

From Few to Many

Ten Years of Health Insurance Expansion in Colombia

Amanda L. Glassman
María-Luisa Escobar
Antonio Giuffrida
Ursula Giedion
Editors



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The Brookings Institution**

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Inter-American Development Bank
1300 New York Avenue, N.W.
Washington, D.C. 20577
www.iadb.org

Co-published by
The Brookings Institution
1775 Massachusetts Avenue, N.W.
Washington, D.C. 20036
www.brookings.edu

Produced by the IDB Office of External Relations

The views and opinions expressed in this publication are those of the authors and do not necessarily reflect the official position of the Inter-American Development Bank.

**Cataloging-in-Publication data provided by the
Inter-American Development Bank
Felipe Herrera Library**

From few to many: ten years of health insurance expansion in Colombia / Amanda L. Glassman ... [et al.], editors.

p. cm.
Includes bibliographical references.
ISBN: 978-1-59782-073-8

1. Health insurance—Colombia—Case studies. 2. Health care reform—Colombia. 3. Medical policy—Colombia. 4. National health services—Colombia. 5. Public health—Colombia. I. Glassman, Amanda L. II. Inter-American Development Bank. III. Brookings Institution.

RA412.5.C6 F76 2009
368.382 F9252--dc22

LCCN: 2009930145

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Preface

After more than a decade of implementation, health insurance in Colombia—once characterized as “managed competition in the tropics” by the late health minister and prominent economist Juan Luis Londoño—has achieved dramatic results in access, utilization, and financial protection, particularly for the poor. More than 85 percent of Colombia’s population is now insured.

In the context of worldwide debates on the best way to achieve universal coverage without creating perverse incentives, this book brings empirically based analysis of Colombia’s achievements to audiences inside and outside of the country. The book also identifies challenges for the future in the areas of financing, public health, benefits packages, and hospital management, recognizing that health system reform is an ongoing process that requires continuous evaluation, learning, and adjustment.

This book is the joint production of researchers based in Colombia and at the Brookings Institution and the Inter-American Development Bank. Initial work on the volume was supported by a grant from the Bill & Melinda Gates Foundation to the Brookings Institution, while additional research, editing, and publication costs were covered by the Inter-American Development Bank. These contributions are much appreciated.

Kei Kawabata
Manager, Social Sectors

This book is dedicated to the memory of Dr. Juan Luis Londoño, the visionary policymaker who set the Colombia reform in motion.

List of Abbreviations

AIDS	acquired immunodeficiency syndrome
BCG	Bacillus Calmette-Guérin
CASEN	Encuesta de Caracterización Socioeconómica Nacional
DANE	Departamento Administrativo Nacional de Estadística (National Administrative Statistics Department)
DHS	Demographic and Health Survey
DOTS	directly observed treatment short-course
DPT	diphtheria, pertussis, tetanus
ECLAC	Economic Commission for Latin America and the Caribbean (Comisión Económica para América Latina y el Caribe)
EPS	Entidades Promotoras de Salud (Health Promotion Entities)
FEDESARROLLO	Fundación para la Educación Superior y el Desarrollo (Foundation for Higher Education and Development)
FOSYGA	Fondo de Solidaridad y Garantía (Solidarity and Guarantee Fund)
GDP	gross domestic product
HIV	human immunodeficiency virus
LSMS	Living Standards Measurement Survey
MDD	matched double difference
MPS	Ministerio de la Protección Social (Ministry of Social Protection)
NMCP	National Malaria Control Program

OECD	Organisation for Economic Co-operation and Development
PAB	Plan de Atención Básica (Basic Services Plan), now the Plan Básico de Salud
PAHO	Pan American Health Organization
PBS	Plan Básico de Salud (Basic Services Plan)
POS	Plan Obligatorio de Salud (Compulsory Health Plan)
PSM	propensity score matching
RDA	regression discontinuity approach
SGSSS	Sistema General de Seguridad Social en Salud (General System of Social Security in Health)
SISBEN	Sistema de Identificación de Beneficiarios (Beneficiary Identification System)
SNS	Sistema Nacional de Salud (National Health System)
UNFPA	United Nations Fund for Population Activities
WHO	World Health Organization



CHAPTER 1

Colombia: After a Decade of Health System Reform

*María-Luisa Escobar, Ursula Giedion,
Antonio Giuffrida, and Amanda L. Glassman*

Background and Context

Colombia is a middle-income country with an estimated 2005 population of 43 million (Departamento Administrativo Nacional de Estadística/National Administrative Statistics Department, 2007). Over the past three decades, the Colombian population has experienced the demographic and epidemiological changes that characterize societies in transition: a rapid decline in the total fertility rate (from 3.24 children per woman in 1985 to 2.48 in 2005), a significant increase in life expectancy (from 71.5 to 76.3 years for women and from 64.7 to 69 years for men, over the 1985 to 2005 period), and rapid urbanization (74.3 percent of the population lived in urban centers in 2005, compared with 67 percent in 1985).

Half the population is identified as poor and inequality is widespread. Colombia, like other developing nations, is highly vulnerable to external and internal shocks that affect the income of the poor and their capacity to purchase needed health care services. Prior to 1993, only a quarter of Colombians had health insurance and more than half of total spending on health was out of pocket. Economic barriers were frequently cited as obstacles to care-seeking by the poor: nearly 60 percent of those who reported an illness requiring a visit to a health

facility in 1993 did not use these services because of costs associated with care-seeking.

Colombia introduced mandatory social health insurance with the approval of an ambitious health care reform package in 1993. Occurring in the midst of decentralization and other state modernization reforms, the health reform was intended to increase burden-sharing of health risks and financing to improve access to care and provide financial protection to those beyond the formally employed. The reform introduced competition into both insurance and the provision of care through a managed-care model.

As of 2008, more than 85 percent of the population is insured and access to and use of health care has increased significantly for the poor. Financial protection has also improved dramatically, as has spending on public health.

Yet despite its novelty and promising results, the Colombian reform remains little studied or discussed internationally. Much of the extensive and high-quality literature produced in the country is not easily available to the rest of the world; perhaps this is one of the reasons little is known of the impact and challenges of Colombia's introduction and implementation of health care reform.

The experience offers an opportunity to understand the challenges, benefits, and pitfalls of introducing health system features like active purchasing, risk adjustment, insurance, and benefits packages—more common to wealthy countries—into a more resource- and capacity-constrained environment. This book aims to make recent research results public and to trigger an evidence-based discussion of this comprehensive reform, both nationally and internationally.

The Health Care System before 1993

Prior to the changes introduced by the health care and financial decentralization reforms in 1993, access to and use of health care was low. The poor were vulnerable to impoverishing spending as a consequence of illness (Giedion, López, and Riveros, 2005). The health care system in Colombia was characterized by atomized risk pools, low efficiency, failure of public subsidies to reach the poor, large out-of-pocket expenditures, and significant inequality.

These factors disproportionately affected the poor: more than half of the bottom income quintile was unable to obtain care when they needed it because they could not afford it. One-quarter of the total population had no access to effective health care because of inadequacies in health care infrastructure, human resources, medicine, and medical goods (Barón, 2007). Although public facilities were intended to be free and were meant to cover the poor and uninsured, only 20 percent of individuals admitted to public hospitals were from the poorest income quintile and 91 percent of the poorest hospitalized patients incurred out-of-pocket expenses. Public subsidies benefited patients who were better off: almost 60 percent of admittances to public hospitals were of middle- or high-income individuals from the fourth and fifth income quintiles, but only 69 percent of the wealthiest hospitalized patients paid out-of-pocket expenses (Molina *et al.* 1993).

The pre-reform National Health System comprised three independent sub-sectors: the official or public sector (government-owned facilities), the social security sector for formally employed people, and the private sector, used by both the insured and the uninsured. More than 40 percent of all health interventions and hospitalizations were provided through the private sector (Departamento Administrativo Nacional de Estadística, 1992). The system relied on general tax revenue, payroll contributions, and out-of-pocket expenditures, with no pooling of the three sources of financing. Not only was government spending before the reform low, but there was also no effective targeting mechanism for public subsidies. Colombia spent 1.4 percent of its gross domestic product (GDP) on health care (Molina *et al.*, 1993) in 1993, though Mexico, Chile, Venezuela, Brazil, and Argentina were already spending a larger percentage of their GDP on health five years earlier.

Public health financing was funneled to finance public hospitals, primary care facilities, public health programs, disease surveillance activities, and the administrative expenses of the central and decentralized Ministry of Health offices based on their historical budgets, without relationship to the level of services provided, the population's health needs, or health outcomes. Beyond the centralized public health programs, there was no separate allocation of resources for disease prevention, health promotion, or community health activities. The public hospital network was composed of institutions of varied levels

of quality and efficiency but all with expensive labor costs stemming from a highly unionized workforce. The concurrent implementation of decentralization gave ownership of public facilities to local governments, which received National Treasury transfers to finance their historical budgets. There were few incentives for public hospitals to become more efficient, improve the quality of care, or adjust their portfolios of services according to population needs. In fact, many public hospitals were often in financial crisis by mid-year and relied on government bailouts to survive.

People who were formally employed contributed with payroll taxes to social security institutions that provided health coverage to the enrolled population through their vertically integrated networks of facilities and health care providers. Social security beneficiaries represented around one-quarter of the Colombian population. Per capita health spending in the social security sector was several times higher than that for the rest of the population relying on the services of the Ministry of Health. In addition, a large private sector provided insurance products and health care to the population; insurance did not generally cover dependents.

The Reforms of 1993

Law 100 of 1993 set up the legal framework of the new Colombian health care system and adopted the “structured pluralism” model (Londoño and Frenk, 1997). The reform unified the social security, public, and private sub-systems under the General System of Social Security in Health (known by its Spanish acronym, SGSSS). The reform also reorganized the system around functions and responsibilities rather than population groups.

The 1993 health reform created mandatory universal health insurance to improve the equity and performance of public spending on health. Financed through a combination of payroll contributions and general taxation, this comprehensive national social insurance scheme included a contributory regime for those able to pay and a fully subsidized scheme for the poor. Beneficiaries enroll with public or private insurers (health funds), have legal rights to an explicit package of health benefits, and receive care from a mix of public and private

providers. The reform introduced a national equalization fund, the Fondo de Solidaridad y Garantía (FOSYGA; Solidarity and Guarantee Fund), to provide cross-subsidies between wealthy and poor, sick and healthy, old and young, and financing to stabilize health financing during economic crises.

Both formally employed and independent workers earning more than a pre-determined minimum income must enroll in the contributory health insurance regime and contribute 12.5 percent of their income (12 percent, before January 2008). Funds are collected by the enrollee's insurer of choice and then go to the national equalization fund. Poor and indigent people, who are identified as such through the Sistema de Identificación de Beneficiarios (SISBEN; Beneficiary Identification System), a proxy means test, do not make any insurance contributions and are covered under the subsidized health insurance regime.

Insured individuals in both the contributory and subsidized regimes choose their insurer, choose care providers within the insurer's network, and receive a health benefits package purchased by insurers from public and private providers through contracts. All participants in the contributory regime can enroll their dependents as a family unit. The benefits plan for the contributory regime is generous and covers all levels of care. The package had a premium equivalent to US\$207 annually in 2007. Primary care, some inpatient care, and emergency care are now covered under the subsidized regime and have a premium equivalent to US\$117. This coverage is complemented by inpatient care at level 3 public hospitals. According to the law, the supply-side subsidies should gradually transform into demand-side subsidies as insurance coverage expands, eventually leading to universal coverage with a uniform package for everyone. Residents still uninsured are able to use public facilities to receive preventive and public health services and emergency care.

Regardless of insurance status, all citizens are eligible to receive the benefits of the public health intervention package, the Plan Básico de Salud (PBS or Basic Services Plan; called the Plan de Atención Básica until 2008). Municipalities provide health promotion and disease prevention services included in the PBS. Financing for public health is separate from other health care funding.

The reforms mandated that public hospitals would make the transition from being state care providers financed through supply-side subsidies based on their historical budgets, to being state enterprises with autonomous governance structures remunerated for the services provided. Private health care providers were to compete with public providers for the provision of the mandatory benefit plan on the basis of quality and were to negotiate contracts with insurers. The challenges were many and the pressure for modernization in the public hospital network was great with the changes introduced to the provision of care.

