for general practitioners or “family physicians” in Italy (combined with fee-for-service mechanisms), United Kingdom (with fee-for-service), Ireland, Austria (with fee-for-service), Holland, and Denmark.

Fee-for-service, with periodic fee negotiations, is the primary mechanism in the remaining European countries. In some cases it is combined with capitation, as in Holland and Denmark.

TABLE 2: PRIMARY CARE PAYMENT MECHANISMS IN DEVELOPED COUNTRIES

Model	Country	% independent	Capitation	Fee for service	Salary	Gatekeeping
SS	Belgium	97	-	S	-	-
SS	France	97	-	S	-	-
SS	Germany	100	-	S	-	-
SS	Holland	93	S	S	-	S
MF	Austria	99	-	S	-	-
MF	Greece	30	-	(S)	S	-
MF	Switzerland	99	-	S	-	-
MF	United States	-	-	-	-	-
LT	Canada	Mostly	-	S	(S)	S
LT	Denmark	100	S	S	-	S
LT	Finland	2	-	-	S	-
LT	Italy	98	S	-	-	S
LT	Sweden	1	-	-	S	-
CT	Australia	Mostly	-	S	(S)	S
CT	Ireland	1	S	-	-	S
CT	New Zealand	Mostly	-	S	-	S
CT	Norway	58	-	S	(S)	S
CT	Portugal	1	-	-	S	S
CT	Spain	4	-	-	S	S
CT	United Kingdom	99	S	(S)	(S)	S

SS= Social Security; MF= Mixed Financing; CT=Central Taxes.; LT= Local Taxes; Gatekeeper=regulator of access to specialists

Source: Williams, 2002, Adapted from Saltman, Busse and Mossialos (European Observatory 2002).

Table 2 also shows other characteristics of primary care physicians. For instance, in most cases, they are independent, and in many cases, especially in systems financed by general centralized taxes (CT) and local taxes (LT), these physicians are gatekeepers to specialists.

The capitations are usually adjusted. The main risk adjusters are sex and age, but other variables are common as well, including socio-demographic variables such as geographic location, ethnic group, income, and education. Other models include health status variables such as morbidity.

TABLE 3: RISK ADJUSTERS FOR CAPITATION FORMULAS IN COUNTRIES WITH CENTRAL TAX FUNDING SYSTEMS

Country	Risk adjusters
Australia	Age, sex, ethnic group, indigence, mortality, education, rural/urban
Canada	Age, sex, socioeconomic status, ethnicity, distance
Denmark	Age, number of children in single-parent households, number of rented apartments, employment status, education, immigrant status, social status, elderly living alone
England	Age, mortality, morbidity, employment status, elderly living alone, ethnic background, socioeconomic status
Finland	Age, disability, morbidity, archipelago, distance
Island	None
Ireland	Not applicable
Italy	Age, sex, mortality, morbidity, utilization
New Zealand	Age, sex, welfare status, ethnicity, rural/urban
Norway	Age, sex, mortality, elderly living alone, marital status
Portugal	Based mainly on historical background; age, relative burden of disease (diabetes, hypertension, tuberculosis, AIDS)
Spain	Percentage of population older than 65, region
Sweden	Age, sex, marital status, employment status, occupation, house ownership, high utilization

Source: Busse R., in turn taken from Rice y Smith 2002; Mapelli 1999; Järvelin Rico, and Cedtani 2002; Vilgarda, Krasnik, and Vrangbaek 2001.

Some countries with health social security systems also use capitated payments, with risk-adjusted compensations in their sickness indices or health insurance plans, which have evolved significantly.

TABLE 4: RISK ADJUSTERS FOR CAPITATION FORMULAS IN COUNTRIES WITH SOCIAL SECURITY FUNDING

Country	Implementation year	Risk adjusters
Austria	None	-
Belgium	1995	Age, sex, social security status, employment status, mortality, urbanization, income
	2006	Age, sex, social security status, employment status, mortality, urbanization, income, diagnosis, pharmaceutical cost groups
France	None	-
Germany	1994/1995	Age, sex, disability pension
	2002	Age, sex, disability pension, participation in Disease Management Program
Japan	None	-
Rep. of Korea	None	-
Luxemburg	None	-
Holland	1993	Age, sex
	1996	Age, sex, region, disability
	1999	Age, sex, social security/employment status, residence region
	2002	Age, sex, social security/employment status, residence region, diagnosis, pharmaceutical cost groups
Switzerland	1994	Age, sex

Source: Busse R., in turn adapted from Busse, Saltman, and Dubois 2004 and updated with data from the Risk Adjustment Network (RAN).

2.2.2 PAYMENTS TO HOSPITALS

Payment mechanisms for hospital care are also heterogeneous. However, in Western Europe, the most common system is a global budget based on actual provider production. Case-mix based systems are becoming more common in countries including England, Belgium, Germany, Norway, Finland, Australia, Spain, Portugal, and Holland, using measuring tools like DRGs (Ibern et. al, 2007).

Various countries have adapted the original United States Health Care Financing Agency (HCFA) DRGs to their own realities. England has HRGs (Health-related groups), which are an adaptation of the DRGs; Norway has NorDRGs; Finland has FindDRGs; and Belgium uses and studies AP-DRGs. Spain (Cataluña) and Portugal also use DRGs, as does Australia (Victoria) (Ibern et al, 2007). The historical budget has virtually disappeared in these countries. In transitioning economies (such as Hungary), fee-for-service systems are common, and many of these countries still finance their hospitals using historical budgets (Bitrán et al, 2004).

In sum, the following countries use some type of DRG system for financing: Australia, Great Britain, the United States, Austria, Belgium, the Czech Republic, Finland, France, Germany, Italy, Norway, Portugal, Cataluña (Spain), and Sweden.

TABLE 5: HOSPITAL PAYMENT SYSTEMS IN DEVELOPED COUNTRIES

Country	Prospective budgets	Item budgets	Global budget	Per day	Per case	Per service
Austria	75%	-	-	30%	70%	-
Belgium	Yes	-	-	Non-medical	-	Medical
Canada	No	-	Yes	Yes	-	-
Denmark	Yes	-	Yes	-	-	-
Finland	Yes	-	-	-	Some	Mostly
France	Yes	-	Yes	Yes	-	-
Germany	Yes	-	-	-	Since 2002	-
Greece	30%	70%	-	30%	-	-
Ireland	Yes	-	Yes	-	-	-
Italy	Yes	-	-	-	Yes	-
Holland	Yes	-	Yes	-	-	-
New Zealand	Yes	-	Yes	-	-	-
Norway	Yes	-	50%	-	50%	-
Portugal	3%	-	Yes	-	In process	-
Spain	Yes	-	-	Weighted	-	-
Sweden	Yes	-	Some	-	Yes	-
Switzerland	Yes	-	Yes	Yes	-	-

Source: Williams, 2002, in turn from European Observatory on Health Care Systems.

In this table, the authors refer to “per-case payments” as DRG-based payments in which hospitals are essentially paid according to the illnesses that they treat (case mix). This system is increasingly common in Europe. As shown, these countries have generally abandoned the historical budget (or retrospective payments). Fee-for-service mechanisms are also uncommon. Case mix payments are generally combined with other payment methods, often prospective budgets and global budgets. The table presents 2002 data and there have been some changes since, including changes to part of the system, such as in Spain as well as Denmark as mentioned above.

Case mix payments are on the rise in Eastern Europe as well, generally combined with other methods.

TABLE 6: PAYMENT SYSTEMS FOR HOSPITALS IN EASTERN EUROPEAN COUNTRIES

Country	Budgets	Per day	Per case
Bulgaria	Developing	-	Developing
Croatia	-	Yes	-
Czech Republic	Yes	-	Yes
Estonia	-	Yes	-
Hungary	-	-	Yes
Lithuania	-	Yes	Developing
Poland	-	-	Yes
Rumania	-	-	Developing
Slovakia	-	Yes	-
Slovenia	-	Yes	-

Source: Williams, 2002, McKee, M and Healy, J.

2.2.3 TERRITORIAL FINANCING OF POPULATIONS

To motivate integration of care, the system should have an entity capable of allocating resources that considers a territorial spending ceiling for providers. This can take the form of an expected budget based on risk-adjusted capitation.

In this context, integration of care means emphasizing the population's health needs, adjusting available services to population's needs, by coordinating and integrating services among the levels of care. This implies integrating all health care services, from health promotion and prevention to curative care and rehabilitation, within the capitated area (Agustí Fabr , et. al., 2006).

The objectives of such a policy are to provide equitable access to health services, improve efficiency by coordinating management, and ensure continuity of care. The policy should foster a spirit of collaboration and common purpose among all levels of care. Another objective is to improve the quality of care provided. The financier and provider should define objectives to guarantee quality of care and improved health for the population. These objectives should be established in some type of contract and thus be monitored, in such a way that the provider must supply a given intervention or meet a given goal for a region. Furthermore, as noted above, the system should create a coordinated network of services that provide continuous care among all levels for the target population. Such a system requires using the economies of scale, minimizing transaction costs, and that administrative synchronization prevents duplication of services. In addition, this type of financing system distributes responsibility among all the agents in a territory, passing along a certain level of risk, as the group shares a fixed, predetermined budget (Agust  Fabr , et al, 2006).

One applied example of territorial capitation with an expected spending ceiling is a pilot project initiated in Spain a few years ago. The project covers five territorial zones in Catalu a, including 7% of the population and a significant proportion of providers at various levels of care, as seen in Table 7. Providers are 28 BCA, 6 acute hospitals, and 21 health centers, including 15 separate entities.

TABLE 7: AREAS AND PROVIDERS IN CATALUÑA'S PILOT TERRITORIAL CAPITATION PROJECT

Area of Cataluña	Basic health areas	Acute Hospitals	Socio-health centers	Mental Health Centers	Number of different providers	Target population
Osona	10	1	2	2	8	128,927
Altebrat	4	1	2	2	2	41,199
Alt Maresme/Selva Marítima	8	2	4	2	2	160,462
La Cerdanya	1	1	1	2	1	13,350
Baix Emporda	5	1	1	3	2	100,567
Total	28	6	10	11	15	444,505

Source: Augustí, Puig, Brosa, Argimon, 2006.

A key component of a well-functioning mechanism is a good information system that links providers, financiers, and users throughout the process of care provision. Information systems should provide data on costs, quality, results, etc. This data can facilitate adequate calculations, improve transparency, and support monitoring and evaluation systems.

Finally, payment mechanisms should induce an organizational structure that facilitates alliances among the government, management, medical entities and other providers to achieve health objectives.

3. BACKGROUND ON SIS

The public health system in Peru is organized territorially into health care networks. There are 7,142 facilities organized into 34 Regional Health Offices (DIREAS), each managing facilities at all three levels of care.

SIS reimburses a fraction of the variable cost for services provided. The difference generally corresponds to human resources and capital costs. MINSA or user copayments usually finance the remaining costs. SIS's funding constitutes a public supply-side subsidy for individuals who cannot pay to access health care.

MINSA issues norms regarding fees, such as fee policies, catalogs of services, relative value units (RVUs), and copayment schedules. In Peru, the administration has experience with calculating standard costs, defined as the planned costs to cover the prioritized list of health problems. However, standard costs are measured assuming efficiency based on pre-determined conditions. This type of cost calculation is useful for developing indices to compare among providers. Observed costs, on the other hand, are based on the costs actually incurred in providing care, and the representativeness of this value will depend on the sample used to develop the computations.

It is natural for there to be some degree of conflict between the financier and the provider regarding whether the transfers are truly covering costs. However, when this conflict reflects probable significant gaps between costs and fees, the problem should be addressed.

3.1 RELEVANT DATA ON SIS

This section presents some data on SIS to illustrate its current situation.

3.1.1 BRIEF DESCRIPTION OF SIS'S DATA

According to the data in Table 8, SIS transfers to providers in 2006 totaled 266 million soles, representing a 6.1% increase from the prior year. From 2002 to 2006, transfers increased by about 100 million soles. Transfers peaked in 2004 at 280 million, even though quantity of services was at its lowest that same year, causing the unit value of each service to double from 11 soles the previous year to 21.5 soles.

TABLE 8: SERVICES AND TRANSFERS FROM SIS, 2002 – 2006 (TRANSFERS IN SOLES FOR EACH YEAR)

Indicators	2002	2003	2004	2005	2006
Services	15,170,607	18,601,314	13,068,769	14,915,217	17,430,217
Transfers	166,229,736	207,294,102	280,366,257	251,053,416	266,481,036
Expenditure per service	11.0	11.1	21.5	16.8	15.3
Growth rate		2003/2002	2004/2003	2005/2004	2006/2005
Services		22.6%	-29.7%	14.1%	16.9%
Transfers		24.7%	35.3%	-10.5%	6.1%

Source: SIS statistics, 2006.