A Decade of Change

The Political Economy

The government administration changed with the presidential elections in mid-1994, seven months after Law 100 was approved. Although from the same political party as the previous government, the new team was not completely aligned with the principles of the reform. Approval of key by-laws and regulations required for implementation of the law were delayed and the reform process lost momentum. Despite these difficulties, however, the contributory regime attracted new insurers that entered the system to extend insurance coverage. Regulations for insurers for the subsidized regime were formally introduced at the end of 1995 to launch the implementation of that scheme. Political difficulties and necessary negotiations with local governments followed; the subsidized regime was not launched until almost two years later.

Between 1991 and 1994, Colombia experienced important economic growth, followed by a dramatic reverse that led to a recession in 1998–99 (with record negative growth of –4.3 percent in GDP in 1999). A mild economic recovery followed in 2000–01, with GDP growing in those years by 2.8 and 2.4 percent, respectively. Official unemployment figures rose from 8.7 percent in 1995 to 20.2 percent in 2000, however (representing the highest unemployment rates in the past 20 years), and in 2000, informal employment represented 54.9 percent of total employment. The recession occurred in the context of an intensification of the internal armed conflict, which displaced about 580,000 people between 1998 and 2001. The rural population was the most

severely affected: 82 percent of displaced individuals came to cities from rural areas.

The health care reforms had been only partially implemented by 2001 and the SGSSS was undergoing a severe and generalized financial crisis. Universal insurance coverage was still far from being achieved in 2001, with only 58 percent of the population insured, and the transformation of hospital financing had affected only 50 percent of hospital revenue. Confusion about the decentralized roles of local authorities in public health, combined with shortages in the allocation of resources for vaccination programs, negatively affected immunization rates.

That situation forced the government to consider two alternatives. One was to return to the supply-side subsidies, with public-sector budgets controlled by the central government—and in particular the National Treasury—but at the expense of the subsidized regime and the health care system's reform (Gaviria, Medina, and Mejía, 2006). Alternatively, the government could correct the external conditions affecting the delivery of care and strengthen the health sector reform process. The government adopted the latter approach and the administration committed to accelerating the expansion of subsidized health insurance for the poor; developing a program to support the redesign, reorganization, and modernization of public hospitals and to ensure their financial sustainability; and strengthening the national immunization program.

The implementation of this vision began in 2002. The previous labor and health ministries were merged. The new Ministry of Social Protection became responsible for pensions, health insurance, public health programs, and all other social assistance programs. A quality assurance system was designed, with the introduction of a licensing and accreditation process for public and private health care facilities and providers. An aggressive hospital restructuring program was negotiated with local governments and the Ministry of Finance.

Measuring Results

To objectively measure the impact of social policy change in the developing world, it is necessary to analyze progress in light of the original pre-reform conditions, not only with respect to the degree of achieve-

ment of ambitious reform goals. Given that reforms are processes evolving over time and within societies in states of continuous change, it seems sensible to first understand the complexities of transformation in order to objectively assess any change, even when it seems small and incomplete by international standards.

Breaking apart the traditional social security schemes for the formally employed and transforming them into regular, competing insurers was a political and institutional task impossible to imagine before 1993. In fact, most—if not all—countries in Latin America with health care systems similar to that of pre-reform Colombia still have segmented health care systems with significant inequality in health financing, no explicit benefits packages, and no contracting of a mix of public and private providers. Establishing a functional equalization fund to transform income contributions into risk-adjusted capitated payments to insurers was a test for those financial agencies to be contracted through public bidding to manage the fund's finances. The complexity of the equalization fund—with four sub-funds (or accounts in FOSYGA) to support such functions as full or partial insurance premiums for more than 30 million people—requires well-developed capital and financial markets accompanied by state-of-the-art information systems.

Demonstrating and accepting that public subsidies did not reach the poor, and introducing a proxy means test to better target government subsidies to those most in need, was an immense challenge in the early 1990s; it still is in many parts of the developing world. The introduction and use of the SISBEN in the health sector was a victory for the Colombian poor and an important improvement for the allocation of public resources to health. The scheme was later adopted in other sectors as well.

Governance mechanisms like the Consejo Nacional de Seguridad Social (National Social Security Council)—with representatives from public and private insurers and care providers, the government, and civil society having the power to make decisions on the functioning of the health care system—are still unknown in many countries with income levels similar to Colombia's. After 1993, for the first time there is a formal regulatory structure, through which the Minister of Finance and the Minister of Health sit at the same table to debate the techni-

cal and financial aspects of the health care system when negotiating any decision affecting public finances. An open negotiating sphere in which all special interest groups are represented is commoner to more egalitarian societies with well-established democracy than to a low- to middle-income country with a 40-year history of internal armed conflict. The risk of capture was important and the technical requirements for it to function as envisioned were great. Ten years of implementation have taught important lessons both for Colombia and for other countries that face similar challenges.

The five papers brought together in this volume examine Colombia's health system reforms and their impact after more than a decade of implementation. The book presents discussion in areas such as financing, hospital reform, insurance impact, regulation, and public health. Each paper analyzes the reform from a different perspective, although all are naturally inter-related, given the structure of the system and the way it functions. The analysis discussed here refers to the period between 1993 and 2003; it was carried out with the information available before the most recently released National Health Survey of 2007–08 and the approval of Health Law 1122 in 2007.

Examination of the Reform Experience

Chapter 2, by Amanda L. Glassman, Diana M. Pinto, Leslie F. Stone, and Juan Gonzalo López, seeks to improve the quality of the policy debate on public health in Colombia by examining the evolution of public health institutions, spending, and programs—and the effectiveness of these—over the past 30 years. The chapter uses the vaccination, tuberculosis, and malaria prevention and control programs as case studies. The authors find that public health conditions have improved substantially in Colombia over the past decade. Equity in access to public health services has increased over time, but remains a problem for the very poor and for ethnic minorities and displaced people. Spending on public health has increased, and earmarked financing protects it in the aggregate. A severe recession in the late 1990s negatively affected the availability of non-earmarked financing for public health, however, which led to drops in health coverage during this period. Insurance has proven a useful tool to increase coverage rates for some interventions,

although available data and analyses provide a confusing picture of coverage and impact trends in tuberculosis and malaria.

Decentralization reforms have complicated the public health panorama, particularly from the perspective of vulnerable populations, leading to suboptimal implementation of programs and, perhaps, outcomes. The use of insurance and contracting to achieve public health goals is of interest worldwide, and the Colombia case shows that the devil is in the details of underlying governance, data, and evidence necessary to develop and implement effective policy.

Chapter 3, by Ursula Giedion, Beatriz Yadira Díaz, Eduardo Andrés Alfonso, and William D. Savedoff, examines the impact of health insurance by applying a series of different quasi-experimental design techniques, including regression discontinuity, propensity score matching, and matched double difference when comparing differences between insured and uninsured people. The chapter discusses the effect of subsidized insurance on equity, access to care, utilization of services, and financial protection of households.

Although insurance coverage increased across all income groups after 1993, the improvement has been particularly pronounced among the poorest individuals and in the least-developed regions. Empirical evidence indicates that before the reforms, the poorest segment of the population had almost no financial protection when facing illness, since only a small portion of costs were covered by health insurance. Meanwhile, 6 of every 10 of the wealthiest individuals were protected by insurance. A decade later, the gap between the rich and the poor has been reduced considerably. Insurance coverage in the lowest income group has increased to 18 times what it was in 1993, whereas coverage among the highest income group increased only 1.4 times. Analysis with four methodologies consistently indicates that the subsidized health insurance scheme has considerably improved access to and utilization of health services, especially among rural and poor Colombians. Insured people of all ages are much more likely than their uninsured peers to receive care when they need it. Analysis results show that insurance is quite important for rural and poor children because it increases the likelihood of prenatal care, of attendance by a qualified care provider at birth, of receiving care when ill, and of a completed immunization scheme.

Chapter 4, by Teresa M. Tono, Enriqueta Cueto, Antonio Giuffrida, Carlos H. Arango, and Alvaro López, presents evidence and discussion of the transformation of the public hospital network and of the achievements, failures, difficulties, and challenges the health care system still faces. Although the reform laws gave public hospitals the legal framework to become more autonomous entities, hospitals had no precedent for operating in a competitive environment, and had high labor costs and few managerial skills. The latter problems were great challenges for public hospitals to overcome on their own. In response, a modernization project tailored to the shortcomings of each individual hospital was set in place to improve both the capacity of public hospitals to participate in the health services delivery market, and their productivity and the quality of services they offered. By 2006, 179 public hospitals had already participated in this ongoing process, some with good results.

The hospital modernization experience shows that public hospitals were not able to modernize on their own, even though an appropriate legal framework was in place. Maintaining strong political will over time is necessary for successful transformation of public facilities. Skillful negotiation with decentralized governments has also been necessary to provide appropriate incentives to develop a lasting process of transformation. An appropriate allocation of resources is also required, making reshaping of the public hospital network costly and slow. The results presented here suggest that legislation, along with hospital network modernization and labor restructuring programs, improves the efficiency and quality of the hospitals: participating public hospitals have decreased their deficits and improved their market participation.

Chapter 5, by Carmen Elisa Flórez, Ursula Giedion, Renata Pardo, and Eduardo Andrés Alfonso, analyzes the impact of the reforms on financial protection of health insurance. This chapter discusses the methodological challenges of measuring financial protection and the sensitivity of results to the method used. Results show that the reforms provide substantial financial protection from catastrophic expenditure and impoverishment, benefiting all insured people in both the subsidized and contributory regimes, particularly self-employed and informally employed workers.

Finally, Chapter 6, by María-Luisa Escobar, Ursula Giedion, Olga Lucía Acosta, Ramón Castaño, Diana M. Pinto, and Fernando Ruiz Gómez, presents evidence of the impact of the reforms on the level, composition, distribution, and equity of health care financing. The chapter also examines threats to the reform's financial sustainability. The health care system is still financed by both general tax revenue and payroll contributions; however, its financial structure and the mechanics of resource flows were changed to improve equity, to extend insurance coverage to all—the poor in particular—and to improve efficiency of public spending.

The composition of financing in Colombia is now similar to that of countries that are part of the Organisation for Economic Co-operation and Development (OECD); public spending, including social security, accounts for more than 80 percent of total health spending, while out-of-pocket spending is among the lowest in the world. Results support the idea that the reforms make government subsidies for health the best-targeted public subsidy in the country. The subsidies have also had an important redistributive impact. Despite these major accomplishments, the system faces important challenges before it can achieve financially sustainable universal coverage.

Despite these encouraging results, there is still much to do and to improve. A decade after the reform, 15 percent of the population remains uninsured; benefit plans under the contributory regime and the subsidized regime still differ. There are deficiencies in the quality of care and not all public hospitals are modernized. The stewardship function needs to be strengthened; the financial sustainability of the system is continually at risk. Nevertheless, the health care system in Colombia experienced drastic changes that have benefited the health of the country's population.

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CHAPTER 2

Institutions, Spending, Programs, and Public Health

*Amanda L. Glassman, Diana M. Pinto,
Leslie F. Stone, and Juan Gonzalo López*

During a decade of health insurance and decentralization reforms, and despite a profound economic recession in the late 1990s and an ongoing internal armed conflict that has waxed and waned, average indicators of health and well-being have improved substantially in Colombia (Table 2.1). For example, the infant mortality rate in 2005 was lower than that in Brazil (28 per 1,000) and Mexico (22 per 1,000), two comparable middle-income countries in the region (WHO, 2007).

Yet nowhere have Colombia's reforms been as controversial as in their impact on public health. Much of the literature reaches conclusions about the impact of the insurance and decentralization reforms based on limited data and inappropriate methods of analysis. An article examining the evolution of vaccination coverage in the late 1990s, published by the Pan American Health Organization (PAHO), for example, concludes that "[p]ublic health programs in Colombia have deteriorated.... Health systems based on regulated competition are not the most suitable ones for Latin America" (Homedes and Ugalde, 2005). In a news item published by the *British Medical Journal* in 1997, the correspondent concludes that the health status in Bogotá is worsening owing to the reforms, which have forced physicians to work longer hours (Richards, 1997).