The vast majority of SIS beneficiaries are affiliated to plans that cover children and youth (adolescents); in fact, these two groups account for 95% of beneficiaries.

Furthermore, in 2006, 63% of affiliates were from the first two income quintiles, increasing to 67% in 2007. Table 9 shows the 2006 data.

TABLE 9: SIS BENEFICIARIES, BY BENEFITS PLAN AND POVERTY QUINTILE, 2006

Income quintiles	Total Peru	% per quintile	Plan A: 0-4 years	% per quintile	Plan B: 5-17 years	% per quintile	Plan C: Pregnant	% per quintile	Plan E: Targeted adults	% per quintile
I	3,713,253	35.9%	955,515	35.4%	2,598,585	36.6%	54,396	27.7%	104,757	29.4%
II	2,800,122	27.1%	748,565	27.7%	1,904,880	26.9%	53,055	27.0%	93,622	26.3%
III	1,883,829	18.2%	491,138	18.2%	1,280,813	18.1%	41,284	21.0%	70,594	19.8%
IV	1,157,401	11.2%	299,532	11.1%	773,133	10.9%	27,820	14.1%	56,916	16.0%
V	792,326	7.7%	207,923	7.7%	534,148	7.5%	20,147	10.2%	30,108	8.5%
Total	10,346,931	100%	2,702,673	100%	7,091,559	100%	196,702	100%	355,997	100%
% per plan	100%		26%		69%		2%		3%	

Source: Authors.

Table 10 shows that 68% of SIS-funded health care benefits the maternal and infant population covered by SIS Plans A and C, which represent 28% of affiliates (Table 8). The distribution of income levels among plans is more unequal, with poverty concentrated in plans A and B. That is, in plans covering children and adolescents up to the age of 17. In other plans, even when more than 50% of affiliates are within the first two poverty quintiles, the concentration of the poorest groups remains lower than the national average (63%).

TABLE 10: SIS FINANCED SERVICES, BY BENEFITS PLAN AND INCOME QUINTILE, 2006

Income quintiles	Total Peru	% per quintile	Plan A: 0-4 years		Plan B: 5-17 years		Plan C: Pregnant		Plan D and E: Targeted and emergency adults	
			% per quintile	% per quintile	% per quintile	% per quintile	% per quintile	% per quintile		
I	6,499,727	37.6%	2,964,167	37.3%	2,435,085	45.4%	1,040,417	27.3%	60,058	33.4%
II	4,558,202	26.4%	2,184,520	27.5%	1,340,485	25.0%	996,727	26.2%	36,470	20.3%
III	2,959,517	17.1%	1,364,070	17.2%	762,379	14.2%	794,592	20.9%	38,476	21.4%
IV	1,795,366	10.4%	781,628	9.8%	449,767	8.4%	542,184	14.2%	21,787	12.1%
V	1,481,554	8.6%	647,210	8.1%	375,145	7.0%	436,313	11.5%	22,886	12.7%
Total	17,294,366	100.0%	7,941,595	100.0%	5,362,861	100.0%	3,810,233	100.0%	179,677	100.0%
% per plan	100%		46%		31%		22%		1%	

Source: Authors using SIS statistics, 2006.

In addition, 46% of SIS-funded services benefit children under the age of 4, who are beneficiaries of Plan A. Thirty-one per cent of SIS-funded services benefit children and adolescents, that is, persons between the ages of 5 and 18, beneficiaries of Plan B. Finally, 22% of services benefit expectant mothers, beneficiaries of Plan C. In other words, 99% of SIS-funded care is delivered to children, adolescents, and mothers.¹

Sixty-two percent of SIS-funded services are physical exams at primary or secondary outpatient level care.

TABLE 11: SIS FUNDED CARE, BY TYPE OF FACILITY AND INCOME QUINTILE, 2006

Income quintiles	Total Peru	% per quintiles	National Hospitals and		Regional and Local Hospitals		Health Centers		Health Posts	
			% per quintiles	% per quintiles	% per quintiles	% per quintiles	% per quintiles	% per quintiles		
I	6,499,727	38%	6,035	1%	174,715	16%	1,975,535	28%	4,343,442	49%
II	4,558,202	26%	19,003	5%	380,288	34%	1,802,820	26%	2,356,091	27%
III	2,959,517	17%	87,858	21%	333,461	30%	1,439,170	21%	1,099,028	12%
IV	1,795,366	10%	120,954	29%	165,126	15%	975,271	14%	534,015	6%
V	1,481,554	9%	184,707	44%	69,173	6%	750,662	11%	477,012	5%
Total	17,294,366	100%	418,557	100%	1,122,763	100%	6,943,458	100%	8,809,588	100%
% per provider			2%		6%		40%		51%	

Source: Authors using SIS statistics, 2006.

Table 11 shows that 91% of care funded partially by SIS took place in primary care health centers and posts. This represents 73% of SIS's total productive value² for 2006.

Only 8.9% of SIS-funded care was provided in hospitals. This represents 13.6% of SIS's total productive value for 2006.

About 50.6% of SIS-funded care reaches rural residents, and 21.3% of care reaches marginal urban residents. These two beneficiary groups receive 72% of care funded by SIS, representing 64.3% of total SIS spending in 2006.

¹ The other plans are Plan D: Emergency care for adults and Plan E: Targeted adult.

² Refers to the value of services financed by SIS and not to the portion financed by other sources where the main source is MINSA.

TABLE 12: SIS FUNDED CARE, BY LEVEL OF FACILITY AND BENEFITS PLAN, 2006

Urbanization	Total Peru		Plan A: 0-4 years		Plan B: 5-17 years		Plan C: Pregnant women		Plan D and E: Targeted and emergency adults	
		%		%		%		%		%
Urban	4,862,086	28.1%	2,142,866	27.0%	1,257,439	23.4%	1,395,037	36.6%	66,744	37.1%
Marginal urban	3,680,213	21.3%	1,730,852	21.8%	921,986	17.2%	989,817	26.0%	37,558	20.9%
Rural	8,752,067	50.6%	4,067,877	51.2%	3,183,436	59.4%	1,425,379	37.4%	75,375	42.0%
Total	17,294,366	100.0%	7,941,595	100.0%	5,362,861	100.0%	3,810,233	100.0%	179,677	100.0%

Source: Authors using SIS statistics, 2006.

Rural inhabitants are mainly beneficiaries of Plan B, that is, the plans covering children and adolescents 5 to 17 years old. Most of the care provided in urban areas is covered under plans targeting adults, although their impact is small in terms of the total volume of care.

About 56% of SIS spending in 2006 was concentrated on individuals in the first and second income quintiles, that is, the poorest 40% of the country's population.

Furthermore, 28.2% of SIS transfers targeted inhabitants of Lima, and 71.8% reached the rest of the country. There is significant homogeneity in the unit cost per SIS beneficiary among most health regions. The national average unit cost is 51.18 soles, with a standard deviation of 12.09 soles and a variation coefficient of 0.24. The unit cost per beneficiary in Lima is strikingly high (S/.102.27), which can be explained by the more complex care provided and the greater installed capacity in the capital.

3.2 RISKS ENTAILED IN SIS'S CURRENT PAYMENT SYSTEM

There are two main sources for financing public health providers in Peru. The arrangement involves a dual financing system. MINSA finances the fixed, and therefore the largest but most stable, portion of costs. On the other hand, SIS finances the variable cost, which is generally smaller and more flexible. However, public sector providers also have other sources of income, including payment for services from third parties (EsSalud or the private sector), copayments, and voluntary contributions from users. The duality described above can create financing problems as well as the general administration problem for the public health system.

In practice, there is a single concept of resource transfer to providers which is fees that are paid retrospectively as a "fee for service." There is a wide variety of fees (around 400 fees) for regional hospitals and support centers or health posts, but a limited range of fees for national hospitals and specialized institutes (11 fees).

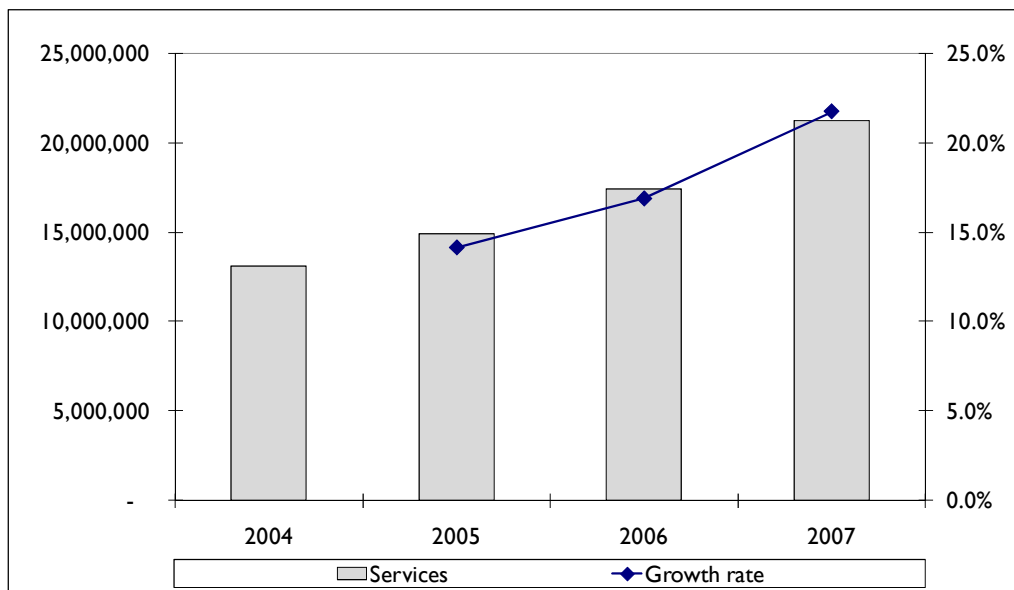
Payment systems should involve a set of payment mechanisms, as a single criterion will not represent the existing differences in ways to produce the health services and the incentives that should be in place. In Peru's current system, only the differentiation of fees by levels of care follows this guideline. Concurrently, as the system relies on fees as its sole financing mechanism, the public sector works with historical budgets broken down by DIRESA and health facility, by which both providers and SIS must function. This is a source of likely distortions, as part of the financing is based on production, which is equivalent to an allocation based on a theoretical fee for service, while another part of the financing is based on the historical budget, which also includes this (variable cost) and other services.

In addition, the lack of homogenous cost accounting systems in Peru for all relevant health facilities is a major disadvantage.

The presence of pre-existing healthcare information systems appear to be a strength. However, these existing systems must be evaluated to verify their capacity for maintaining individual information throughout the care cycle as well as regarding the validity of their records. SIS requires its providers to record all service provided, and this record is used to calculate the following month's payments. This creates two contradictory phenomena. On the one hand, the information is likely complete and up-to-date. On the other hand, there is always the risk that the provider is altering the information to obtain a larger payment. According to data reviewed, the diagnostic, procedure, and supply codes can be standardized to international codes. Such a standardized system would be advantageous when designing a new fee and payment system using diagnostic group tools to reflect case mix and morbidity.

Another significant source of pressure for SIS is that in 2008, the budget will increase by 70% to cover the population not yet enrolled. The explosive increase in services to be financed by SIS makes it even more crucial to set up provider transfer mechanisms in such a way as to contain costs and adequately finance the population's health needs. Furthermore, this will considerably increase SIS's share of spending within the public health system (from 10% today, increasing to 20% by our estimation). This shift makes communication and coordination crucial between the two institutions that manage public health financing in Peru.

FIGURE 6: GROWTH OF SIS FUNDED CARE IN RECENT YEARS



Source: Authors, based on SIS annual statistical bulletins.

In this context of explosive activity growth, it is important for the residual creditor for the public sector to keep in mind that the current payments are fee-for-service. This system risks inducing production over and above true health needs, and therefore an upward cost spiral. In addition, such a system carries the risk of adverse selection, either of patients (those that present the best fee/cost ratio) or health services (those that are most profitable rather than those that best meet health needs). This type of behavior should be prevented as it may create access problems.

Furthermore, the public provider is induced to select SIS beneficiaries vs. non-SIS beneficiaries if the fee is greater than the copayment the provider can expect to receive from a non-SIS patient. Even without a copayment, the provider may perceive that the variable cost is more beneficial for its cash flow in the short term, whereas with a fixed payment it functions only as a cash box. The same issue occurs with

prioritized services and plans, as they create an incentive to select among SIS-covered services (depending on whether the fee schedule benefits the facility). These plans do create an incentive for the facility to provide said service, which is a positive aspect.

At present, a program like SIS is necessary to ensure access to care for the poorest segment of the population. However, in the medium and long term a dual and fractured financing system as exists in Peru's public health sector can also induce fractured production of services, parallel information systems, etc. Furthermore, the impending increase in SIS beneficiaries will create a need for increased supply (fixed costs will become variable costs) and increased fixed costs. The global vision of this need can become blurred if there is no a single observer, making it difficult to coordinate and plan for health needs.

4. PAYMENT SYSTEM AND PROPOSALS FOR SIS

4.1 ATTRIBUTES OF A GOOD PAYMENT SYSTEM

International experience indicates that no single optimal payment system fits all circumstances. The need to induce health systems to perform at a high level is leading countries to implement a combination of payment mechanisms.

However, evidence shows that a good payment mechanism is necessary but insufficient to achieve health objectives and contain costs. Non-economic incentives involving planning and evaluation are also required.

The need for innovative payment methods is an ongoing issue, even for the most vanguard prospective payment systems, which require constant updating.

To induce good performance, a payment system needs reliable information and evaluation systems. The selection of a payment system depends partly on the information available.

Furthermore, experience has shown that absence of a global vision of integrated financing and payment systems results in deficiencies or undesirable behaviors within health production system. Hence, a payment system can be defined as a set of payment mechanisms that promote integration of care, equity, efficiency, and improved health status in a territorially-defined population. That is, a payment system is a set of payment mechanisms applied to different types of providers, unified under a target population. In this context, macro- and micro-allocation of resources should be differentiated in order to emphasize certain concepts, such as emphasis on equity in macro-allocation and efficiency in micro-allocation. In addition, institutional functions should be differentiated, including budgeting and payment mechanisms, for MINSA and SIS.

4.1.1 RELEVANT CHARACTERISTICS OF A GOOD PAYMENT SYSTEM

Characteristics of a good payment system have been mentioned throughout this document, including:

Risk-adjusted territorial capitation to allocate resources to populations, as a budgetary ceiling for the set of providers within the health care network: This mechanism promotes integration of care among providers at different levels, that is, adequate communication among the different levels of care, including prevention, access, referrals, and cross referrals (access within the system). Risk-adjusted capitated financing as a budgetary ceiling for the territory should reflect the health needs of the population and ensure continuity of care within the area covered.

Mixed payments for hospitals: That is, combining prospective and retrospective payments for a hospital's physical structure and case mix (complexity), in the context of a payment system based on comparison among homogenous facilities. The goal is to develop a mixed payment system based on structure, complexity, and performance. Complexity is measured through case mix indices, defined according to

observed morbidity. DRGs are an evaluation tool, and not payment mechanisms in and of themselves. They are categories of health conditions for hospitalized patients expected to use similar levels of resources. At this level, they are used to promote efficiency via competition, by comparing a given hospital to an average hospital (shadow hospital) according to comparable groups.

Risk-adjusted capitation for primary care: This model uses socio-demographic, and if possible, diagnostic data to predict health spending for a territorial population over a given period. The observed levels of resource use for a population are normalized to reflect the population's health. Future payments are adjusted to reflect expected resource use.

Special mixed payments for other areas, for example: Traveling health teams, small facilities that must remain open for geographic reasons, emergencies.

Ex-post payments for extreme cases: In some countries, this retrospective mechanism is used to cover high-cost, unpredictable activities.

4.1.2 TOOLS TO GROUP CASES AND ADJUST FOR MORBIDITY

The use of costing and diagnostic tools is a common element of state of the art evaluation and payment systems. Varied tools are available for evaluating health services, and risk adjustment is currently a commonly used option. Which tool to select depends on the evaluation that it is to perform. It is important to consider that a health service evaluation method is not the same as a payment method. Confusing the two by using the same tool for both will lead to errors.

Furthermore, in selecting a tool, one should take advantage of available information to develop cost-effective systems that reflect reality as closely as possible. This implies making an effort to improve existing information systems before mounting new ones. This also includes perfecting costing studies, as well as strengthening technical capacity within the institutions analyzed.

4.1.2.1 HOSPITALS: ABOUT DRGS

Diagnosis-Related Groups (DRGs) are categories of health conditions for hospitalized patients expected to use similar levels of resources. Developed in Louisiana, USA, with 506 categories (used by HCFA – Medicare in the USA) in the early 1980s, they represent hospital admissions grouped in a specific manner, according to North American morbidity patterns.

The relative weights reflect United States costs (specific weights), and the diagnostic groupings were originally taken from ICD-9-CM hospital diagnostic codes. DRGs have been used since in many countries, including the USA since the 1980s and in Europe since the 1990s.

DRGs can be used as payment mechanisms or as clinical evaluation systems for service administration. There are various system evaluations.

In Chile, DRGs were the inspiration for the PADs and FONASA's special programs in the 1990s. Recently, they were used to evaluate and compare clinical performance of four type I hospitals (Fondef, PUC, 2004). They are currently being used in a pilot study of new payment mechanism, to measure public hospital case mixes in the VIII Region in Chile (MINSAL, 2007).

After more than two decades of existence, various evaluations and critiques of the DRGs have emerged. In our interpretation, most of the criticisms focus on models that have implemented DRGs as fees or prices for a set of services associated with a diagnosis, i.e., as payment mechanisms. Below is a brief summary of some relevant findings:

- OECD (study of 35 countries): Artificially increase case-mix; decrease quality of care.

(Dana A. Forgiione, et. al. *Journal of Health Care Finance*, Fall 2004)

- Artificially increase case-mix and complication rates for newborns (South Carolina, USA). Increase spending and decrease quality.

(Baker, Kronenfeld; *Health Care Financing Review*, Fall 1990)

- Do not predict spending: problems with surgical mortality (LIJMC New York) and outliers. Trigger deficits.

(Muñoz, Chalfin, et al. *Hospital and Health Services Administration*, Spring 1989.)

- Australia (Victoria): Increase hospital deficits because they do not predict high costs well. Evaluate risk-adjusted need per capita.

(Antioch KM; Walsh MK, *The European Journal of Health Economics*, June 2004)

- Seen as fee-for-service, require complex and costly hospital administration systems. Induce hospitals to use more resources.

Weyuker Lori, Kaiser (Chile, March 2003):

Currently, DRGs are generally understood as a measure of hospital case mix that can be used to adjust financing (Ibern, 2007). For a DRG-based payment system, a competition model compares among similar hospitals using case mix indicators. In this context, DRGs are not used as fees (however in some countries they are still used as the fixed prices for health packages). In European countries, the tendency is to adapt the DRG system to national reality (diagnostic classifications and specific weights), such as in the Nordic countries, Germany, and Spain (Cataluña) and use them as indicators of hospital case mix.

“The concept of hospital case mix has been introduced to gain a general understanding of the care provided and resources used by a hospital in treating a given type of patient. Results of a case-mix analysis can be applied as a health policy tool, providing mechanisms to promote equity and efficiency in hospital reimbursement; as a planning tool, offering useful information; and as a tool in evaluating health programs.” (Dr. Carmen Blázquez Gómez. Universidad Las Palmas de Gran Canaria)

4.1.2.2 TOOLS FOR AMBULATORY MORBIDITY

In general, ambulatory morbidity has been more difficult to capture and group. Attempts include ACGs (Johns Hopkins U.), CRGs, and DCGs (Boston University). Recently, some studies (in Holland and Spain) and some cases in the United States have successfully applied these models to estimate expected ambulatory costs.

DCGs as an example

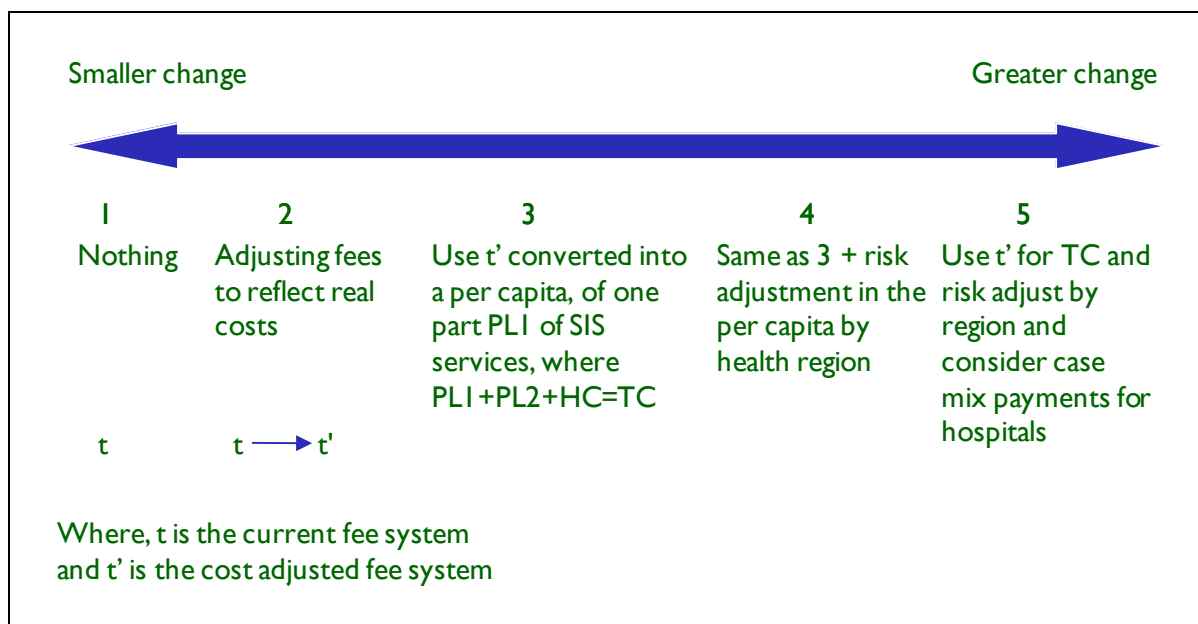
The DCG model runs a regression on demographic and diagnostic data to predict the health spending of a territorial population over a given period. The observed levels of resource use are normalized to reflect the population's health. Future payments are adjusted to reflect expected resource use. Thus, the model predicts the cost per individual. The system predicts costs at different levels of care (individually or by group), using demographics and the diagnoses for which the individuals have received care. DCG is a risk-adjustment model in which diagnostic groupings are homogeneous; that is, with similar levels of future medical needs.

These types of models are also used to evaluate provider performance profiles and for “central level” payments to health insurance companies, health spending accounts, or HMOs for the insured population, and in some cases, to providers.

4.2 OPTIONS FOR SIS WITHIN THE CURRENT CONTEXT

Figure 7 provides a timeline for the possible successive models. As shown, stage 3 cannot be implemented until completion of the updated production costs for primary care services, as proposed in stage 2.

FIGURE 7: ALTERNATIVES FOR SIS



Source: Authors.

According to our analysis, SIS could pursue the following path to improve its fee and provider payment policies:

1. Keep fee adjustments to a minimum: It is always possible that not doing anything will end up being cheaper than attempting changes that cannot be made, for example, due to lack of political support.

2. Set fees that accurately reflect production costs, using the results of observed cost studies.
 - a. Define a set of health interventions to cost, beginning with primary care, equivalent to a manageable percentage of spending;
 - b. Progressively cost health interventions;
 - c. Progressively adjust fees to the calculated observed costs.

3. Use cost-adjusted fees, as set in the prior step, to develop per capita payments for primary care activities.
 - a. Take the cost of a representative set of primary care interventions and create a per capita payment (this implies broadening the scope of observed costs);
 - b. Pay providers in two ways: per capita, as above, for specified primary care services; and fee-for-service, for the hospital sector (and remaining primary care services);
 - c. Progressively expand capitation and reduce fees, until all primary care services are covered under the capitated payment;
 - d. Eventually develop a capitated territorial budget for each DIRESA.

4. As above, adding risk adjustment to the capitation
 - a. Adjust capitations for risk, calculating the expected cost by population group, based on morbidity, rurality, and poverty, for example;
 - b. Continue to pay hospitals via fees and progressively adjust these fees to real costs;
 - c. Develop an adjusted, capitated territorial budget as a spending ceiling for the covered set of services for each DIRESA.

5. Capitate the entire set of primary care services, adjusting for risk, and transition hospitals to case mix and cost payments, as a spending ceiling for the capitated territory.
 - a. Implement the model;
 - b. Considerably increase the portion of services covered by the risk-adjusted, capitated payment (eventually covering the entire primary care system);
 - c. Implement a risk-adjusted, capitated territorial ceiling;
 - d. Provide financial incentives tied to comparisons among hospitals according to case mix (DRGs) and installed capacity (including decision regarding the weight of each);
 - e. Specify exceptions under the capitated territorial ceiling (teaching, emergencies, etc.);
 - f. Develop special payments for important public health problems such as maternal mortality, deliveries;

- g. Develop a mechanism for ex-post payments for catastrophic or high-cost illnesses.

These suggestions are consecutive, that is, one cannot be initiated until the previous is complete.

4.3 METHODOLOGY AND SIMULATION OF ONE OPTION

Two simulations for steps 3 and 4 presented in the previous section will illustrate the proposed methodologies.