This chapter seeks to improve the quality of the policy debate on public health in Colombia by examining the evolution of public health

TABLE 2.1 Public Health and Living Standards Before and After the 1993 Reforms

Indicator	ca. 1990	ca. 2006
Public spending on public health, excluding donor funding and supply subsidies (billions of 2004 Colombian pesos)	No data	1,417,000
Public spending on public health (percentage of GDP)	No data	0.41
Unmet basic needs, such as clean water, sewage, etc. (percentage of total population with at least one basic need unmet)	35.8	27.6
Life expectancy at birth (years)	68.3	72.8
Infant mortality rate (per 1,000 live births)	26.3	17.2
Under-5 mortality rate (per 1,000 population)	34.7	21.4
Births attended by professionals (percentage of total births)	81.8	96.4
Measles, mumps, and rubella immunization (percentage of children aged 12–23 months)	82.0	89.0

Sources: Spending: authors' analysis based on Ministry of Social Protection data; basic needs and life expectancy: National Administrative Statistics Department (www.dane.gov.co, accessed June 30, 2007); remainder: Demographic Health Survey 2005; Profamilia and Macro International (2006).

institutions, spending, and programs—and their effectiveness—over the past 30 years. Vaccination, tuberculosis, and malaria prevention and control programs are used as case studies. It is hoped that this synthesis and discussion of the evidence, developed using available data and literature, will be relevant both inside and outside Colombia, as other countries grapple with similar policy issues worldwide.

The chapter will first provide background on the health and decentralization reforms and their impact on financing and spending for public health, as well as trends in the burden of disease and mortality statistics. This background sets the stage for the examination of the three program case studies, followed by a discussion.

Background

Health Reforms

Prior to 1985, public health interventions—defined as maternal and child care, and control of epidemics, and later including immuniza-

tion and control of tuberculosis, leprosy, malaria, and sexually transmitted diseases—were financed as an indistinguishable part of the then–Ministry of Health budget and were organized as centralized programs. Seventy-two percent of health care financing was spent on curative care services that disproportionately benefited relatively well-off patients (analysis based on National Health Accounts data produced by the National Planning Department). Public financing for public health programs such as immunization and family planning was complemented by international donors such as the United States Agency for International Development (USAID), the United Nations Fund for Population Activities (UNFPA), the World Health Organization (WHO), and PAHO (Tono *et al.*, 2002), although the exact amounts of these contributions are impossible to quantify retrospectively. Public health interventions were also provided by the Social Security Institute, a social insurance scheme for formally employed workers (but excluding their dependents), financed by a payroll tax. Facilities owned by the institute provided these services.

After 1993, motivated by the poor performance of the health system and the high levels of out-of-pocket spending on health care, the financing and care provision arrangements governing public health were substantially changed. National health insurance covering formally employed workers and their families, and progressively larger numbers of the poor, was introduced with Law 100 of 1993. The insurance scheme—intended to be universal eventually—was made up of a contributory regime of formal sector workers and their families, and a fully subsidized regime directed to the poor. (Legislation affecting public health is embodied in the original reform law—Law 100 of 1993—as well as in the law governing decentralization—Law 60 of 1993—and subsequently in Law 715 of 2001, which attempted to clarify public health functions and responsibilities at each level of government.)

The law distinguished between a package of health interventions for individuals, known as the Plan Obligatorio de Salud (POS; Compulsory Health Plan), to be financed and purchased by private and public insurers, and a package of public health interventions, known as the Plan Básico de Salud (PBS; Basic Services Plan). Called the Plan de Atención Básica until 2008, the PBS was to be financed by a mix of public resources, and resources purchased and/or provided by sub-national

(departmental and municipal) governments. National health insurance for the poor—the subsidized regime—is financed by contributors to the formal sector contributory regime, as well as by general revenues and other earmarked taxes (see Chapter 6). Thus, insurance for the poor is also financed by public monies. In 2001, a law governing responsibilities at different levels of government required that departmental health directorates contract out for PBS activities. However, a later circular (No. 0018 of 2004) from the Ministry of Social Protection required that departments or municipalities contract preferentially with public providers: “...if quality conditions are equal, it will be preferable to contract with public rather than private providers.”

Insurance-financed interventions are conceptually categorized as those interventions with benefits that accrue mostly to individuals, while PBS interventions are those with benefits that are collective or display high externalities. Insurance-financed interventions reach the insured person, while PBS interventions are intended to be universal. In addition to the PBS, sub-national governments are required to provide laboratory services and individual services for uninsured people during the transition to universal coverage. This supply-side subsidy for the uninsured has been ill-defined and left to the discretion of each municipality, however; many municipalities simply transferred the funds to public hospitals. Studies have found lower rates of utilization and coverage of key interventions among uninsured patients, suggesting that subsidies channeled to public hospitals for this purpose are not being optimally used (see Chapter 4).

Both sets of interventions, along with protocols and standards of care as of 2000, were explicitly established in laws, norms, and guidelines, thus creating a financing and expenditure benchmark for public health and a legal entitlement for the respective target populations.¹ Table 2.2 describes the interventions, target populations, and financing sources for public health in Colombia in 2006. Some overlap in the content of packages exists, particularly in chronic disease control.

¹ Colombia's Constitution of 1991 allows easy access to the court system; Colombians are able to, and frequently do, contest health access problems. See Chapter 6.

TABLE 2.2 Public Health Service Packages, Target Populations, and Financing Sources

Package name and content	Target population	Financing sources and amount
<p>Basic Services Plan</p> <ul style="list-style-type: none"> • Law 100/1993 and Resolution 4288/1996: Public information; education; health promotion; control of tobacco, alcohol, and drug abuse; nutritional supplementation; family planning; deparasitization; vector control; environmental, food, and animal safety; national campaigns for prevention, early diagnosis, and control of contagious diseases such as HIV/AIDS, sexually transmitted diseases, tuberculosis, and leprosy, and tropical diseases such as malaria • Circulars 018 and 002/2004: Priority chronic disease risk-factor screening 	<p>Universal (see coverage rates by intervention, in next section)</p>	<ul style="list-style-type: none"> • Source: National transfers allocated to public health • Amount: 10.4% of total national transfers = 399 billion 2006 pesos
<p>Compulsory Health Plan for the Subsidized and Contributory Insurance Regimes—public health content</p> <ul style="list-style-type: none"> • Resolution 3997/1996: Prevention of diseases related to pregnancy, birth, and puerperium; child growth monitoring; child vision and hearing disease prevention; acute respiratory infection prevention; immunization; drug addiction prevention; cancer and other chronic disease prevention • Agreement 117/1998: Pregnancy, birth, newborn, and low-birth-weight interventions; integrated management of childhood illnesses; preventive oral care; priority chronic disease risk-factor screening and some treatment (hypertension, diabetes, obesity, asthma) 	<p>Insured people:</p> <ul style="list-style-type: none"> • Contributory regime: 15.9 million • Subsidized regime: 18.3 million • 70% total population 	<p>Contributory regime:</p> <ul style="list-style-type: none"> • Source: Wage contributions • Amount: Total resources disbursed for premium^a = 5 trillion 2006 pesos. Resources for promotion and prevention sub-fund = 235 billion 2006 pesos. <p>Subsidized regime:</p> <ul style="list-style-type: none"> • Source: National transfers for demand subsidies, Solidarity and Guarantee Fund (FOSYGA), sub-national resources • Amount: Total resources disbursed to cover subsidized regime premium = 3.8 trillion 2006 pesos. 4.01% transferred to municipalities for promotion and prevention = 157 billion 2006 pesos^b

Source: National Planning Department.

^a Premium covers full benefits package for each regime. Insurers are expected to spend at least 10% of premium in health promotion and disease preventive activities.

^b Transfer was eliminated by Law 1122 of 2007.

Decentralization Reforms

In the mid-1980s, under pressure to democratize and decentralize government, Colombia began to implement fiscal, political, and institutional decentralization reforms that sought to reassign government functions and responsibilities among the national, departmental, and municipal levels.² Under this decentralization framework, the central government's role concentrates on policy design, regulation, and public finance. Departmental governments assume regional planning, management, and finance responsibilities, and provide some services and articulation of local and national levels. Municipal governments take on policy implementation and public service provision.

From 1990 to 1993, legislative mandates introduced additional sub-national functions and responsibilities, and defined new sources of financing for health service provision and their respective allocation formulas.³ Administrative procedures to certify local governments as “decentralized” were established. If met, these procedures shifted authority, responsibility, and budgetary control of these resources to departments and municipalities.⁴ Among these requirements was the creation of local health directorates that would assume public health responsibilities.

Health policy and decentralization reforms thus combined to distribute public health responsibilities as shown in Table 2.3.

Implementation of decentralization was heterogeneous in terms of the depth to which territories carried out the processes required to assume the public health functions established in the law—and the speed with which they did it. This problem has been attributed to lack of clarity and precision in the laws concerning responsibilities at the different levels of government, poor articulation between national health sector policies and the new functions that were to be assumed

² Colombia is divided into 32 administrative units, or departments, which in turn are divided into municipalities, of which there are 1,098. There are also four capital districts corresponding to major cities. Municipalities are governed by mayors and departments by governors, both elected by popular vote. Although 70% of municipalities are rural and have fewer than 20,000 inhabitants, more than 60% of the population lives in the six largest, urban municipalities.

³ Law 10/1990; Political Constitution, 1991; Law 60/1993 and Decree 1757/1994; Law 100/1993.

⁴ Law 10/1990 Section 37; Law 60/1993 Sections 14 and 16; Decree 1770/1994.

TABLE 2.3 | Public Health Responsibility by Level of Government

Public health function	Responsible entity			
	Insurance carriers	Municipal health directorates	Departmental health directorate	Central government
Individual/family health promotion and disease prevention; curative care for conditions of public health interest	Provision of individual services to insured patients	Provision of individual services for uninsured patients (certified municipalities)	Provision of individual services for uninsured patients (non-certified municipalities)	Ministry of Health: Purchase and distribution of medications for tuberculosis, leprosy, leishmaniasis, and malaria, and supplies for public health laboratory diagnostic tests
Collective health promotion and disease prevention actions	Pre-2006: Purchase of syringes for vaccinating insured patients	Provision of collective care; hiring vaccinators and fumigators	Carrying out complementary municipal activities	Ministry of Social Protection: Complementary sub-national activities; acquisition and distribution of vaccines and supplies for implementation of the Programa Ampliado de Inmunización and vector control
Public health information and surveillance	—	Data collection and analysis for conditions of public health interest; case follow-up, outreach, and referral for diagnosis and treatment of contagious diseases; control of epidemics	—	National Health Institute: Planning, development, and articulation of sub-national surveillance system; design of standards; and provision of technical assistance

Continued on next page

TABLE 2.3 | **Public Health Responsibility** (*continued*)

Public health function	Responsible entity			
	Insurance carriers	Municipal health directorates	Departmental health directorate	Central government
Environmental risks	—	Oversight of water, food, disease vectors, and risk factors for infectious diseases	Control of medications and potentially toxic chemicals	Food and Drug Safety Agency (INVIMA): Training, assistance, and control of sub-national governments in implementation of norms and procedures relating to medications and chemical substances
Community participation	—	Provision of information on health rights and responsibilities, promotion of community participation	—	—
Institutional capacity building	—	—	Provision of technical assistance, supervision, and evaluation of municipal PBS	Provision of technical assistance; supervision and evaluation of sub-national PBS
Research	—	—	—	—
Stewardship, planning, and monitoring	—	Established Consejo Territorial de Salud (Territorial Health Council)	Development of departmental PBS complementing municipal activities; distribution of resources for public health to non-certified municipalities	Ministry of Social Protection: Development of national policies and guidelines for PBS activities, inter-sectoral activities; National Health Supervisory Agency: Inspection and oversight of efficient use of public health resources

Continued on next page

TABLE 2.3 | **Public Health Responsibility** (*continued*)

Public health function	Responsible entity			
	Insurance carriers	Municipal health directorates	Departmental health directorate	Central government
Public health laboratories	—	—	Provision of public health laboratory services	National Health Institute: Coordination, assistance, and supervision of national network of public health labs

Source: Authors.

by territories, differences in sub-national financial and administrative capacity, fluctuations and lack of stability in available resources, and lack of surveillance and control over sub-national performance (Vargas and Sarmiento, 1997; Sánchez, Yepes, and Cantor, 1998; Sánchez and Yepes, 1999; Herrera and Cortez, 2000).