For this simulation, we gathered data on total health spending charged to SIS for each of the 34 RegioRESA, and SIS transfers to each DIRESA. We used SIS's 2006 statistics and financing data, as well as health facility records with patient data such as gender, age, level of care, tests, procedures, medications, and amount paid by SIS for each good or service.

4.3.1 SIMULATING A CAPITATED BUDGETARY CEILING

4.3.1.1 FIXED CAPITATION

A first approximation is to develop a fixed capitation based on total SIS spending, and apply it to the population of each region.

To calculate the fixed capitation, we used the following formula:

$$\text{Fixed per capita} = \frac{\sum_{i=1}^{34} \text{Total transfers DIRESA}_i}{\text{SIS's Total Beneficiary Population}}$$

The fixed capitation obtained was 40.50 soles. Multiplying this figure by SIS's regional beneficiary populations yields new estimated regional spending figures, while keeping total spending for the country neutral. For example, Lima had a beneficiary population of 232,683 in 2006. To calculate the new total spending for Lima, we multiply the beneficiary population by the fixed capitation, and obtain a figure of S./ 9,424,740 (232,683 × 40.50). For Callao, we multiply by the fixed capitation by beneficiary population (91,851) and obtain a figure of S./ 3,720,391.

There are significant differences between the observed resources allocated and this simple simulated allocation, as shown in Table 12. This is a zero-sum exercise, as total 2006 spending remains fixed at 266 million soles.

TABLE 13: RESULTS OF APPLYING A FIXED CAPITATION FOR 2006

Transfers 2006		Observed per capita			Fixed per capita		
DISA code	DISA/DIRESA	Production value	Population	Observed per capita	Total value based on fixed per capita	Redistributions with fixed per capita	Percentage relative to PV 2006
010	AMAZONAS - CHACHAPOYAS	2,311,922	59,606	38.79	2,414,319	102,397	4.4%
020	ANCASH	7,402,309	234,117	31.62	9,482,824	2,080,515	28.1%
030	APURIMAC I	4,513,435	127,036	35.53	5,145,547	632,112	14.0%
040	AREQUIPA	10,287,220	204,997	50.18	8,303,329	(1,983,891)	-19.3%
050	AYACUCHO	9,626,822	332,768	28.93	13,478,647	3,851,825	40.0%
060	BAGUA	5,487,083	124,677	44.01	5,049,997	(437,086)	-8.0%
070	CAJAMARCA I	5,180,686	221,590	23.38	8,975,422	3,794,736	73.2%
080	CALLAO	6,237,444	91,851	67.91	3,720,391	(2,517,053)	-40.4%
090	APURIMAC II	3,207,345	96,557	33.22	3,911,006	703,661	21.9%
100	CAJAMARCA II - CHOTA	2,770,042	106,280	26.06	4,304,833	1,534,791	55.4%
110	CUSCO	12,853,566	539,819	23.81	21,865,172	9,011,606	70.1%
120	CAJAMARCA III - CUTERVO	4,082,633	102,275	39.92	4,142,612	59,979	1.5%
130	HUANCAVELICA	6,066,222	213,868	28.36	8,662,646	2,596,424	42.8%
140	HUÁNUCO	14,420,967	394,022	36.60	15,959,718	1,538,751	10.7%
150	ICA	3,910,432	78,777	49.64	3,190,834	(719,598)	-18.4%
160	JAEN	5,271,496	157,826	33.40	6,392,685	1,121,189	21.3%
170	JUNIN	9,381,635	251,336	37.33	10,180,273	798,638	8.5%
180	LA LIBERTAD	11,888,726	398,869	29.81	16,156,044	4,267,318	35.9%
190	LAMBAYEQUE	11,102,264	290,208	38.26	11,754,770	652,506	5.9%
200	LIMA CIUDAD	39,598,207	232,683	170.18	9,424,740	(30,173,467)	-76.2%
210	LIMA ESTE	9,684,097	161,427	59.99	6,538,542	(3,145,555)	-32.5%
220	LIMA NORTE	13,271,545	174,931	75.87	7,085,517	(6,186,028)	-46.6%
230	LIMA SUR	8,141,561	166,797	48.81	6,756,052	(1,385,509)	-17.0%
240	LORETO	14,874,850	398,119	37.36	16,125,665	1,250,815	8.4%
250	MADRE DE DIOS	1,048,613	26,136	40.12	1,058,629	10,016	1.0%
260	MOQUEGUA	1,067,867	26,688	40.01	1,080,988	13,121	1.2%
270	PASCO	2,995,344	63,237	47.37	2,561,392	(433,952)	-14.5%
280	PIURA	9,552,895	292,489	32.66	11,847,161	2,294,266	24.0%
290	PUNO	7,189,012	308,074	23.34	12,478,425	5,289,413	73.6%
300	SAN MARTIN	7,379,296	257,173	28.69	10,416,699	3,037,403	41.2%
310	SULLANA	5,787,364	177,282	32.64	7,180,743	1,393,379	24.1%
320	TACNA	3,006,815	51,276	58.64	2,076,916	(929,899)	-30.9%
330	TUMBES	2,258,957	59,790	37.78	2,421,772	162,815	7.2%
340	UCAYALI	4,599,865	155,889	29.51	6,314,227	1,714,362	37.3%
Overall total		266,458,537	6,578,470	40.50	266,458,537	-	0.0%

Source: Calculated based on SIS statistics for 2006.

If all individuals had the same expected health spending needs, the current budgets should change significantly. This means that allocated resources as well as utilization rates per capita vary from region to region. Where observed per capita spending is higher, we can assume that utilization of services per person is higher as well. Above all, this reflects spending in hospitals with installed capacity and in referral centers such as Lima and Callao, as shown below.

4.3.1.2 DEMOGRAPHIC RISK-ADJUSTED CAPITATION

To perform this exercise, we took 2006 SIS-financed spending and capitated the allocations according to beneficiary population associated with each DIRESA, by gender and age group. Then we adjusted for risk, using the demographic adjusted (gender and age) national average spending. We will call these figures demographic risk-adjusted capitations. We then reallocated the resources by region according to the risk-adjusted capitation. Finally, we studied the gaps between the observed 2006 fees allocated and the capitations produced in this exercise. We will explain this methodology in detail below.

We used two adjusters for this simulation: gender and age. We organized the data into 10 cells, representing the 5 age groups and 2 genders.³ Each cell contains the total health costs for the age and gender group, as taken from SIS's 2006 database. This yields total cost for each gender and age group. Then we divide each cell by total beneficiaries in each group, which yields the per capita cost for each group (Table 14).

For example, according to Table 14 per capita spending for a girl aged 0 to 4 years is 18.65 soles, while for a boy 10 to 19 years spending is 5.49. To obtain the normalized per capita cost for girls 0 to 4 years, we divide 18.65 by the national per capita average for SIS (which is 13.32⁴), yielding a result of 1.399. Similarly, for a boy 10 to 19 years old, we divide 5.49 by 13.32 to calculate a normalized per capita cost of 0.412. The normalized per capita costs represent relative risk of the gender and age groups (demographic risk).

TABLE 14: COST PER CAPITA (SOLES), NORMALIZED COST, BY AGE AND GENDER GROUPS

Per capita cost by age and gender			
Age group	Female	Male	Average
0 to 4 years	18.65	19.91	19.29
5 to 9 years	8.54	8.52	8.53
10 to 19 years	12.05	5.49	8.86
20 to 59 years	26.85	0.68	19.32
60 and over	1.29	1.10	1.21
Total	16.45	9.58	13.32

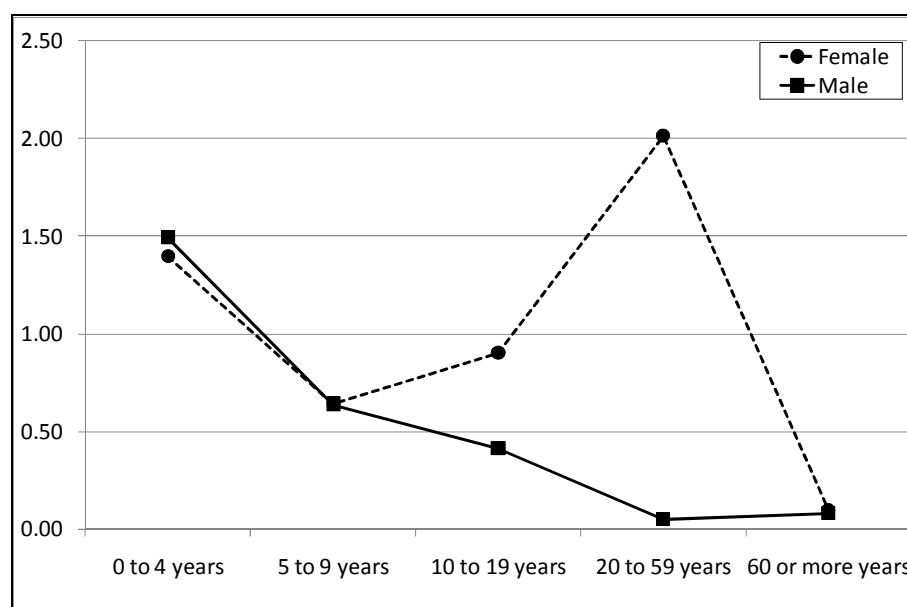
Per capita cost normalized to average			
Age group	Female	Male	Average
0 to 4 years	1.399	1.494	1.448
5 to 9 years	0.641	0.640	0.640
10 to 19 years	0.904	0.412	0.665
20 to 59 years	2.015	0.051	1.450
60 and over	0.097	0.083	0.091
Total	1.235	0.719	1.000

Source: Own calculations based on SIS data.

³ SIS selected these groups based on the authors' recommendation.

⁴ The national averages for age and gender groups were based on SIS's care data, which does not include all recorded SIS transfers. Therefore the average cost is lower than the national per capita cost calculated using transfers.

FIGURE 8: RISK FACTOR BY AGE AND GENDER (AVERAGE=1)



Source: Error! Reference source not found.

Using these age and gender risk factors and SIS demographic information on the DIRESA's beneficiary population, we calculated the risk factors for each DIRESA. The formula to calculate the risk of each DIRESA is the following:

$$\text{Risk factor for DIRESA}_i = \frac{\sum_{\text{sex, age}} \text{Risk factor}_{\text{sex, age}} \times \text{Affiliated population to DIRESA}_i_{\text{sex, age}}}{\text{Total affiliated population to DIRESA}_i}$$

For example, using the beneficiary population of the Lima DIRESA by gender and age group presented in Table 14 and the normalized per capita average cost (or risk factor by gender and age group) in Table 13, we can calculate the risk factor for Lima.

TABLE 15: BENEFICIARY POPULATION OF THE LIMA DIRESA, BY GENDER AND AGE GROUP

Beneficiary population in Lima by age and gender			
Age group	Female	Male	Total
0 to 4 years	30,361	32,435	62,796
5 to 9 years	20,963	22,301	43,264
10 to 19 years	36,396	32,668	69,064
20 to 59 years	43,739	7,846	51,585
60 and over	3,741	2,233	5,974
Total	135,200	97,483	232,683

Source: SIS Data.