Evaluations of departmental and municipal uptake of PBS interventions have focused on the number of municipalities taking on and assigning staff to the implementation of the PBS, the frequency of supervisory and technical assistance visits, and the application of norms and standards associated with the PBS and its contracting (Grupo de Gestión Integral en Salud, 2005; Jaramillo, 1999; Unión Temporal, 2004). Over time, an increasing number of municipalities have taken on the PBS and about half directly executed fund transfers for that use (prior to regulations in 2001 stipulating that there would be no direct provision).

Contracting processes have worked well for most municipalities but have been problematic for about one-third: 36 percent reported difficulties, while a substantial portion did not follow minimum standards for due process (no evaluation of timeliness or quality, frequent resort to direct contracting without competitive bids, no supervision, or cancellation for non-performance) (Unión Temporal CCRP-ASSALUD-BDO, 2004). Some municipalities used funds for purposes not permitted by legislation, such as for hiring personnel to work directly in the municipality, and a large proportion contracted with public hospitals

for services such as environmental safety and disease vector control, in spite of the limited expertise and poor track record of these entities in this area (public hospitals are run by the municipality and were extensively used for patronage during the 1995–2000 period; see Chapter 4). Accounting problems and misuse of funds are also reported in some cases (Grupo de Gestión Integral en Salud, 2003–05).

Epidemiological notification and management reporting systems are sluggish. Although most eventually report, 92 percent of municipalities did not comply with required reporting on time in 2003; a year later the figure had decreased to a still-high 85 percent. Departments were found to have been lax in their role of advising, monitoring, and enforcement, although the participation of government and civil society in the development of PBS action plans was high (Unión Temporal, 2004).

Shortcomings observed have been attributed to high human resources turnover rates, poor skill mix, poor-quality information systems that generate incorrect or unreliable data, absence of effective civil society oversight mechanisms, late and ineffective interventions by controllers and auditors in response to complaints, and low population awareness of rights and responsibilities in public health.

Governments have made efforts to align incentives better in the system and to assess the impact on public health of the new arrangements. Slow progress in meeting decentralization goals, and an increasingly precarious fiscal situation at the sub-national level prompted enactment of Law 715 in 2001. This law sought to correct the weaknesses identified in previous policy. Law 715 reset the amount of national fiscal resources for health and the parameters used for their distribution, basing the latter on sub-national indicators of equity and efficiency. The law also redefined responsibilities to be more in accordance with sub-national capacity. For example, less-developed municipalities are no longer responsible for vector control and environmental health. However, the law continues to permit decentralized municipalities to maintain functions and authority over resources and service provision, as long as they meet performance targets designed for this purpose. The law also increases the department's role in articulation and oversight of public health activities carried out by insurers and municipalities.

Vaccination rates are among the performance targets established under the new laws; their achievement is rewarded with a bonus payment to municipalities. This system, however, while conceptually appealing as a pay-for-performance mechanism, created unintended effects through the use of official denominators from the 1993 census. Given extensive economic- and conflict-related migration after 1993, the reliability of municipal-level projections for disaggregated age groups (0–11 months, 12–24 months) across such a long period rapidly deteriorated, thus greatly distorting denominators used to calculate official vaccination rates. A 2004 sample survey carried out to check administrative data quality at the municipal level found errors that consistently both over- and under-reported vaccination performance by large margins, resulting in both undeserved rewards and performance improvements that went unrecognized.

For example, in Quibdó, the capital of Chocó, the national statistical agency grossly underestimated the growth in the population of children under 1 year old (the denominator), thus resulting in an “official” diphtheria/pertussis/tetanus (DPT) vaccination rate of 111 percent for 2003. Results from the 2004 sample survey showed a DPT coverage rate of 49 percent for this city. Conversely, in Valparaiso Antioquia, as with many other small towns, the projections for the population of children under age 1 were overestimated, resulting in an official DPT vaccination rate of 63 percent, whereas the sample survey showed a coverage rate of 93 percent.

Law 715 also introduced greater fragmentation of public health activities aimed at individuals included in the subsidized regime benefits package. It did this by shifting the provision of specific health promotion activities, immunization, family planning, and cervical cancer screening to municipalities.⁵ Under this law, for example, a beneficiary enrolled in the subsidized insurance regime would be sent to a municipally financed care provider for a Pap smear. If an abnormal smear required a confirmatory diagnostic test (colposcopy), the patient would have to pay for the test out of pocket because that intervention was not covered by the subsidized regime benefits package. If diagnosed with cancer,

⁵ Law 715/2001 Section 46; Agreement 229/2002.

the patient would then return to the insurance-financed provider for treatment, which is covered under the benefits package. Municipalities had little incentive for screening and early diagnosis, since reimbursements for treatment accrued to insurers. The law has since changed again, but continuity of care for some priority interventions for both insured and uninsured populations remains problematic.

Financing and Spending

The main source of funding for health care before 1993 was central government revenue allocated to the Ministry of Health for specific programs or transferred to sub-national (departmental and municipal) governments. At the sub-national level, sources of funding included local taxes earmarked for health and other sources of revenue allocated at the discretion of each sub-national government.

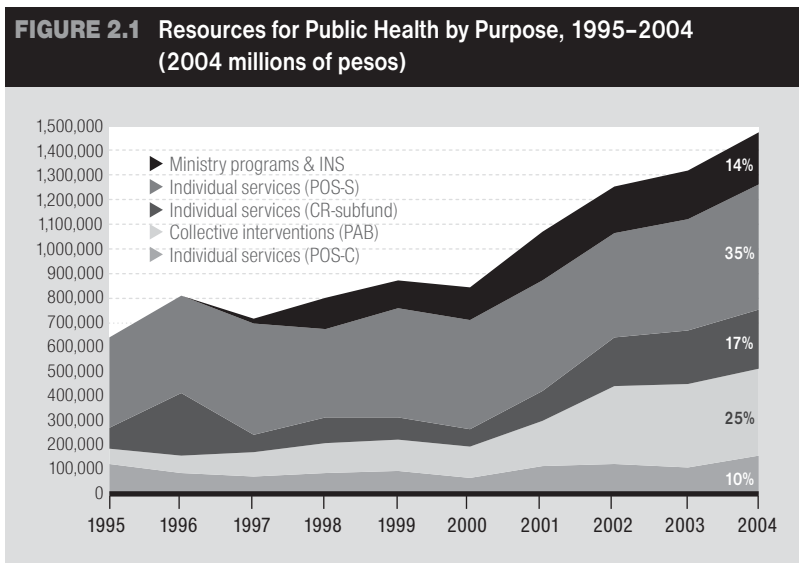
No data are available on the allocation of resources for public health prior to 1993 because budgets were transferred in lump sums, and expenditures on public health were made at the discretion of local health authorities. Between 1970 and 1990, the share of expenditures on personal care increased from 50 percent to 72 percent, while expenditures on environmental interventions and infrastructure decreased from 31 percent to 12 percent and from 21 percent to 16 percent, respectively.⁶ Although all these expenditure categories include interventions that could be considered part of the public health armament, environmental and infrastructure expenditures are likely to contain a larger share of public health expenses. For example, the bulk of personal care expenditures were distributed among hospital, medical, and dental care (about 55, 27, and 5 percent of the total, respectively); the remainder was allocated to interventions related to public health such as nursing, health promotion, and immunization services.

⁶ Values obtained for 1970–90 data on allocation of total public expenditures on health for three purposes: personal care (medical care and other services provided to individuals), environmental interventions (programs and interventions to reduce risk factors, such as aqueducts, sewage systems, vector control campaigns, food safety, etc.), and infrastructure; no other expenditures, such as capacity building, construction, research, and health promotion activities for children and elderly people, are included (calculations based on data in Molina *et al.*, 1994, and Vivas *et al.*, 1988).

The health and decentralization reforms not only increased resources for public health but also earmarked them exclusively for this purpose, either for collective interventions through PBS or for individual services provided through the insurance benefits packages. Given the stagnation in insurance coverage as a result of the recession, limited discretionary funding was also provided by municipalities to finance individual services for uninsured people, usually through transfers to public hospitals. In addition, a special sub-fund for health promotion and disease prevention activities for contributory regime enrollees was created, equivalent to 0.41 percent of total revenue from premium contributions.

The growth and distribution of resources for public health, categorized by purpose, from 1995 to 2004 are shown in Figure 2.1.

Public health resources underlying the calculations used in Figure 2.1 include resources from the national budget allocated to the Ministry of Social Protection, national transfers for public health (Situado fiscal 1995–2002, Sistema General de Participaciones 2002–04), a proportion of the contributive and subsidized premiums expected



Source: Authors' calculations based on Ministry of Social Protection data.
 INS = National Institute of Health; PBS = Basic Services Plan; POS-S = subsidized regime; POS-C and CR = contributory regime.

to be assigned to health promotion and disease prevention activities (10 percent), and the promotion and prevention contributory regime sub-fund revenue. No data were available on external donor funding or supply subsidies for insured patients.

Resources available for public health increased by 30 percent between 1995 and 2004. Total resources for public health in 2006, excluding donor funds, could have totaled \$Col 1.4 trillion (US\$584,000⁷), or 0.4 percent of the GDP. With respect to purposes, the shares of total resources available for public health were distributed in the following way: Ministry of Social Protection programs, operation expenses, and National Health Institute, 10 percent; PBS, 25 percent; health promotion and preventive individual services included in the contributive and subsidized benefits packages, 17 percent and 35 percent, respectively; and other health services financed by the health promotion and diseases prevention sub-fund for the contributory regime, 14 percent.

As of 2004, about one-third of resources were allocated to sub-national governments for public health interventions included in the PBS. About 57 percent of total resources were potentially available for individual public health activities provided by insurance, mostly for the contributory regime, given the relative size of this program (Dirección General de Salud Pública, 2004).

In summary, pre-reform health spending concentrated on curative care, and levels of financing for public health before 1993 were low and unpredictable. Since 1993, resources available for public health have increased and minimum levels are guaranteed. A large proportion of funds remain tied to individual interventions, however, and resources are fragmented among different agencies and levels of government, which complicates the flow, articulation, and accountability of funding.

Trends in the Burden of Disease

The bulk of the demographic transition in Colombia occurred during the 1980s. During that decade, large drops in the fertility and mortality

⁷ As of January 2009.

rates occurred. By 1990, the burden of disease was concentrated in non-communicable disease. After the mortality drops observed in the 1980s, the pace of the transition slowed. In the period covering the health and decentralization reforms, these trends simply become more pronounced, with the combined share of communicable, maternal, perinatal, and nutritional conditions shrinking further to 17.8 percent of total illnesses. The share of non-communicable diseases increased dramatically—from 39 percent of the total burden to 52.1 percent in 2002.

Although a study of avoidable mortality found a leveling out of the rate beginning in 1991 (Gómez, 2005), it is difficult to attribute these patterns to the effects of the insurance or decentralization reforms. Such plateaus are observed worldwide—the kinds of interventions required to reduce infant mortality from a rate such as 18.7 per 1,000 live births require different investments than interventions used when the infant mortality rate was 26 per 1,000 and higher.

Trends in Mortality

The infant mortality rate (the number of deaths at less than age 1 per 1,000 live births) is a commonly used measure of population health and well-being, and is a gauge of inequalities in access to the public health care system. The infant mortality rate in Colombia decreased from 56.7 per 1,000 in 1975–80 to 18.7 per 1,000 in 2000–05 (Flórez, 2000; Profamilia, 2005).

Nonetheless, geographic and economic disparities persist. Not surprisingly, infant mortality in Colombia is generally higher in rural areas, in departments with lower levels of development, and among the poor. This reality can be explained in part by determinants of morbidity, including differences in access to health services, infrastructure, basic services, housing quality, and education.