Below we present the calculations for Lima, whose risk factor is 1.09.

$$\begin{aligned} \text{Risk factor for Lima City} &= (1,399 \times 30.361 + 0,641 \times 20.963 + 0,904 \times 36.396 + 2,015 \times 43.739 + 0,097 \times 3.741 \\ &\quad + 1,494 \times 32.435 + 0,640 \times 22.301 + 0,412 \times 32.668 + 0,051 \times 7.846 + 0,719 \times 2.233) \\ &\quad / 232.683 \\ &= 1,09 \end{aligned}$$

Please note that if the risk factor of a DIRESA is greater than one, that DIRESA has a higher-than-average risk and its expected costs will be greater than the average capitation. If the risk factor is less than one, the DIRESA will have a lower-than-average risk and its expected costs will be lower than the average capitation. Once the DIRESA's risk factor is calculated, the general formula to calculate risk-adjusted capitation by age and gender is the following:

$$\text{Per capita adjusted by age and sex for DIRESA}_i = \text{SIS's average per capita} \times \text{Risk factor for DIRESA}_i$$

TABLE 16: RESULTS OF APPLYING A GENDER- AND AGE-ADJUSTED CAPITATION FOR 2006

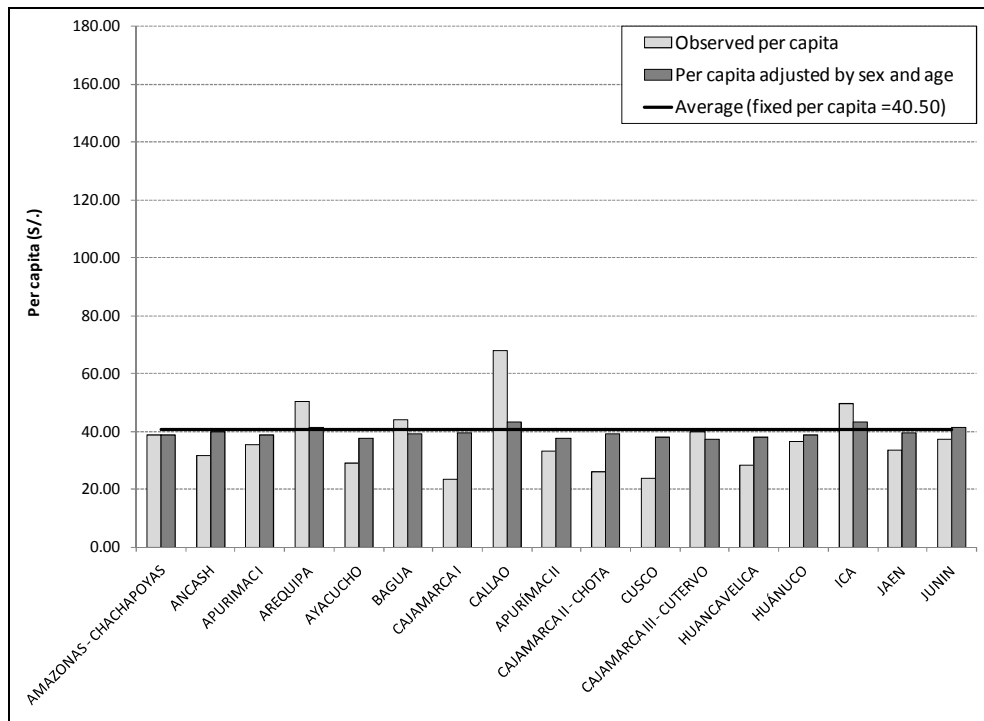
DISA code	DISA/DIRESA	Production value	Population	Observed per capita	Per capita adjusted by sex and age	Adjusted production value
010	AMAZONAS - CHACHAPOYAS	2,311,922	59,606	38.79	38.89	2,318,333
020	ANCASH	7,402,309	234,117	31.62	39.98	9,360,447
030	APURIMAC I	4,513,435	127,036	35.53	38.75	4,922,639
040	AREQUIPA	10,287,220	204,997	50.18	41.45	8,496,226
050	AYACUCHO	9,626,822	332,768	28.93	37.79	12,573,672
060	BAGUA	5,487,083	124,677	44.01	39.31	4,901,413
070	CAJAMARCA I	5,180,686	221,590	23.38	39.60	8,775,219
080	CALLAO	6,237,444	91,851	67.91	43.09	3,957,956
090	APURÍMAC II	3,207,345	96,557	33.22	37.60	3,630,266
100	CAJAMARCA II - CHOTA	2,770,042	106,280	26.06	39.29	4,175,544
110	CUSCO	12,853,566	539,819	23.81	38.12	20,577,894
120	CAJAMARCA III - CUTERVO	4,082,633	102,275	39.92	37.28	3,812,801
130	HUANCAVELICA	6,066,222	213,868	28.36	38.16	8,161,419
140	HUÁNUCO	14,420,967	394,022	36.60	38.69	15,245,064
150	ICA	3,910,432	78,777	49.64	43.15	3,399,125
160	JAEN	5,271,496	157,826	33.40	39.40	6,218,774
170	JUNIN	9,381,635	251,336	37.33	41.35	10,391,921
180	LA LIBERTAD	11,888,726	398,869	29.81	40.75	16,252,850
190	LAMBAYEQUE	11,102,264	290,208	38.26	42.14	12,230,749
200	LIMA CIUDAD	39,598,207	232,683	170.18	44.23	10,292,127
210	LIMA ESTE	9,684,097	161,427	59.99	45.78	7,390,336
220	LIMA NORTE	13,271,545	174,931	75.87	41.09	7,188,772
230	LIMA SUR	8,141,561	166,797	48.81	43.93	7,327,940
240	LORETO	14,874,850	398,119	37.36	42.25	16,822,013
250	MADRE DE DIOS	1,048,613	26,136	40.12	42.40	1,108,139
260	MOQUEGUA	1,067,867	26,688	40.01	41.59	1,109,970
270	PASCO	2,995,344	63,237	47.37	40.41	2,555,241
280	PIURA	9,552,895	292,489	32.66	41.42	12,115,864
290	PUNO	7,189,012	308,074	23.34	39.88	12,286,853
300	SAN MARTIN	7,379,296	257,173	28.69	39.83	10,243,641
310	SULLANA	5,787,364	177,282	32.64	42.56	7,544,576
320	TACNA	3,006,815	51,276	58.64	42.47	2,177,662
330	TUMBES	2,258,957	59,790	37.78	41.34	2,471,560
340	UCAYALI	4,599,865	155,889	29.51	41.19	6,421,530
Overall total		266,458,537	6,578,470	40.50	40.50	266,458,537

Source: Calculated based on SIS data.

The following graphs provide a better sense of the differences between the risk-adjusted and non-risk-adjusted capitations.

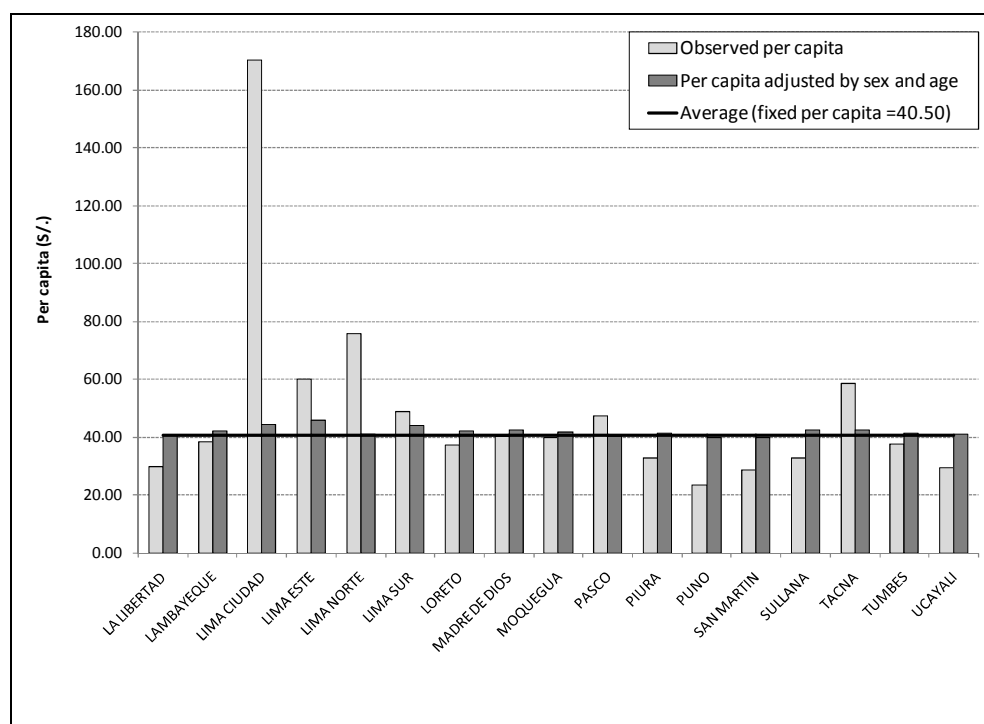
Any capitation above the average means that that health region has higher-than-average expected costs. DIRESAs with lower-than-average capitations have lower expected costs than the national average. A second analysis examines the gap between the observed 2006 allocation and the risk-adjusted capitation calculated for the same year. If the risk-adjusted capitation is assumed to express the population's real needs, those DIRESAs with observed allocations lower than the calculated capitations have unmet financial needs. Those with observed allocations higher than the calculated capitations are over-producing services, and resources should be cut from their territorial budgets.

FIGURE 9: RISK-ADJUSTED CAPITATION VS. OBSERVED ALLOCATION, BY DIRESA (FIRST GROUP OF 17 DIRESAS)



Source: Error! Reference source not found..

FIGURE 10: RISK-ADJUSTED CAPITATION VS. OBSERVED ALLOCATION, BY DIRESA (SECOND GROUP OF 17 DIRESAS)



Source: Error! Reference source not found..

The result is decisive; resources would be distributed among the regions much differently according to the calculated capitations. If we assume that the productive value is equivalent to the budget, we could say, for example, that the Amazonas DIRESA would remain about the same with the adjustment. However, the Ancash DIRESA would receive a 26.5% increase and the Apurimac DIRESA a 9.1% increase over their 2006 budgets. Arequipa, on the other hand, would receive a 17.4% budget cut, and so on. Puno and Lima are extreme cases; spending in the former should increase 70% and decrease 74% in the latter.

If per capita allocation is adjusted demographically, differences between the simulated and observed allocations are smaller than the gaps noted in the first exercise. This finding can be explained by the composition of the population. That is, if a region with a higher total budget in a fixed cost model has a smaller budget when using an adjusted model, it means that the higher-cost population is a relative minority or the lower-cost population is relatively large. This occurs for Lima, for example, where there is a higher concentration of older adults.

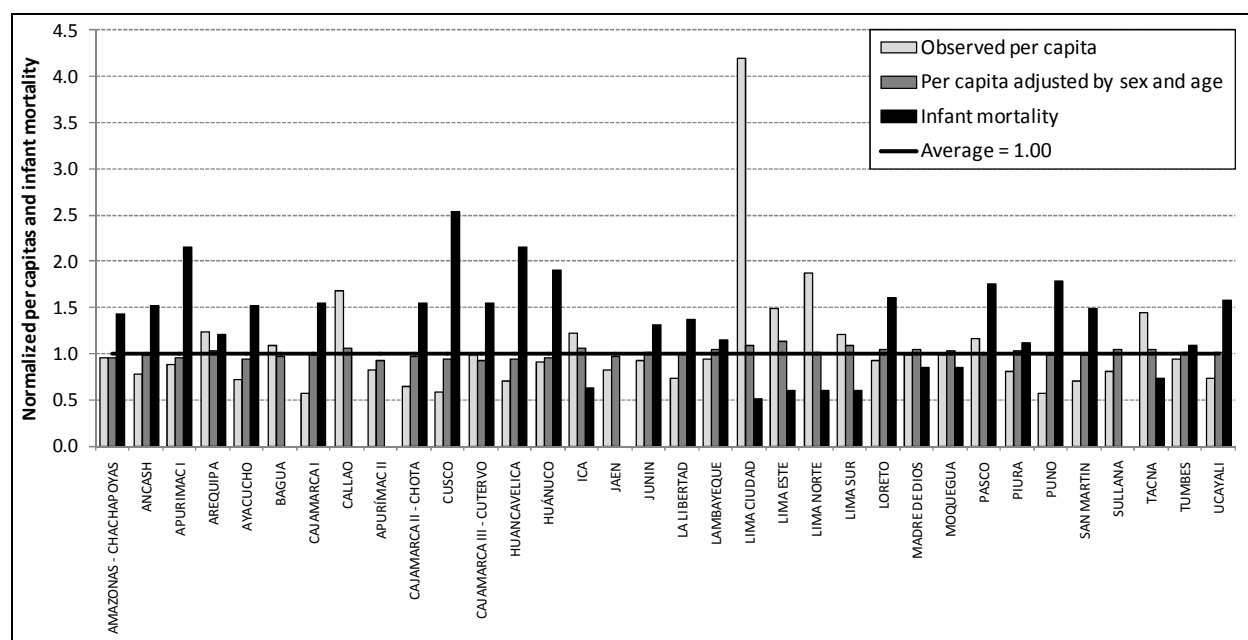
TABLE 17: REDISTRIBUTION OF CAPITATED RESOURCES BY REGION, USING A GENDER- AND AGE-ADJUSTED BUDGET

DISA code	DISA/DIRESA	Production value	Adjusted production value	Redistributions	Percentage relative to PV 2006
010	AMAZONAS - CHACHAPOYAS	2,311,922	2,318,333	6,411	0.3%
020	ANCASH	7,402,309	9,360,447	1,958,138	26.5%
030	APURIMAC I	4,513,435	4,922,639	409,204	9.1%
040	AREQUIPA	10,287,220	8,496,226	(1,790,994)	-17.4%
050	AYACUCHO	9,626,822	12,573,672	2,946,850	30.6%
060	BAGUA	5,487,083	4,901,413	(585,670)	-10.7%
070	CAJAMARCA I	5,180,686	8,775,219	3,594,533	69.4%
080	CALLAO	6,237,444	3,957,956	(2,279,488)	-36.5%
090	APURIMAC II	3,207,345	3,630,266	422,921	13.2%
100	CAJAMARCA II - CHOTA	2,770,042	4,175,544	1,405,502	50.7%
110	CUSCO	12,853,566	20,577,894	7,724,328	60.1%
120	CAJAMARCA III - CUTERVO	4,082,633	3,812,801	(269,832)	-6.6%
130	HUANCANELICA	6,066,222	8,161,419	2,095,197	34.5%
140	HUÁNUCO	14,420,967	15,245,064	824,097	5.7%
150	ICA	3,910,432	3,399,125	(511,307)	-13.1%
160	JAEN	5,271,496	6,218,774	947,278	18.0%
170	JUNIN	9,381,635	10,391,921	1,010,286	10.8%
180	LA LIBERTAD	11,888,726	16,252,850	4,364,124	36.7%
190	LAMBAYEQUE	11,102,264	12,230,749	1,128,485	10.2%
200	LIMA CIUDAD	39,598,207	10,292,127	(29,306,080)	-74.0%
210	LIMA ESTE	9,684,097	7,390,336	(2,293,761)	-23.7%
220	LIMA NORTE	13,271,545	7,188,772	(6,082,773)	-45.8%
230	LIMA SUR	8,141,561	7,327,940	(813,621)	-10.0%
240	LORETO	14,874,850	16,822,013	1,947,163	13.1%
250	MADRE DE DIOS	1,048,613	1,108,139	59,526	5.7%
260	MOQUEGUA	1,067,867	1,109,970	42,103	3.9%
270	PASCO	2,995,344	2,555,241	(440,103)	-14.7%
280	PIURA	9,552,895	12,115,864	2,562,969	26.8%
290	PUNO	7,189,012	12,286,853	5,097,841	70.9%
300	SAN MARTIN	7,379,296	10,243,641	2,864,345	38.8%
310	SULLANA	5,787,364	7,544,576	1,757,212	30.4%
320	TACNA	3,006,815	2,177,662	(829,153)	-27.6%
330	TUMBES	2,258,957	2,471,560	212,603	9.4%
340	UCAYALI	4,599,865	6,421,530	1,821,665	39.6%
Overall total		266,458,537	266,458,537	-	0.0%

Source: Authors, using SIS data.