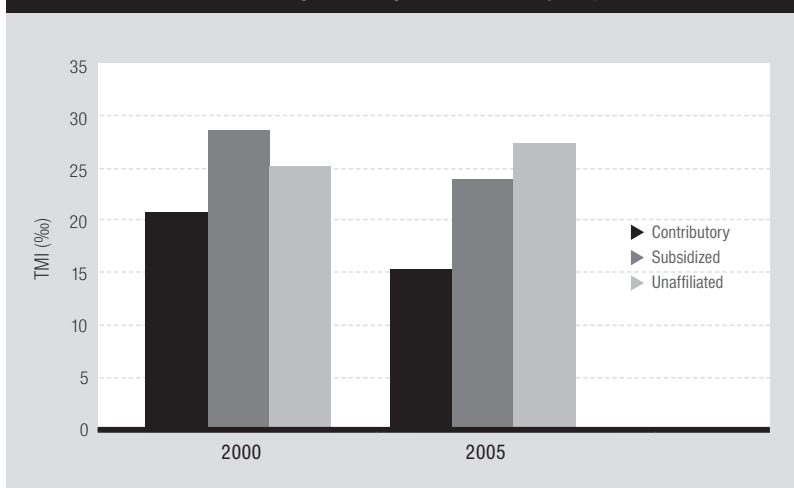
Urban–rural inequalities in infant mortality actually increased between 1995 and 2000, but then decreased during the 2000–05 period. In 2000, infant mortality in rural areas was about 50 percent greater than in urban areas. That difference had decreased to 30 percent by 2005, but the differential in 2005 remained higher than that of 1995. Regional inequalities are also pronounced. In the Pacific region, for example, where the country's Afro-Colombian population is concentrated,

infant mortality is 28 percent higher than it is in urban areas (Flórez and Ruiz, 2006). In the past 10 years, infant mortality rates have fallen faster among the lowest-income quintile than in the richest, changing from 2.5 times higher among the poor to 2.2 times higher.

Disparities in infant mortality by health insurance status in 2005 show that mortality rates are highest among uninsured people, slightly lower among enrollees in the subsidized regime, and much lower among those enrolled in the contributory regime (Figure 2.2). This differential has become more pronounced in recent years, given the decrease in infant mortality among all insured people, while infant mortality among the uninsured has increased (from 25.2 to 27.4 per 1,000 between 2000 and 2005).

It should be noted that over this same period, the percentage of the population that was uninsured shrank—from 46 to 33 percent of the total population. The differentials in infant mortality across the various health insurance status groups may be partly associated with disparities in access to maternal-infant care according to insurance status. Other factors, such as the impact of the internal armed conflict on children living in affected municipalities, also influence the infant mortality rate (Box 2.1).

FIGURE 2.2 Infant Mortality Rates by Insurance Regime, 2000–05



Source: Flórez and Soto (2006).

BOX 2.1 | Infant Mortality Rate and Violence in Colombia

Although the infant mortality rate (IMR) in Colombia has decreased from 32.3 per 1,000 live births in 1986 to 18.7 per 1,000 in 2005 (Demographic and Health Survey data), the country has experienced an even faster decline in fertility levels and improvement in other socioeconomic variables.

Urdinola (2004) examined the extent to which the armed conflict in Colombia may have affected infant mortality during the 1990–2000 period. She first tested the notion of negative effects of violence on infant survival in a cross-country fixed-effects model. She found that if Colombia had had the same socioeconomic profile as the other 10 Latin American countries, by the year 2000 it would have had, on average, an IMR of about 5 deaths per 1,000 live births lower than it actually had.

Second, Urdinola estimated a fixed-effects model using Colombian municipal data with about 90 percent national coverage to test the effects of violence and other covariates on the IMR. Violence was measured by both homicide rates and armed activities perpetrated by the four guerrilla groups active in Colombia, paramilitary armies, and unorganized criminals. Municipal characteristics include a wide range of variables, including per capita public investment in health and health-related sectors. In the model that used homicides as the proxy for violence, Urdinola found that a reduction in the homicide rate of 1 per 1,000 inhabitants correlated with a decrease in IMR of 3 per 1,000 per year and an additional reduction of 1.5 infant deaths from the lagged effect of violence.

What type of violent act mattered most? When measuring violence in terms of armed acts, increased struggle for territory was correlated with an increase in IMR of more than 28 per 1,000 births. An increase in the destruction of physical infrastructure per 10,000 inhabitants coincided with an increase in IMR of 12 per 1,000, the presence of massacres by 3 per 1,000, and increased weapons trafficking by 1 per 1,000. Although the author could not determine causal pathways (e.g., that violence deteriorates the health care system, thus increasing infant mortality; that violence implies an overall lack of State presence and services; or simply that displaced status negatively affects infant survival rates), the relationship between violence and infant survival is clear.

Program Case Studies

Vaccination

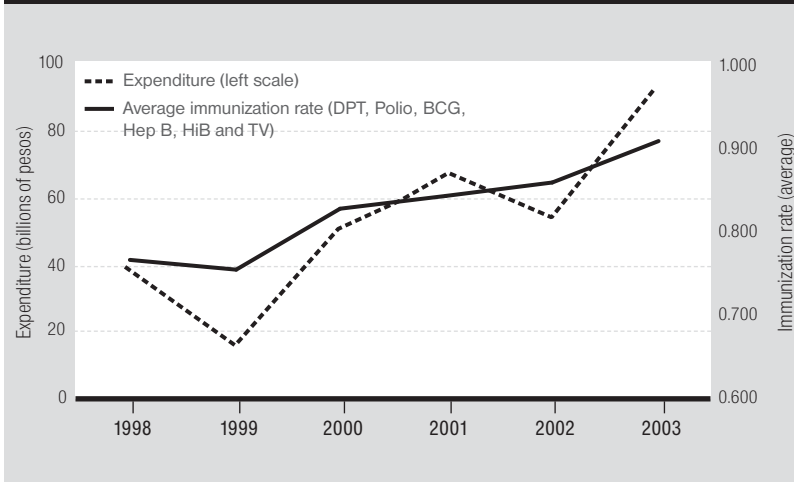
Vaccination programs began in Colombia in 1968, using a combination of campaign and routine strategies administered by a centralized program. Vaccination rates in the 1970s and 1980s were reportedly low (around 20 percent for completed courses of multiple-dose vaccines), in spite of “sufficient human, physical, and economic resources” (Ministerio de Salud, PAHO, 1982).

After the reforms of the early 1990s, functions within the vaccination program were split. To realize economies of scale in procurement,

vaccines continued to be purchased for the entire country at the national level. The national administration also set norms and policies with respect to the program, and provided technical assistance and limited supervision to sub-national governments. Departments were responsible for supervision, technical assistance, surveillance, and reporting, while municipalities assumed most of the operations of the program, including ensuring that supplies reached providers, monitoring and reporting on vaccination, and conducting campaigns. Insurers were responsible for purchasing syringes and providing vaccinations to insured residents.

According to administrative data reported to the Pan American Health Organization, vaccination rates for individual vaccines started at around 16 percent of children under age 1 in 1980 and reached their apex in 1996, with all vaccines in the Expanded Program of Immunization being provided to approximately 95 percent of children under 5 years old (López Casas, 2007). In 1998–99, there was a 15 percentage point drop in vaccination rates, coinciding with the worst economic recession in the country’s history, followed by a recovery from 2000 to 2004.

Although spending on PBS was protected by earmarked funding during the recession, levels of vaccination over that period seem to be directly related to the availability of non-earmarked national financing for vaccine purchases (Figure 2.3). Central government funding for vaccine purchases is marginal—between US\$25 million and US\$35 million per year, or less than one-quarter of one percent of the GDP. In the context of a heavily earmarked total budget at the national level (experts estimate that 85 percent of the national budget is earmarked for salaries and pensions for civil servants), funds for vaccination represented “flexible” spending, vulnerable to cuts as revenue dropped. These cuts illustrate that in spite of the PBS and insurance earmarks, the marginality of the amount represented by vaccine purchases, Colombia’s status as a middle-income country, and the fragmentation in the program’s essential functions resulted in a drop in vaccination rates during the recession. The shortage of the one essential input for the program—vaccines—also resulted in inefficiency in the use of PBS resources at the sub-national level. However, the movement of vaccination rates with vaccine purchases is positive, in that it shows that when inputs are available, the system is able to deliver vaccinations.

FIGURE 2.3 Vaccination Coverage and Central Government Spending on Immunization, 1998–2003

Source: Authors' estimates based on Ministry of Social Protection data.

Vaccinating children on time is a major challenge. According to population-based rates derived from a series of demographic and health surveys, complete age-appropriate vaccination for tuberculosis, DPT or equivalent, polio, and measles has declined over time. In 1990, 67.5 percent of children were fully vaccinated with an age-appropriate scheme before age 1; this number was 58.1 percent in 2005.⁸

Beyond the financing issues associated with the recession, problems in the vaccination program are attributed to the fragmentation of its functions; other observers point to the negative impact of the internal armed conflict on access to poor municipalities as an explanation for low vaccination rates (Gómez, 2005). Others opine that the vaccination program has never been satisfactory and depends on campaigns (Restrepo Trujillo, 2004) to make up for low coverage delivered through routine channels.

Several authors, notably Ayala Cerna and Kroeger (2002), have attempted to link the poor performance of the vaccination program

⁸ Reports only complete vaccination schemes recorded on vaccination cards seen by interviewers; as such, this is a conservative estimate. ORC Macro, 2007. Measure DHS StatCompiler: <http://www.measuredhs.com>, June 27, 2007.

to the introduction of insurance and managed competition. These studies relied on trends before and after reforms to conclude that the insurance reform had a negative impact on vaccination rates. However, in the only study that uses appropriate methods to establish causality, Giedion *et al.* (see Chapter 3) used propensity score matching and a quasi-panel of cross-sectional data covering a decade and found that the likelihood of complete vaccination is significantly higher for insured children (6 percent). This trend is more pronounced among rural residents (12 percent). Although vaccination is included in the PBS and thus theoretically available to the entire population, this finding suggests that the greater use of health services resulting from insurance is increasing the likelihood of routine health care visits for children and thus timely vaccination.

Beyond insurance status, socioeconomic status (measured by a wealth index) and rural residence affect the equity of vaccination coverage in Colombia. Differentials in vaccination by socioeconomic status worsened after the recession; the wealthiest quintile had vaccination rates 32 percent higher than the poorest quintile in 2000 and these differences have been maintained over time (Flórez and Soto, 2006). Given that vaccination is free and universal, and that geographical access to public care providers is nearly universal in Colombia, these socioeconomic differentials in access may be explained by remaining economic, socio-cultural, and informational barriers to access, including the cost of transportation, opportunity costs, and household knowledge.

To respond to these inequities, in 2001 the Government of Colombia implemented a conditional cash transfer program intended to stimulate demand for preventive health care. The program now reaches over 700,000 extremely poor or displaced families. A quasi-experimental impact evaluation, the results of which were published in 2005, found that the program has significantly increased the probability of adequate DPT vaccination for children less than 24 months of age (Attanasio *et al.*, 2005).

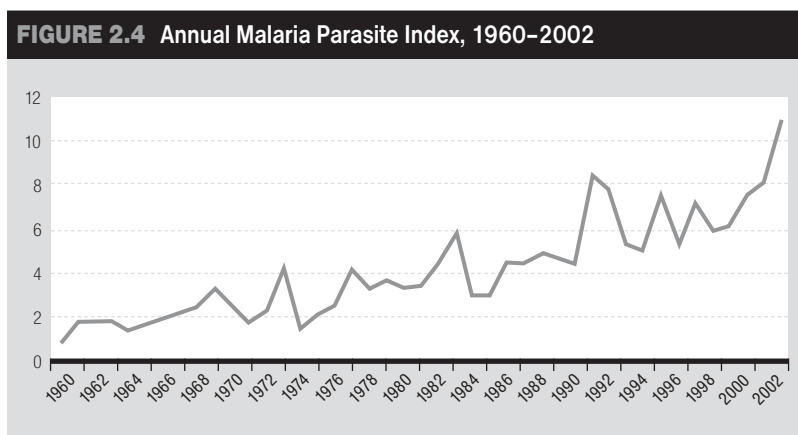
Malaria

The Malaria Eradication Service was established in 1957 as a unit of the former Ministry of Health. It was a centralized vertical program with

its own budget and personnel. Under the new framework created by the health sector reforms, the unit was decentralized. Responsibilities for vector control were delegated to departments, and diagnosis and treatment of malaria to municipalities. In accordance with the Global Malaria Control Strategy and the principles of the Roll Back Malaria Partnership, the Ministry of Social Protection launched the National Malaria Control Program (NMCP) in 1998. The program includes:

1. improved diagnosis and treatment;
2. selective vector control, including use of insecticide-treated nets or mosquito-repellant chemicals;
3. mosquito breeding control and targeted indoor residual spraying;
4. strengthening of public health surveillance, including entomological and vector resistance surveillance; and
5. inter-sectoral and social participation (Korenromp *et al.*, 2005).

Currently, Colombia has one of the higher malaria incidences in this region of the Americas, accounting for 10 to 20 percent of cases. The incidence of malaria has been increasing since the 1960s, although there have been larger increments during the past decade, with a peak in 1991 and another in 2002, as depicted in Figure 2.4.



Source: Carrasquilla (2006), based on National Institute of Health data (2003).

The observed malaria trend in Colombia is likely related to several factors, including climatic changes, increasing resistance to anti-malarial medications, resistance of mosquito vectors to insecticides, and internal migration due to the armed conflict (Carrasquilla, 2006). The majority of cases, however, are concentrated in municipalities located in deprived areas, which are not covered by the NMCP because of security concerns (Korenromp *et al.*, 2005). It is also important to note that after the implementation of the NMCP in 1998 there has been an improvement in disease registry, increasing diagnostic coverage by almost 30 percent in areas with high transmission rates (Dirección General de Salud Pública, 2004).

Another hypothesis is that the institutional changes brought about by the health sector reforms have affected the implementation of malaria prevention and control measures. Carrasquilla (2006) explored this relationship by compiling secondary data on epidemiological indicators, risk factors, and financial resources for malaria prevention and control in 255 malaria-endemic municipalities in Colombia for the period 1991 to 2000. (The study sought to collect information on cases, hospital discharges, and deaths, and on malaria prevention and control activities, in 319 municipalities. Owing to large gaps in available information, data of varying completeness for each year was obtained from only 255 municipalities.)

Carrasquilla conducted semi-structured interviews with relevant health sector officers involved in malaria control regarding operational aspects of the program before and after decentralization. Trends in malaria morbidity were analyzed for three periods: 1990–93 (pre-program decentralization), 1994–98 (transition), and 2000–01 (program decentralization). The study found no statistically significant differences in mean malaria incidence rates among these periods. Because of gaps in information, it was not possible to use a uniform model to explore associations between malaria rates in each period and factors such as climatic variables (including rainfall), decentralization status, insurance coverage, municipal development, and rural population, thus limiting conclusions about the possible determinants of the observed trends. (The study found important gaps in information, such as the absence of data on available resources and expenditures specific to the malaria program, and

a large variability in reported cases in some areas. For example, for the 1994–98 period only 67 municipalities had information about 1997 health expenditures.)

Carrasquilla's findings with respect to the institutional aspects of the malaria program circa 2001 indicate that sub-national governments were allocating resources to, planning, and executing activities in accordance with their responsibilities for malaria control. However, the participation of private institutions in diagnosis and treatment activities is small in relation to the activity of the public sector. Weaknesses that could jeopardize the effectiveness of the malaria program identified by the survey include frequent rotation of personnel and lack of training of officers appointed for malaria control.

Tuberculosis

As in the cases of vaccination and malaria, prior to 1993 the tuberculosis control program was a national vertical program that comprised planning, administration, technical assistance, financing, and provision of care through public hospitals. Tuberculosis services were offered free throughout the country.

After the insurance and decentralization reforms, the Ministry of Health became responsible for policies, norms, and procurement of first-line medications and the anti-tuberculosis vaccine Bacillus Calmette-Guérin (BCG). Departmental health directorates provided technical assistance, monitoring, supervision, and distribution of medicines and vaccines to municipalities, while municipalities were responsible for providing PBS services, which included monitoring tuberculosis control activities, distribution of medicines and vaccines to providers, carrying out home visits, and providing treatment to uninsured patients. Insurers provided vaccines to their populations and, after Law 715, referred tuberculosis patients to the public sector for treatment.

A review of tuberculosis incidence published in 2004 reported an incidence rate for all forms of tuberculosis that declined from 34 cases per 100,000 population in 1992 to approximately 26 cases per 100,000 in 2002 (Chaparro *et al.*, 2004). A rate calculated by the authors based on the number of detected cases from the National Health Institute's

epidemiological surveillance system⁹ and denominators constructed from the 2005 census indicates a national average that has oscillated around 20 per 100,000 from 2003 to 2006. Although there are differences in the incidence rates reported by the ministry (26 per 100,000 in 2005) and the National Health Institute (24 per 100,000 in 2005), the number of notified cases in each series has remained relatively steady over this period, ranging from 8,308 cases in 2003 to a high of 9,009 cases in 2004, declining again to 8,300 cases in 2006. The World Health Organization reports a very different rate of 45 per 100,000, based on officially notified cases adjusted for estimates of under-reporting (WHO, 2007).

While some authors give importance to the slight increase in cases observed in 2002 (Ayala Cerna and Kroeger, 2002), the tuberculosis rate picture is unclear. It may have worsened or stayed more or less the same over the decade. Stable tuberculosis mortality rates and declining hospital discharge rates observed in the late 1990s have been interpreted by some as evidence of stagnation (Segura, Rey, and Arbeláez, 2004).

Factors hypothesized to explain tuberculosis incidence trends include those related to fragmentation of care provision, which is said to have led to late diagnosis, more frequent hospitalization, and higher mortality (Arbeláez, 2006). Although no studies have rigorously analyzed the impact of insurance status on case detection and treatment, insurance status seems to affect adherence to treatment: a 1999 study in Bogotá of 726 cases found that adherence was higher among the insured in the contributory regime and lowest amongst the uninsured (Arbeláez, 2006).

Treatment errors by health providers also play a role; in small-scale municipal studies, such errors have been observed, leading to modest levels of drug-resistant tuberculosis (Moreira *et al.*, 2004; Laserson *et al.*, 2000). Co-infection with human immunodeficiency virus (HIV) is also hypothesized to affect tuberculosis status, although only 5 to 10 percent of diagnosed tuberculosis cases present with HIV co-infection (Chaparro *et al.*, 2004; García *et al.*, 2004). Application of directly observed treatment short-course (DOTS) is considered low; in 2005, the WHO

⁹ www.ins.gov.co, accessed June 2007.

estimated that 50 percent of cases benefited (Dirección General de Salud Pública, 2000). In contrast to these findings, a regional study published in 2003 indicated that Colombian incidence rates were a result of better implementation of DOTS (Sobero and Peabody, 2006). BCG coverage is high, with 97 percent of children under 4 years old having received the vaccine, consistent with high rates of professionally attended births (Profamilia and Macro International, 2006).

Discussion

Overall, public health status has improved in Colombia, although inequities remain. The evidence indicates that spending on public health has increased substantially and that insurance increases access to some key interventions (see Chapter 3). Given that, a more rapid transition to full insurance is an important vehicle for improving public health.

The ongoing armed conflict and the recession of the late 1990s have played important roles in explaining results observed in public health programs. Just as these factors explain the slow extension of the subsidized health insurance regime (see Chapter 6), the fall in vaccination rates appears directly linked to the budgetary effects of recession: less vaccine was purchased and fewer children were vaccinated. Urdinola's study (2004) of the impact of violence in certain municipalities as a significant determinant of the pace of infant mortality rate decline also illustrates the sometimes limited scope of health sector interventions. The inability of the vaccination and malaria programs to work in certain highly vulnerable municipalities for security reasons also limits the impact of the programs.

More can be done to isolate the importance of these multiple forces affecting public health outcomes, leading to more nuanced policy options, and measures could be taken to ensure that essential public health inputs are protected during periods of economic downturn.

Among the most critical challenges facing public health is the fragmentation of health care functions among levels of government. This fragmentation was created by decentralization, combined with a lack of articulation among the different participants in the insurance system. A vaccination program that puts one organization in charge of procuring vaccines, several others in charge of procuring syringes,

and yet others in charge of contracting vaccinators is likely to show poor performance because the inputs necessary to vaccinate on time are simply unavailable. Although recent government efforts have sought to better align incentives, much remains to be done to adjust those incentives to improve the impact of the program. For example, the Ministry of Social Protection has consolidated the procurement of vaccines and syringes with one entity and now regularly supervises insurers and municipalities to ensure timely vaccination.

The lack of unified and effective stewardship and accountability for public health outcomes remains problematic. Slow and partial responses to outbreaks of diseases such as dengue fever are an example: a 2004 report of an outbreak of dengue found that only 1 of every 9 suspected dengue cases presenting at emergency rooms was reported (Loevinsohn and Harding, 2005). As a result, national funding and technical assistance to deal with the outbreak arrived late and avoidable deaths occurred. Poor surveillance was attributed to a complex, facility-based reporting procedure, which has now been complemented by the implementation of a sentinel surveillance system.

Health workers specializing in the control of communicable diseases have also reported reassignment to other functions by municipal or departmental health authorities, indicating limited capacity to understand the issues at stake, particularly in the poorer municipalities. Since much of the communicable disease occurring in Colombia is concentrated in a core number of poor municipalities, efforts and financing could be targeted more effectively, while still operating within the framework of reform and decentralization.

While popular throughout Latin America, the conceptual model that separates individual and collective health interventions should remain conceptual. Its enshrinement in legislation, financing, and the content of benefits packages has unnecessarily complicated care-seeking and interrupted the continuum of care. Although its intention was the opposite, and it was later revoked in Law 1122 of 2007, Law 715 aggravated this situation by removing key prevention and promotion interventions from insurance packages and making municipalities exclusively responsible for their provision. Future efforts should seek to establish benefits packages and associated financing arrangements that facilitate care-seeking and adherence to treatments, no matter

what the economic rationale for investment or the insurance status of the affected individual.

Colombia's experience confirms that governance conditions are important to the effectiveness of health care programs. Municipalities were allowed to contract out the contents of the PBS, yet many opted to execute directly or carry out direct contracts that were vulnerable to misuse and generated disappointing results. Open and competitive contracting for key public health services has shown promise elsewhere in the world (Loevinsohn and Harding, 2005), yet this potentially innovative policy opportunity was lost in many Colombian municipalities and resulted in misuse of funds and limited impact of services. The new requirement to use a portion of public health funds to contract with public hospitals worsens the situation.

Poor-quality data and research mean limited policy effectiveness. From the example of the outdated census to the uncertainties around the incidence rate of tuberculosis, it is difficult to design policies and ensure their intended results in the absence of at least minimal data. Further, research methods must be strengthened. Many studies reviewed for this chapter lack power, or use inappropriate methods to establish causal links between reforms and outcomes observed, or both.

Finally, official data on public health are dispersed and inconsistent. Colombian authorities should do more to ensure the consistency and accuracy of public health data collected and used by institutions in Colombia and reported to international agencies such as the World Health Organization. Tuberculosis incidence rates reported by the WHO are double what any source in Colombia reports. These inconsistencies muddy the policy waters and can lead to spurious conclusions.

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CHAPTER 3

The Impact of Subsidized Health Insurance on Health Status and on Access to and Use of Health Services

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In the early 1990s, Colombia introduced a universal health insurance scheme with two forms of affiliation. The contributory regime covers formal sector workers earning at least one minimum salary (about US\$223) per month,¹ and informal and independent workers earning at least two minimum salaries per month; the subsidized regime covers those considered poor according to a proxy means test, the Sistema de Identificación de Beneficiarios (SISBEN; Beneficiary Identification System).

Individuals who qualify for the contributory regime are charged a 12 percent payroll tax for a comprehensive insurance plan valued at about US\$207.² Payroll tax contributions are pooled by a public

¹ Minimum salary for 2007, defined by Decree 4580/2006 of the Ministry of Social Protection, was \$Col 433,700, equivalent to US\$223. Exchange rate at June 15, 2007: \$Col 1,945/US\$1.