If we analyze key equity variables in the health system such as poverty and infant mortality, we can broach the issue of whether the new methodology succeeds in closing equity gaps.

FIGURE 11: COMPARISON OF OBSERVED, RISK-, AND INFANT-MORTALITY-ADJUSTED PER CAPITA ALLOCATIONS, BY DEPARTMENT, 2006



Source: Own calculations and INEI data, 2001.

As noted, in the majority of cases with available data, that is, 26 of 29 departments (5 regions could not be evaluated because the infant mortality indicator was unavailable, and Lima was divided into 2 regions) the variables behave as expected. Where infant mortality is higher than the national average, the observed per capita budget is lower than the simulated budget. Where infant mortality is lower than average, the opposite is true.

4.3.1.3 POVERTY-, GENDER- AND AGE-ADJUSTED CAPITATION BY DEPARTMENT

Because poverty indicators are not available for the SIS data, we used 2006 Statistics and Information National Institute's (INEI) data to develop the poverty adjusters.

The adjustment formula is the following:

$$\begin{aligned} \text{Per capita adjusted by sex, age and poverty for DISA}_i &= \text{Per capita adjusted by sex and edad for DISA}_i \times 70\% \\ &+ \text{Observed per capita for DISA}_i \\ &\times \text{Normalized percent of poverty for DISA}_i \times 30\% \end{aligned}$$

For example, for Lima, the calculation for gender-, age-, and poverty-adjusted capitation is the following:

$$\begin{aligned} \text{Per capita adjusted by sex, age and poverty for DISA}_i &= 44.23 \times 70\% + 170.18 \times 24.2 \times 30\% \\ &= 58.73 \end{aligned}$$

The percent weights imply a 70% importance for the demographic adjuster and a 30% importance for the regional poverty adjuster.

TABLE 18: REDISTRIBUTION OF CAPITATED RESOURCES BY REGION USING A GENDER- AND AGE-ADJUSTED BUDGET INCLUDING AGGREGATE POVERTY

Transfers 2006		Observed per capita			Aggregated adjustment by sex, age and poverty			
DISA code	DISA/DIRESA	Production value (PV)	Population	Observed per capita	Per capita adjusted by sex, age and poverty	Adjusted production value	Redistributions	Percentage relative to PV 2006
010	AMAZONAS - CHACHAPOYAS	2,311,922	59,606	38.79	42.68	2,543,965	232,043	10.0%
020	ANCASH	7,402,309	234,117	31.62	36.94	8,648,248	1,245,939	16.8%
030	APURIMAC I	4,513,435	127,036	35.53	45.04	5,721,836	1,208,401	26.8%
040	AREQUIPA	10,287,220	204,997	50.18	37.88	7,764,382	(2,522,838)	-24.5%
050	AYACUCHO	9,626,822	332,768	28.93	41.74	13,889,724	4,262,902	44.3%
060	BAGUA	5,487,083	124,677	44.01	27.52	3,430,989	(2,056,094)	-37.5%
070	CAJAMARCA I	5,180,686	221,590	23.38	37.78	8,370,930	3,190,244	61.6%
080	CALLAO	6,237,444	91,851	67.91	30.16	2,770,570	(3,466,874)	-55.6%
090	APURÍMAC II	3,207,345	96,557	33.22	26.32	2,541,186	(666,159)	-20.8%
100	CAJAMARCA II - CHOTA	2,770,042	106,280	26.06	38.71	4,114,310	1,344,268	48.5%
110	CUSCO	12,853,566	539,819	23.81	34.69	18,728,523	5,874,957	45.7%
120	CAJAMARCA III - CUTERVO	4,082,633	102,275	39.92	43.27	4,424,952	342,319	8.4%
130	HUANCAVELICA	6,066,222	213,868	28.36	43.67	9,340,458	3,274,236	54.0%
140	HUÁNUCO	14,420,967	394,022	36.60	45.49	17,924,157	3,503,190	24.3%
150	ICA	3,910,432	78,777	49.64	38.17	3,006,814	(903,618)	-23.1%
160	JAEN	5,271,496	157,826	33.40	27.58	4,353,141	(918,355)	-17.4%
170	JUNIN	9,381,635	251,336	37.33	41.50	10,430,369	1,048,734	11.2%
180	LA LIBERTAD	11,888,726	398,869	29.81	37.87	15,103,911	3,215,185	27.0%
190	LAMBAYEQUE	11,102,264	290,208	38.26	40.10	11,637,724	535,460	4.8%
200	LIMA CIUDAD	39,598,207	232,683	170.18	58.73	13,664,780	(25,933,427)	-65.5%
210	LIMA ESTE	9,684,097	161,427	59.99	41.83	6,753,158	(2,930,939)	-30.3%
220	LIMA NORTE	13,271,545	174,931	75.87	41.60	7,277,865	(5,993,680)	-45.2%
230	LIMA SUR	8,141,561	166,797	48.81	38.72	6,457,822	(1,683,739)	-20.7%
240	LORETO	14,874,850	398,119	37.36	46.28	18,423,966	3,549,116	23.9%
250	MADRE DE DIOS	1,048,613	26,136	40.12	35.58	929,808	(118,805)	-11.3%
260	MOQUEGUA	1,067,867	26,688	40.01	36.48	973,515	(94,352)	-8.8%
270	PASCO	2,995,344	63,237	47.37	51.02	3,226,434	231,090	7.7%
280	PIURA	9,552,895	292,489	32.66	40.89	11,958,788	2,405,893	25.2%
290	PUNO	7,189,012	308,074	23.34	39.92	12,298,696	5,109,684	71.1%
300	SAN MARTIN	7,379,296	257,173	28.69	38.39	9,871,869	2,492,573	33.8%
310	SULLANA	5,787,364	177,282	32.64	29.79	5,281,203	(506,161)	-8.7%
320	TACNA	3,006,815	51,276	58.64	37.56	1,925,722	(1,081,093)	-36.0%
330	TUMBES	2,258,957	59,790	37.78	32.96	1,970,709	(288,248)	-12.8%
340	UCAYALI	4,599,865	155,889	29.51	39.58	6,169,628	1,569,763	34.1%
Overall total		266,458,537	6,578,470	40.50	40.50	266,458,537	-	0.0%

Source: Calculated based on SIS care data for 2006, SIS statistics for 2006., and INEI data for 2006

The gaps between observed and redistributed spending are lower than in the above cases. Given the high correlation between poverty and infant mortality (correlation coefficient = 0.90), this simulation is better corrected for health status, meaning that the resources are better targeted. Therefore, this option is superior to the previous two examples.

Finally, we should consider that this is only an exercise. To develop an exhaustive simulation, SIS should perform complete cost studies, starting with an integrated primary care package of services it wishes to cover.

4.3.2 SIMULATING A RISK-ADJUSTED CAPITATION FOR PRIMARY CARE

In the above exercises, we analyzed total SIS transfers for one year (2006) and found significant differences by DIRESA, although these differences were mitigated when more adjusters were added. We performed this simulation to illustrate a resource allocation method with a capitated spending ceiling for the Regional Health Offices (DIRESA or DISA). However, because SIS transfers primarily cover primary care services, including hospital costs distorts the results, as hospital spending is concentrated in cities like Lima or Callao. To eliminate this distortion, we will now estimate capitations

excluding hospital spending, both for total SIS transfers and DIRESA budgets and calculation of risk factors to be used in the correction. That is, the factors will be derived solely from consumption of primary care.

4.3.2.1 FIXED CAPITATION FOR PRIMARY CARE

The average national capitation for primary care is 25.2 soles. Applying this figure to each DIRESA's population yields a new estimated transfer level. If we compare these estimates with observed costs for 2006, we can observe any gaps.

TABLE 19: RESULTS OF APPLYING A FIXED CAPITATION FOR PRIMARY CARE, 2006

Transfers 2006		Observed per capita			Fixed per capita		
DISA code	DISA/DIRESA	Production value (PV)	Population	Observed per capita	Total value with fixed per capita	Redistributions with fixed per capita	Percent redistribution with primary care per capita
010	AMAZONAS - CHACHAPOYAS	1,941,081	59,606	32.57	1,502,133	(438,948)	-22.6%
020	ANCASH	5,006,127	234,117	21.38	5,899,993	893,866	17.9%
030	APURIMAC I	3,956,882	127,036	31.15	3,201,440	(755,442)	-19.1%
040	AREQUIPA	7,655,493	204,997	37.34	5,166,138	(2,489,355)	-32.5%
050	AYACUCHO	7,109,463	332,768	21.36	8,386,101	1,276,638	18.0%
060	BAGUA	4,661,252	124,677	37.39	3,141,990	(1,519,262)	-32.6%
070	CAJAMARCA I	4,213,484	221,590	19.01	5,584,299	1,370,815	32.5%
080	CALLAO	2,740,938	91,851	29.84	2,314,741	(426,197)	-15.5%
090	APURIMAC II	2,523,965	96,557	26.14	2,433,337	(90,628)	-3.6%
100	CAJAMARCA II - CHOTA	2,367,742	106,280	22.28	2,678,367	310,625	13.1%
110	CUSCO	9,915,615	539,819	18.37	13,604,002	3,688,387	37.2%
120	CAJAMARCA III - CUTERVO	4,019,222	102,275	39.30	2,577,437	(1,441,785)	-35.9%
130	HUANCAVELICA	5,480,647	213,868	25.63	5,389,697	(90,950)	-1.7%
140	HUÁNUCO	12,903,895	394,022	32.75	9,929,766	(2,974,129)	-23.0%
150	ICA	2,179,895	78,777	27.67	1,985,263	(194,632)	-8.9%
160	JAEN	4,403,259	157,826	27.90	3,977,380	(425,879)	-9.7%
170	JUNIN	6,388,264	251,336	25.42	6,333,929	(54,335)	-0.9%
180	LA LIBERTAD	8,809,759	398,869	22.09	10,051,915	1,242,156	14.1%
190	LAMBAYEQUE	8,804,737	290,208	30.34	7,313,544	(1,491,193)	-16.9%
200	LIMA CIUDAD	3,585,987	232,683	15.41	5,863,854	2,277,867	63.5%
220	LIMA NORTE	6,695,531	174,931	38.28	4,408,444	(2,287,087)	-34.2%
230	LIMA SUR	5,245,608	166,797	31.45	4,203,458	(1,042,150)	-19.9%
240	LORETO	11,669,287	398,119	29.31	10,033,014	(1,636,273)	-14.0%
250	MADRE DE DIOS	659,087	26,136	25.22	658,654	(433)	-0.1%
260	MOQUEGUA	634,421	26,688	23.77	672,565	38,144	6.0%
270	PASCO	2,031,710	63,237	32.13	1,593,638	(438,072)	-21.6%
280	PIURA	8,334,931	292,489	28.50	7,371,028	(963,903)	-11.6%
290	PUNO	5,158,404	308,074	16.74	7,763,786	2,605,382	50.5%
300	SAN MARTIN	6,244,426	257,173	24.28	6,481,028	236,602	3.8%
310	PIURA II SULLANA	4,096,450	177,282	23.11	4,467,691	371,241	9.1%
320	TACNA	1,914,987	51,276	37.35	1,292,209	(622,778)	-32.5%
330	TUMBES	1,306,744	59,790	21.86	1,506,770	200,026	15.3%
340	UCAYALI	3,125,015	155,889	20.05	3,928,565	803,550	25.7%
Overall total		165,784,308	6,578,470	25.20	165,784,308	-	0.0%

Source: Calculated based on SIS statistics for 2006.