² Premiums for 2007 were established by Agreement 35/2006 of the National Social Security Council at \$Col 404,215.20 (contributory regime) and \$Col 227,577.60 (subsidized regime). Dollar values, using the exchange rate of June 2007 (\$Col 1,945/US\$1) were US\$207 (contributory regime) and US\$117 (subsidized regime).

fund, the Fondo de Solidaridad y Garantía (FOSYGA; Solidarity and Guarantee Fund), which channels resources from individuals whose contributions are greater than the value of premiums for themselves and their families to those whose contributions are less.

For those who cannot afford to purchase insurance, the government uses national revenues, local revenues, and a portion of the payroll tax (1 percent of payroll) from the contributory regime to purchase insurance coverage for the poor under the subsidized regime. The benefits package is more limited in the subsidized regime (costing about US\$117) but legislation calls for it to become similar to the contributory regime, depending on the mobilization of additional resources. By 2007, most basic care and most high-cost interventions related to catastrophic illnesses such as cancer and acquired immunodeficiency syndrome (AIDS) were covered under the subsidized regime. Most hospital care is therefore not yet covered; for these services, rules of access do not differ for insured and uninsured.

Under either regime, the patient chooses a health insurance company, which may be public, private, or mixed and which may be run for profit or not for profit. The insurance company, in turn, covers a portion of health care costs by establishing contracts with public and private providers or through its own health care providers. Insurance companies are paid a risk-adjusted per capita amount.

As a result of these reforms, insurance coverage increased from 24 percent of the population in 1993 to 62 percent in 2003. The increase was largest among the lowest-income quintile, rising from 6 percent before the reforms to 47 percent a decade later. The current government intends to achieve universal coverage during its term by mobilizing new financial resources.

Despite these gains, criticism of the reforms is common. Several opposition groups have called for massive changes to the system; the reforms have been prominently debated in the past two presidential elections. Although growing empirical evidence exists on the benefits of the subsidized health insurance scheme—specifically, access to and utilization of care (see, for example, Panopoulou, 2001), financial protection for households against out-of-pocket costs (for example, Flórez, Giedion, and Pardo, 2007), and better targeting of public-sector resources (Acosta *et al.*, 2007)—many argue that the health system was

better before the reforms and claim that the new system has worsened health conditions. Further, some observers consider that the large fiscal effort involved in financing the subsidized health insurance scheme (about 1 percent of gross domestic product in 2003; Barón, 2007) may not be worthwhile and may have had a negative impact on employment (Gaviria, Medina, and Mejía, 2006). This chapter provides evidence to inform and enrich such debate and to call attention to the risks involved when supporting massive changes before considering how they could alter the positive results already achieved.

Finally, Colombia has been one of the first countries in the developing world to introduce a social insurance scheme providing universal coverage and equal financial access to a basic benefits package for all (Panopoulou, 2001). The expansion of insurance coverage among the poor has been on the agenda of many countries and international organizations as a means of improving access to care and financial protection for those most vulnerable to the consequences of illness. Therefore, by reaching almost two-thirds of its population with insurance coverage, Colombia's case provides a unique opportunity to gather evidence on one of the most hotly debated issues in the health sector.

In this context, evidence of the impact of the Colombian health reforms is urgently needed, not only to inform policymaking in Colombia but also to provide lessons for other countries considering similar reforms. This study uses existing data and impact evaluation methods to measure the effects of the Colombian subsidized regime on the levels and distribution of insurance coverage, health service access and utilization, and health status. It confers robustness to its results by combining and comparing the results from several different semi-parametric impact evaluation methods.

Background and Context

Why Care about Insurance?

Health insurance reduces the direct costs of access to and utilization of health care services by individuals and families. It therefore reduces the financial risk of illness and improves access to health services. This

study addresses the hypothesis that the subsidized health insurance regime introduced in Colombia in 1993 has improved the health status of the insured population by making health care more affordable.

Several qualifications are in order.³ First, health insurance affects only the affordability of health care; it does not necessarily alter the other factors that affect access.⁴ Second, health insurance affects health indirectly through its impact on health care utilization. Third, the effect of health insurance may vary across the population. In particular, in areas with effective social safety nets, lack of insurance may not be a significant barrier to receiving care and, consequently, the marginal impact of introducing insurance coverage may be small compared with the impact in areas where individuals have fewer options (Buchmueller *et al.*, 2005). Fourth, people who have health insurance may differ systematically, in some consistent way, from those without insurance, making analysis more difficult. Finally, health status is itself a complex concept and findings may vary depending on the particular variables chosen to measure it.

Eligibility for and Affiliation with the Subsidized Regime

Participation in the subsidized regime is a two-step process: according to the existing legal framework, the vulnerable population is first identified as being eligible and then gradually affiliated with the subsidized regime based on several predefined prioritization criteria. To model “participation”—a key issue when using quasi-experimental methods such as propensity score matching or matched difference-in-differences; it is used in this impact evaluation of the subsidized regime—it is necessary to understand what determines how and why an individual becomes eligible for subsidized health insurance, and what determines whether an eligible person is affiliated with the subsidized regime. We will briefly discuss these issues below.

³ For an excellent review of these issues see Buchmueller *et al.* (2005) and Levy and Meltzer (2001).

⁴ Penchansky and Thomas (1981) identify five dimensions of access: availability, accessibility, accommodation, affordability, and acceptability, as described in McLaughlin and Wyszewianski (2002).

Eligibility rules for enrollment in the subsidized regime are complex. This complexity affects the analytical strategy employed in the study. First priority is given to special populations such as orphans and the elderly, irrespective of proxy means test scores. Priority is then given to the poor with low test scores who are either pregnant, under the age of 5, displaced by violence, or disabled. The remaining population is ranked according to scores obtained under the SISBEN.

After this ordered list is published, selected individuals can subscribe to one of the competing insurance entities. If an individual does not sign up, he or she loses the opportunity to enroll in the insurance scheme and must wait for the next round of affiliations. Affiliation of those eligible occurs gradually as additional funds become available nationally and locally. Those eligible but unaffiliated can use public hospitals at highly subsidized prices but are not granted the explicit and legally guaranteed benefits package of those who are insured.

The system's implementation introduced further complications. First, the proxy means test and affiliation were introduced unevenly across the country, depending on the availability of additional local funds and municipal administrative capacity. Second, the distinction between those with and those without insurance is somewhat blurred, given that the latter are granted partial fee waivers in public hospitals (see Panopoulou, 2001). Third, some evidence indicates that SISBEN scores and affiliation are manipulated by local authorities, leading to the inclusion of non-poor populations. (Despite the limited coverage and some leakage of subsidies to wealthier people, the subsidized regime is still the best-targeted social program in Colombia and the health sector has made the most progress with targeting in the past two decades. See Lasso, López, and Núñez, 2004.)

In summary, legislation guiding participation in the subsidized regime, data from previous surveys, and analyses carried out by several researchers indicate that participation in the subsidized regime is not random and depends on many variables other than poverty scores (Panopoulou, 2001; Trujillo and Portillo, 2005). Therefore, simple comparisons of differences in outcome between affiliates and non-affiliates would most certainly yield biased estimates of the impact of subsidized health insurance in Colombia.

Previous Evidence of the Impact of Subsidized Health Insurance in Colombia

A number of studies have analyzed the impact of the subsidized regime on utilization of health care services, financial protection, and health status. Studies using data corresponding to the first stage of implementation of the subsidized regime find evidence of the positive impact of health insurance for outpatient care but not for hospital care (Panopoulou, 2001; Trujillo and Portillo, 2005).⁵ The latter result can be explained by the limited coverage of hospital services under the subsidized regime, as previously indicated. Both reports find stronger evidence of a positive impact in urban areas than in rural areas.

Relying on more recent data, Gaviria *et al.* (2006) found a positive and substantial impact of the subsidized regime on the use of preventive medical care and outpatient visits, and a negative impact on hospitalization rates at the national level. According to these authors, the former result may be explained by the fact that uninsured patients have higher emergency and, consequently, hospital utilization rates. Bitrán *et al.* (2004) use descriptive statistics to show that poor insured people under the subsidized regime benefit from lower rates of unsatisfied demand and fewer financial barriers when accessing services, make more outpatient visits, have lower out-of-pocket health care spending, and have a lower incidence of catastrophic health expenditure than do poor people lacking insurance. Note, however, that the former results are based on the comparison of simple means and may be biased, owing to potential differences between affiliates and non-affiliates.

Only a few studies have sought evidence of the impact of the subsidized regime on health status. Gaviria and his colleagues use self-reported health status and birth weight as health status outcome measures (Gaviria *et al.*, 2006; Gaviria and Palau, 2006). They found that insurance has a positive impact on health status perception using an instrumental variable approach, but given the method these authors chose, this result requires a questionable leap of faith with respect to the independence of health status perception (outcome) from social

⁵ Both studies use Living Standards Measurement Study data from 1997, which corresponds to the first years of implementation of the subsidized regime.

and political context at the municipal level, as measured by the number or share of years lived in the same municipality (the “instrument”).⁶ These authors also find that birth weight increases slightly for insured patients but only for those belonging to the very poorest strata of the population. It is, however, impossible to tell whether insured babies are healthier just because they weigh 50 grams more than uninsured babies. Only when weight falls below a certain threshold is a child’s health at risk. This is why many authors use low birth weight, or extremely low birth weight, as a proxy when evaluating the impact of health insurance on infants.

Some of the difficulties in the earlier literature are caused by bias. Researchers applied different methods, ranging from descriptive analysis to instrumental variables and semi-parametric approaches, to address bias. In all cases, researchers had to struggle with questions related to the difficulty of interpreting causality between health insurance and selected outcome variables.

The present study complements the existing evidence by: testing the robustness of results through the implementation of several impact evaluation methods; taking advantage of a quasi-panel data set; and combining in one study the analysis of an array of access, utilization, and health status variables not only at the national level but also by poverty level and by area. (Note that none of the previous studies used repeated cross-sectional data instead of cross-sectional data to correct for some of the potential selection problems related to differences between affiliates and non-affiliates in unobserved characteristics.)

Methods

When experimental data are unavailable, the choice of analytical approach depends on the specific circumstances and often requires testing several methods (see Blundell and Dias, 2000). To control for selection bias due to differences between affiliates and non-affiliates, and to test the robustness of the results, four different methods were implemented, including a regression discontinuity approach (RDA), propensity score

⁶ See the complete report (Giedion and Díaz, 2007) for more detail on the instrumental variables approach.

matching (PSM), and matched double difference (MDD). The RDA was discarded because the data showed that one of this method's central assumptions—the randomness of affiliation based on the proxy means test eligibility score—did not hold in the context of the Colombian subsidized regime (for further details see Giedion and Díaz, 2007). When good panel or repeated cross-sectional data are available, MDD is superior to PSM because it controls not only for differences between affiliates and non-affiliates in observable characteristics (for example, education, income, and housing characteristics) but also for time-invariant differences in unobservable differences (Blundell and Dias, 2000). There was, however, a tradeoff between precision of the estimate and control for selection bias: MDD is inferior to PSM in terms of the richness of outcome variables found in the available data sets. The repeated cross-sectional data set required for MDD contained a substantially poorer set of access-, utilization-, and health status-related variables than the cross-sectional data from the Demographic and Health Survey (DHS) from 2005 needed to implement PSM. Results from both methods are presented below.⁷

Data Description and Sample

This study uses a combination of repeated cross-sectional DHS data from 1995, 2000, and 2005; 1993 census data; and municipal administrative data. No source other than the DHS provides adequate and comparable pre- and post-intervention data on individual health status. Administrative data provided contextual variables (such as health services supply, local management capacity, and financial resources) to analyze the determinants of affiliation with the subsidized regime. Census data from 1993 provided additional information on conditions prior to the reforms. For reasons of confidentiality, it was not possible to obtain individual census data, so block data (each block representing approximately 20 households) had to be used instead. Further details on the data, variables, and matching processes can be found in Giedion and Díaz (2007).

⁷ Results from other methods are available on request.