The gaps observed in the previous examples (point 4.3.1, the exercise using total SIS spending), are reversed when only primary care is considered. A clear example is Lima, which goes from a positive gap (that is, it hypothetically receives more resource transfers than necessary) to a negative gap of 63.5% (that is, it hypothetically lacks this percentage of financing for primary care). In Callao, on the other

hand, the result is in the same direction for both simulations; that is, in both scenarios it hypothetically receives more resource transfers than necessary, but the magnitude of the difference is markedly smaller when considering primary care spending alone. The differences between this and the previous exercise are clearly significant, as shown in the following table.

TABLE 20: DIFFERENCES IN REDISTRIBUTION OF RESOURCES FOR PRIMARY CARE-ONLY VS. TOTAL SPENDING (AS % OF TOTAL SPENDING FOR 2006)

DISA code	DISA/DIRESA	Population	Percent redistribution with primary care per capita	Percent redistribution with total per capita (with hospitals)
010	AMAZONAS - CHACHAPOYAS	59,606	-22.6%	4.4%
020	ANCASH	234,117	17.9%	28.1%
030	APURIMAC I	127,036	-19.1%	14.0%
040	AREQUIPA	204,997	-32.5%	-19.3%
050	AYACUCHO	332,768	18.0%	40.0%
060	BAGUA	124,677	-32.6%	-8.0%
070	CAJAMARCA I	221,590	32.5%	73.2%
080	CALLAO	91,851	-15.5%	-40.4%
090	APURÍMAC II	96,557	-3.6%	21.9%
100	CAJAMARCA II - CHOTA	106,280	13.1%	55.4%
110	CUSCO	539,819	37.2%	70.1%
120	CAJAMARCA III - CUTERVO	102,275	-35.9%	1.5%
130	HUANCAVELICA	213,868	-1.7%	42.8%
140	HUÁNUCO	394,022	-23.0%	10.7%
150	ICA	78,777	-8.9%	-18.4%
160	JAEN	157,826	-9.7%	21.3%
170	JUNIN	251,336	-0.9%	8.5%
180	LA LIBERTAD	398,869	14.1%	35.9%
190	LAMBAYEQUE	290,208	-16.9%	5.9%
200	LIMA CIUDAD	232,683	63.5%	-76.2%
220	LIMA NORTE	174,931	-34.2%	-46.6%
230	LIMA SUR	166,797	-19.9%	-17.0%
240	LORETO	398,119	-14.0%	8.4%
250	MADRE DE DIOS	26,136	-0.1%	1.0%
260	MOQUEGUA	26,688	6.0%	1.2%
270	PASCO	63,237	-21.6%	-14.5%
280	PIURA	292,489	-11.6%	24.0%
290	PUNO	308,074	50.5%	73.6%
300	SAN MARTIN	257,173	3.8%	41.2%
310	PIURA II SULLANA	177,282	9.1%	24.1%
320	TACNA	51,276	-32.5%	-30.9%
330	TUMBES	59,790	15.3%	7.2%
340	UCAYALI	155,889	25.7%	37.3%
Overall total		6,578,470	0.0%	0.0%

Source: Calculated based on SIS statistics for 2006.

4.3.2.2 DEMOGRAPHIC-ADJUSTED CAPITATION FOR PRIMARY CARE

When we include demographic risk adjusters in the primary care capitation⁵, the result is the following:

⁵ The risk-adjustment methodology identical the one explained in point 4.3.1.2, except only primary care spending and consumption is considered

TABLE 21: RESULT OF APPLYING A GENDER- AND AGE-ADJUSTED CAPITATION FOR PRIMARY CARE, 2006

Transfers 2006		Observed per capita			Risk adjusted per capita (sex and age)			
DISA code	DISA/DIRESA	Production value (PV)	Population	Observed per capita	Per capita adjusted by sex and age	Adjusted production value	Redistributions	Percent relative to PV 2006
010	AMAZONAS - CHACHAPOYAS	1,941,081	59,606	32.57	24.30	1,448,555	(492,526)	-25.4%
020	ANCASH	5,006,127	234,117	21.38	25.08	5,871,220	865,093	17.3%
030	APURIMAC I	3,956,882	127,036	31.15	24.03	3,052,813	(904,069)	-22.8%
040	AREQUIPA	7,655,493	204,997	37.34	25.81	5,290,734	(2,364,759)	-30.9%
050	AYACUCHO	7,109,463	332,768	21.36	23.34	7,768,160	658,697	9.3%
060	BAGUA	4,661,252	124,677	37.39	24.88	3,102,208	(1,559,044)	-33.4%
070	CAJAMARCA I	4,213,484	221,590	19.01	24.69	5,470,257	1,256,773	29.8%
080	CALLAO	2,740,938	91,851	29.84	26.72	2,454,312	(286,626)	-10.5%
090	APURIMAC II	2,523,965	96,557	26.14	23.33	2,253,084	(270,881)	-10.7%
100	CAJAMARCA II - CHOTA	2,367,742	106,280	22.28	24.71	2,625,911	258,169	10.9%
110	CUSCO	9,915,615	539,819	18.37	23.63	12,757,111	2,841,496	28.7%
120	CAJAMARCA III - CUTERVO	4,019,222	102,275	39.30	22.95	2,347,317	(1,671,905)	-41.6%
130	HUANCAVELICA	5,480,647	213,868	25.63	24.04	5,140,563	(340,084)	-6.2%
140	HUÁNUCO	12,903,895	394,022	32.75	24.13	9,505,956	(3,397,939)	-26.3%
150	ICA	2,179,895	78,777	27.67	26.81	2,111,722	(68,173)	-3.1%
160	JAEN	4,403,259	157,826	27.90	24.62	3,885,688	(517,571)	-11.8%
170	JUNIN	6,388,264	251,336	25.42	25.94	6,518,852	130,588	2.0%
180	LA LIBERTAD	8,809,759	398,869	22.09	25.30	10,091,669	1,281,910	14.6%
190	LAMBAYEQUE	8,804,737	290,208	30.34	26.10	7,574,502	(1,230,235)	-14.0%
200	LIMA CIUDAD	3,585,987	232,683	15.41	27.36	6,366,963	2,780,976	77.6%
220	LIMA NORTE	6,695,531	174,931	38.28	25.45	4,452,530	(2,243,001)	-33.5%
230	LIMA SUR	5,245,608	166,797	31.45	27.12	4,523,341	(722,267)	-13.8%
240	LORETO	11,669,287	398,119	29.31	26.28	10,461,140	(1,208,147)	-10.4%
250	MADRE DE DIOS	659,087	26,136	25.22	26.43	690,780	31,693	4.8%
260	MOQUEGUA	634,421	26,688	23.77	25.63	683,969	49,548	7.8%
270	PASCO	2,031,710	63,237	32.13	25.45	1,609,152	(422,558)	-20.8%
280	PIURA	8,334,931	292,489	28.50	25.79	7,542,667	(792,264)	-9.5%
290	PUNO	5,158,404	308,074	16.74	25.01	7,704,193	2,545,789	49.4%
300	SAN MARTIN	6,244,426	257,173	24.28	24.81	6,381,319	136,893	2.2%
310	PIURA II SULLANA	4,096,450	177,282	23.11	26.44	4,688,104	591,654	14.4%
320	TACNA	1,914,987	51,276	37.35	26.19	1,343,073	(571,914)	-29.9%
330	TUMBES	1,306,744	59,790	21.86	25.33	1,514,775	208,031	15.9%
340	UCAYALI	3,125,015	155,889	20.05	25.59	3,989,170	864,155	27.7%
Overall total		165,784,308	6,578,470	25.20	25.20	165,784,308	-	0.0%

Source: Calculated based on SIS statistics for 2006.

The simulated risk-adjusted capitations with and without hospitals are both significantly different than the observed 2006 regional allocations. However, for regions with greater installed hospital capacity, these differences invert or change in magnitude from the first to second scenario. For Lima, for instance, the disparity between observed and simulated allocations is greater in the second than in the first exercise. If in the first simulation we would have to take away a hypothetical 74% of its 2006 observed allocated resources, in the second we would have to add an additional 77.6%. Overall, differences between simulated and observed budgets are smaller if primary care alone is considered.

TABLE 22: DIFFERENCES IN REDISTRIBUTION OF RESOURCES FOR DEMOGRAPHIC RISK-ADJUSTED PRIMARY CARE-ONLY VS. TOTAL SPENDING (AS % OF TOTAL SPENDING FOR 2006)

DISA code	DISA/DIRESA	Population	Percent redistribution with total per capita for primary care	Percent redistribution with total per capita (with hospitals)
010	AMAZONAS - CHACHAPOYAS	59,606	-25.4%	0.3%
020	ANCASH	234,117	17.3%	26.5%
030	APURIMAC I	127,036	-22.8%	9.1%
040	AREQUIPA	204,997	-30.9%	-17.4%
050	AYACUCHO	332,768	9.3%	30.6%
060	BAGUA	124,677	-33.4%	-10.7%
070	CAJAMARCA I	221,590	29.8%	69.4%
080	CALLAO	91,851	-10.5%	-36.5%
090	APURÍMAC II	96,557	-10.7%	13.2%
100	CAJAMARCA II - CHOTA	106,280	10.9%	50.7%
110	CUSCO	539,819	28.7%	60.1%
120	CAJAMARCA III - CUTERVO	102,275	-41.6%	-6.6%
130	HUANCAVELICA	213,868	-6.2%	34.5%
140	HUÁNUCO	394,022	-26.3%	5.7%
150	ICA	78,777	-3.1%	-13.1%
160	JAEN	157,826	-11.8%	18.0%
170	JUNIN	251,336	2.0%	10.8%
180	LA LIBERTAD	398,869	14.6%	36.7%
190	LAMBAYEQUE	290,208	-14.0%	10.2%
200	LIMA CIUDAD	232,683	77.6%	-74.0%
220	LIMA NORTE	174,931	-33.5%	-45.8%
230	LIMA SUR	166,797	-13.8%	-10.0%
240	LORETO	398,119	-10.4%	13.1%
250	MADRE DE DIOS	26,136	4.8%	5.7%
260	MOQUEGUA	26,688	7.8%	3.9%
270	PASCO	63,237	-20.8%	-14.7%
280	PIURA	292,489	-9.5%	26.8%
290	PUNO	308,074	49.4%	70.9%
300	SAN MARTIN	257,173	2.2%	38.8%
310	PIURA II SULLANA	177,282	14.4%	30.4%
320	TACNA	51,276	-29.9%	-27.6%
330	TUMBES	59,790	15.9%	9.4%
340	UCAYALI	155,889	27.7%	39.6%
Overall total		6,578,470	0.0%	0.0%

Source: Calculated based on SIS statistics for 2006.

4.3.2.3 POVERTY- AND DEMOGRAPHIC-ADJUSTED CAPITATION FOR PRIMARY CARE

In this case, we use the same methodology described above, weighing 70% of the adjustment on demographics and 30% on the poverty factor.

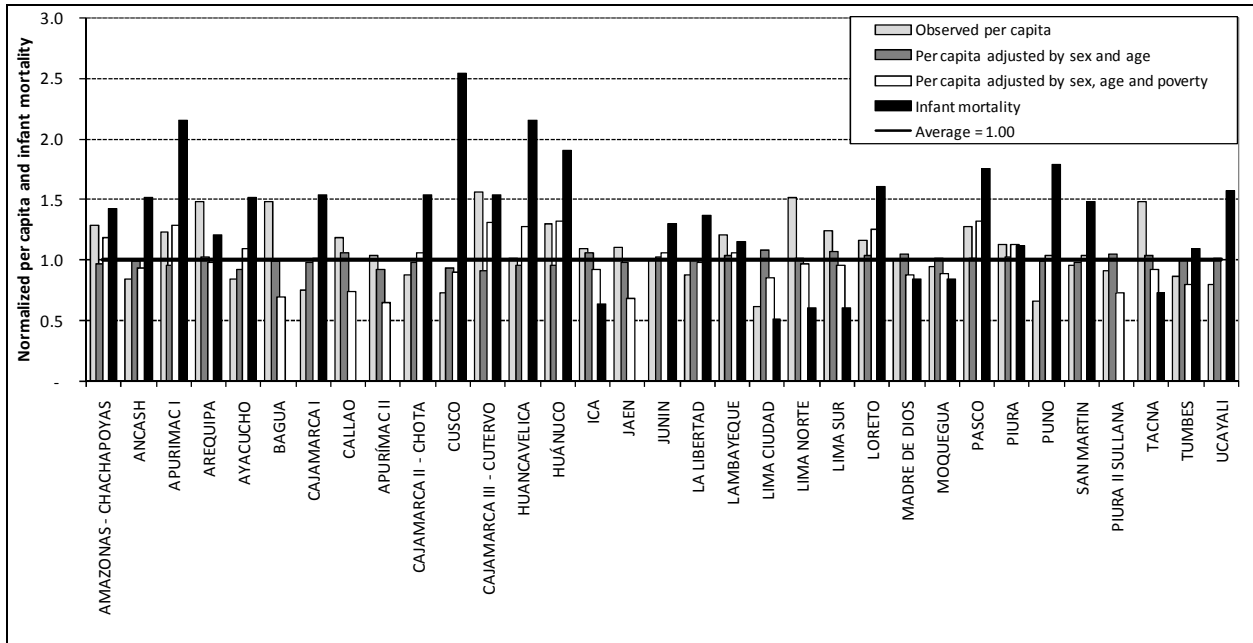
TABLE 23: RESULT OF APPLYING A GENDER-, AGE-, AND POVERTY-ADJUSTED CAPITATION FOR PRIMARY CARE, 2006

Transfers 2006		Observed per capita			Aggregated adjustment by sex, age and poverty		
DISA code	DISA/DIRESA	Production value (PV)	Population	Observed per capita	Adjusted production value	Redistributions	Percent relative to PV 2006
010	AMAZONAS - CHACHAPOYAS	1,941,081	59,606	32.57	1,787,367	(153,714)	-7.9%
020	ANCASH	5,006,127	234,117	21.38	5,527,319	521,192	10.4%
030	APURIMAC I	3,956,882	127,036	31.15	4,132,305	175,423	4.4%
040	AREQUIPA	7,655,493	204,997	37.34	5,055,698	(2,599,795)	-34.0%
050	AYACUCHO	7,109,463	332,768	21.36	9,195,343	2,085,880	29.3%
060	BAGUA	4,661,252	124,677	37.39	2,171,546	(2,489,706)	-53.4%
070	CAJAMARCA I	4,213,484	221,590	19.01	5,641,452	1,427,968	33.9%
080	CALLAO	2,740,938	91,851	29.84	1,718,018	(1,022,920)	-37.3%
090	APURÍMAC II	2,523,965	96,557	26.14	1,577,159	(946,806)	-37.5%
100	CAJAMARCA II - CHOTA	2,367,742	106,280	22.28	2,856,532	488,790	20.6%
110	CUSCO	9,915,615	539,819	18.37	12,265,635	2,350,020	23.7%
120	CAJAMARCA III - CUTERVO	4,019,222	102,275	39.30	3,371,839	(647,383)	-16.1%
130	HUANCAVELICA	5,480,647	213,868	25.63	6,875,698	1,395,051	25.5%
140	HUÁNUCO	12,903,895	394,022	32.75	13,143,813	239,918	1.9%
150	ICA	2,179,895	78,777	27.67	1,827,968	(351,927)	-16.1%
160	JAEN	4,403,259	157,826	27.90	2,719,981	(1,683,278)	-38.2%
170	JUNIN	6,388,264	251,336	25.42	6,712,237	323,973	5.1%
180	LA LIBERTAD	8,809,759	398,869	22.09	9,825,879	1,016,120	11.5%
190	LAMBAYEQUE	8,804,737	290,208	30.34	7,741,756	(1,062,981)	-12.1%
200	LIMA CIUDAD	3,585,987	232,683	15.41	5,041,914	1,455,927	40.6%
220	LIMA NORTE	6,695,531	174,931	38.28	4,249,745	(2,445,786)	-36.5%
230	LIMA SUR	5,245,608	166,797	31.45	4,022,139	(1,223,469)	-23.3%
240	LORETO	11,669,287	398,119	29.31	12,538,576	869,289	7.4%
250	MADRE DE DIOS	659,087	26,136	25.22	580,410	(78,677)	-11.9%
260	MOQUEGUA	634,421	26,688	23.77	595,540	(38,881)	-6.1%
270	PASCO	2,031,710	63,237	32.13	2,101,627	69,917	3.4%
280	PIURA	8,334,931	292,489	28.50	8,314,156	(20,775)	-0.2%
290	PUNO	5,158,404	308,074	16.74	8,046,326	2,887,922	56.0%
300	SAN MARTIN	6,244,426	257,173	24.28	6,752,804	508,378	8.1%
310	PIURA II SULLANA	4,096,450	177,282	23.11	3,281,673	(814,777)	-19.9%
320	TACNA	1,914,987	51,276	37.35	1,195,770	(719,217)	-37.6%
330	TUMBES	1,306,744	59,790	21.86	1,199,533	(107,211)	-8.2%
340	UCAYALI	3,125,015	155,889	20.05	3,930,065	805,050	25.8%
Overall total		165,784,308	6,578,470	25.20	165,784,308	-	0.0%

Source: Calculated based on SIS statistics for 2006.

Correcting for poverty further lessens the differences between simulated and observed regional allocations. This is advantageous when considering a real application of the simulated exercise. Once again, the simulation using only primary care services yields significantly different results than a simulation that considers all services.

FIGURE 12: COMPARISON OF OBSERVED AND RISK- ADJUSTED PER CAPITA ALLOCATIONS, WITH INFANT MORTALITY FOR PRIMARY CARE, BY DEPARTMENT, 2006



Source: Own calculations and INEI, 2001.

TABLE 24: DIFFERENCES IN REDISTRIBUTION OF RESOURCES FOR POVERTY- AND DEMOGRAPHIC RISK-ADJUSTED PRIMARY CARE ONLY VS. TOTAL SPENDING (AS % OF TOTAL SPENDING FOR 2006)

DISA code	DISA/DIRESA	Population	Percent redistribution with total per capita for primary care	Percent redistribution with total per capita (with hospitals)
010	AMAZONAS - CHACHAPOYAS	59,606	-25.4%	10.0%
020	ANCASH	234,117	17.3%	16.8%
030	APURIMAC I	127,036	-22.8%	26.8%
040	AREQUIPA	204,997	-30.9%	-24.5%
050	AYACUCHO	332,768	9.3%	44.3%
060	BAGUA	124,677	-33.4%	-37.5%
070	CAJAMARCA I	221,590	29.8%	61.6%
080	CALLAO	91,851	-10.5%	-55.6%
090	APURÍMAC II	96,557	-10.7%	-20.8%
100	CAJAMARCA II - CHOTA	106,280	10.9%	48.5%
110	CUSCO	539,819	28.7%	45.7%
120	CAJAMARCA III - CUTERVO	102,275	-41.6%	8.4%
130	HUANCAVELICA	213,868	-6.2%	54.0%
140	HUÁNUCO	394,022	-26.3%	24.3%
150	ICA	78,777	-3.1%	-23.1%
160	JAEN	157,826	-11.8%	-17.4%
170	JUNIN	251,336	2.0%	11.2%
180	LA LIBERTAD	398,869	14.6%	27.0%
190	LAMBAYEQUE	290,208	-14.0%	4.8%
200	LIMA CIUDAD	232,683	77.6%	-65.5%
220	LIMA NORTE	174,931	-33.5%	-45.2%
230	LIMA SUR	166,797	-13.8%	-20.7%
240	LORETO	398,119	-10.4%	23.9%
250	MADRE DE DIOS	26,136	4.8%	-11.3%
260	MOQUEGUA	26,688	7.8%	-8.8%
270	PASCO	63,237	-20.8%	7.7%
280	PIURA	292,489	-9.5%	25.2%
290	PUNO	308,074	49.4%	71.1%
300	SAN MARTIN	257,173	2.2%	33.8%
310	PIURA II SULLANA	177,282	14.4%	-8.7%
320	TACNA	51,276	-29.9%	-36.0%
330	TUMBES	59,790	15.9%	-12.8%
340	UCAYALI	155,889	27.7%	34.1%
Overall total		6,578,470	0.0%	0.0%

Source: Calculated based on SIS data for 2006.

Poverty is a key factor. This factor explains the differential allocation of resources to Lima, where the poverty level below the national average and much lower than in certain regions. Gender and age factors alone fail to take into account poverty levels or associated health needs. Therefore, a model lacking a poverty correction factor only partially reflects the health needs of the population.

5. FINAL COMMENTS AND RECOMMENDATIONS

SIS represents an inarguable advance in channeling resources toward the poorest citizens of Peru, ensuring greater access to health care. However, the reform essentially separated the public health system into two sections, MINSA and SIS. To ensure efficient spending in the long term, this analysis suggests that financing be placed into the hands of a single entity, especially for transfers and related items.

The proposed transfer mechanisms should be incorporated consecutively into the financing system. Existing evidence should be applied in developing Peru's new transfer mechanisms. The mechanisms should support the country's health and equity goals and be compatible with a mixed payment system. The system should provide a managing entity, like the DIRESAS, with a territorial budget. It should also provide specific transfer mechanisms within the system for the different levels of care. In sum, we recommend initially implementing a demographic- and poverty-adjusted territorial capitation system, for primary care only. Over time, other components of a good payment system should be added gradually. Furthermore, SIS should begin implementation with pilot tests in regions where conditions are more favorable.

Hospital case studies and risk-adjusted morbidity can improve management of health systems. For SIS, tools such as DRGs and DCGs could be added to the existing information system. Overall, SIS should improve its information, management, and monitoring systems. Established tools such as WinSIG may help homogenize and implement cost accounting systems within health facilities. Such information systems are an important prerequisite for implementing payment systems.

For the first stage of progress, we developed a simulation of immediately implementable recommendations that will help develop conditions favorable for the medium- and long-term recommendations. Intrasectorial coordination is essential to the success of this plan, as are institutional definitions regarding financing issues.

This study simulated a series of territorial capitation systems to illustrate recommended methodology. The first simulation encompassed all SIS spending and the second only primary-level care.

If all individuals had the same expected health spending needs, the current budgets should change significantly. This means that allocated resources as well as utilization rates per capita vary from region to region. Where observed per capita spending is higher, we can assume that utilization of services per person is higher as well. Above all, this reflects spending in hospitals with installed capacity and in referral centers such as Lima and Callao, as shown below.

The result is decisive; resources would be distributed across regions much differently according to the calculated capitations. Puno and Lima are the extreme cases; spending in the former should increase 70% and decrease 74% in the latter.

When per capita allocation is adjusted demographically –i.e., individuals are not assumed to have identical expected health spending needs, but rather needs that vary by gender and age– differences

between the simulated and observed per capita allocations are smaller than the gaps noted in the prior exercise. This finding can be explained by the composition of the population. That is, if a region with a higher total budget in a fixed cost model has a smaller budget when using an adjusted model, it means that the higher-cost population is a relative minority or the lower-cost population is relatively large. This occurs for Lima, for example, where there is a higher concentration of older adults.

In most cases with available data, that is, 26 of the 29 departments, the health efficacy of demographic risk-adjusted capitation behaves as expected. Where infant mortality is higher than the national average, the observed per capita budget is lower than the simulated budget. Where infant mortality is lower than average, the opposite is true.

When poverty is included as a risk adjustment factor, variability in resource allocation is lower than in the above cases. Given the high correlation between poverty and infant mortality, this simulation is better adjusted for health status, meaning that the resources are better targeted. Therefore, this option is superior to the previous examples.

The gaps observed in the previous examples are reversed when only primary care is considered. Lima, for example, goes from a positive gap (that is, it hypothetically transfers more resources than necessary) to a negative gap of 63.5% (that is, it hypothetically lacks this percentage of financing with respect to the amount transferred in 2006 for primary care). In Callao, on the other hand, the result is in the same direction for both simulations; that is, in both scenarios it hypothetically transfers more resources than necessary in both, but the magnitude of the difference is markedly smaller when only considering primary care spending.

The simulated risk-adjusted capitations with and without hospitals are both significantly different than the observed 2006 regional allocations. However, for regions with greater installed hospital capacity, these differences invert or change in magnitude from the first to second scenario. For Lima, for instance, the disparity between observed and simulated allocations is greater in the second than in the first exercise. If in the first simulation we would have to take away a hypothetical 74% of its 2006 observed allocated resources, in the second we would have to add an additional 77.6%.

Correcting for poverty further lessen the differences between simulated and observed regional allocations. This is advantageous when considering a real application of the simulated exercise. Once again, the simulation using only primary care services yields significantly different results than a simulation that considers all services. Poverty is a key factor. This factor explains the differential allocation of resources to Lima, where the poverty level below the national average, much lower than in certain regions. Gender and age factors alone fail to take into account poverty levels or associated health needs. A model lacking a poverty correction factor only partially reflects the health needs of the population. Therefore, capitations should be adjusted for poverty as well as demographic risk factors.

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