The sample was drawn from the different rounds of the DHS (1995, 2000, and 2005) and included all individuals affiliated with the subsidized regime as well as those who were uninsured—that is, lacking affiliation with either the subsidized or the contributory regime. Individuals affiliated with the contributory regime were excluded. This restriction excludes the majority of middle- and upper-income individuals from the sample.

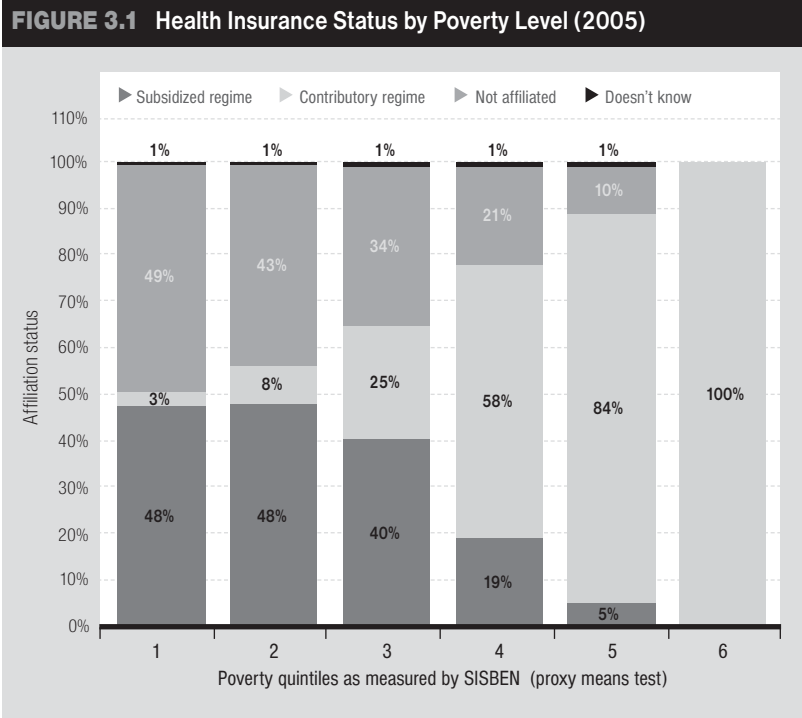
Results

Impact of the Subsidized Regime on Health Insurance Coverage

The increase in health insurance coverage among Colombians is the one successful outcome on which most observers—supporters and opponents of the reform alike—generally agree. It is also an outstanding result at the international level because very few low- and middle-income countries have expanded health insurance coverage so rapidly and to such high levels in such a short time. (Similar coverage levels are being attained in Thailand and the Philippines; Costa Rica and Chile have achieved universal coverage but over a longer time frame.)

Overall, health insurance coverage in Colombia has increased from less than a quarter of the population prior to the reforms (1993) to almost two-thirds of the population a decade later (Escobar, 2005). More recent official administrative information indicates that by 2006, 82.72 percent of the population was covered by health insurance either in the subsidized regime (54 percent) or the contributory regime (46 percent) (Ministerio de la Protección Social, 2006). The growth of insurance coverage was most notable among the poorest quintile, where the insured portion of the population increased almost eight-fold (Escobar, 2005). Data from 2005 (Figure 3.1) indicate that the subsidized regime is well targeted to the poor, since its coverage increases with poverty, whereas coverage by the contributory regime increases with wealth (see Chapter 6 for further details on targeting).

Coverage is similar for both genders and is somewhat higher among teenagers and those over 50 years old. Differences in coverage



Source: Giedion and Díaz (2007) based on Demographic and Health Survey 2005 data. SISBEN = Sistema de Identificación de Beneficiarios.

depending on municipality are quite substantial: in about one-fifth of Colombia’s municipalities, insurance coverage is still below 20 percent, while two-fifths of municipalities have achieved over 80 percent coverage. This variation is primarily a consequence of inequities in the local resources that are applied to the subsidized regime.

Impact of Subsidized Health Insurance on Access to and Utilization of Health Services, and on Health Status

Table 3.1 describes the 13 access and five health status variables used in this study, with information on simple unconditional mean differences between individuals affiliated and not affiliated with the subsidized regime and who are at poverty level 3 or below. The data sets contain substantial information on access to services but very little on health

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status. Furthermore, the health variables focus exclusively on maternal, newborn, and young children's health. This complicates the analysis because many health services for small children and childbearing women are free for everyone regardless of insurance status and, therefore, the financial barriers addressed by having insurance coverage are likely to be less important. Moreover, it is not possible to extrapolate from these variables the impact of insurance coverage on other population health conditions, particularly those that can be directly improved by most insured health care services.

Comparison of Unconditional Means

Comparison of unconditional means of affiliated and unaffiliated individuals belonging to the lowest strata of the population (SISBEN level 3 and below) indicates that those with coverage are less likely to go without care when they need it (26 percent compared with 46 percent for people without coverage; Table 3.1). In addition, only 24 percent of the insured report that their access problems are related to financial barriers, compared to 57 percent of those who are unaffiliated. Instead, affiliated patients more often report difficulties due to limited supply (30 percent, compared with 13 percent for non-affiliates). They use health services more often (68 percent versus 46 percent), and insured small children with coughing or diarrhea are brought more often to a health facility.

Differences related to access to prenatal, birthing, and postpartum services are less pronounced but also show significantly better access for pregnant women with subsidized insurance: they receive 4 percent more prenatal visits, take their babies to health facilities 3 percent more often, and are assisted by professionals (4 percent) or doctors (5 percent) more often than are women without subsidized insurance.

The impact of subsidized insurance on health status, based on the simple comparison of means, provides mixed evidence: the difference in survival of small children is statistically insignificant. According to information provided on birth certificates, affiliates have a lower incidence of extremely low birth weight (0.3 percent versus 1.4 percent for unaffiliated babies) but a higher incidence of low birth weight

TABLE 3.1 | Access to and Utilization of Health Services, and Health Status (2005)

Variable description	Mean value, non-affiliates	Mean value, affiliates	Difference (%)	Statistical significance	Variable construction	Universe ^a
Access variables						
Not receiving medical care when needed (excluding health problems considered too minor to require attention)	45.7%	26.1%	-43%	***	What did you do when having a health problem you considered severe enough to require attention? 0 = Went to health facility, to physician, alternative therapy, nurse 1 = Did not receive any medical care	Household members
Not receiving care when needed because of supply problems	13.2%	30.4%	+130%	***	If you did not receive any care when requiring attention, to what circumstances was this due? 1 = Due to supply problems, including services too far away, services of low quality, didn't attend, didn't resolve problem last time, too much paperwork 0 = Did not receive care for other reasons	Household members

Continued on next page

TABLE 3.1 | Access to and Utilization of Health Services, and Health Status (2005) (continued)

Variable description	Mean value, non-affiliates	Mean value, affiliates	Difference (%)	Statistical significance	Variable construction	Universe ^a
Not receiving care when needed because of financial barriers	56.9%	23.8%	-58%	***	If you did not receive care when having a problem considered severe enough to require attention, was this due to lack of money? 0 = No, did not receive care for other reasons 1 = Yes	Household members
Had outpatient visits in past 12 months	46.2%	68.2%	+48%	***	Has any household member used health services in the past 12 months? 0 = No 1 = Yes	Household members
Child immunization complete for age	37.4%	41.8%	+12%	***	Is immunization complete for age? 1 = Yes 0 = No	Children under 5
Child taken to health care facility when coughing	35.7%	44.8%	+26%	***	Was child taken to health care facility when child had fever or cough? 0 = No 1 = Yes	Children under 5

Continued on next page

TABLE 3-1 | Access to and Utilization of Health Services, and Health Status (2005) (continued)

Variable description	Mean value, non-affiliates	Mean value, affiliates	Difference (%)	Statistical significance	Variable construction	Universe ^a
Child taken to health care facility when having diarrhea	29.4%	35.5%	+21%	**	Was child taken to health care facility when child had diarrhea? 0 = No 1 = Yes	Children under 5
Number of prenatal visits	5,190	5,393	+4%	***	Number of prenatal visits when pregnant	Women
Birth in health facility	83.2%	85.8%	+3%	***	Child delivered in formal setting? 0 = No = home delivery, other 1 = Yes = hospital, clinic, government health center, post-insurance-financed center, private doctor	Women
Birth attended by professional	81.3%	84.7%	+4%	***	Was birth attended by professional? 0 = No = trained birth attendant, relative, friend, other person, other response (uncoded), no one 1 = Yes = doctor, nurse, midwife, auxiliary midwife, health professional	Women

Continued on next page

TABLE 3.1 | Access to and Utilization of Health Services, and Health Status (2005) (continued)

Variable description	Mean value, non-affiliates	Mean value, affiliates	Difference (%)	Statistical significance	Variable construction	Universe ^a
Birth attended by doctor	76.5%	80.0%	+5%	***	0 = No 1 = Yes	Women
Post-natal visit after delivery	47.0%	52.1%	+11%	***	0 = No 1 = Yes = doctor, nurse, auxiliary nurse	Women
Access to medical service when complications present (n = 453 in DHS 2005)	42.3%	48.8%	+15%	***	Received medical attention because of complications 0 = No 1 = Yes	Household members
Health status variables						
Survival of children younger than 5 years	97.7%	97.2%	—		1 = Yes, child is alive 0 = No, child has died	Children under 5
Health status perception score	2.9	2.8	-3%	***	How do you perceive your health status? 1 = Not good 2 = Normal 3 = Good 4 = Very good 5 = Excellent	Household members

Continued on next page

TABLE 3.1 | Access to and Utilization of Health Services, and Health Status (2005) (continued)

Variable description	Mean value, non-affiliates	Mean value, affiliates	Difference (%)	Statistical significance	Variable construction	Universe ^a
Low birth weight (per birth card)	7.6%	10.9%	+43%	**	0 = No = birth weight > 2500 g 1 = Yes = birth weight ≤ 2500 g	Children under 5
Extremely low birth weight (per birth card)	1.4%	0.3%	-77%	**	0 = No = birth weight > 1500 g 1 = Yes = birth weight ≤ 1500 g	Children under 5
Complications after delivery	29.9%	31.5%	+5%	*	0 = No 1 = Yes = excessive bleeding, loss of consciousness, fever, breast infection, pain when urinating, postpartum depression	Women

Source: Authors, based on Demographic and Health Survey 2005 data.

*** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.10$.

^a Sample excludes those affiliated with the contributory regime.

(11 percent versus 8 percent) and more complications after delivery (32 percent versus 30 percent).

The unconditional means are likely to be biased by a number of factors that differentiate individuals with and without insurance, and that are unrelated to their insurance status. The unconditional means are still important for particular policy and planning purposes, however. For example, estimates of the required financial, human, and physical resources required to meet the demand for services need to incorporate this information when considering the effects of expanding the subsidized regime.

Results of Propensity Score Matching Estimates

Using propensity score matching, the average difference between matched individuals is our estimate of the program's impact (Table 3.2). Regardless of the matching method, the estimates confirm that the subsidized health insurance scheme increases access to care for the poor. Those affiliated with the subsidized regime are approximately 40 percent more likely to have made outpatient visits in the past year (69 percent versus 49 percent) and almost half as likely to have experienced barriers to access when needing care (25 percent versus 42 percent). Affiliated individuals report problems with access due to limited supply more often than unaffiliated patients do (30 percent and 13 percent, respectively). Also, insured children coughing or suffering from diarrhea are more likely to be taken to a health care facility. Furthermore, affiliated women are somewhat more likely to give birth in a health care facility and to be assisted by either a doctor or other skilled personnel. Importantly, affiliated children are more likely to have their immunization schemes completed appropriately for their age and, therefore, are less likely to die from a preventable disease.

As expected, health indicators are, in general, worse in rural areas than in urban areas. For example, the percentage of births attended by a doctor or other health professional reaches more than 90 percent in urban areas but is less than 70 percent in rural areas. Interestingly, health insurance coverage appears to have a somewhat greater effect on health care service use in rural areas than in urban areas. For example, in urban areas, about 41 percent of unaffiliated children are taken to a

TABLE 3.2 Propensity Score Matching: Estimated Treatment Effect on Patients for Access, Utilization, and Health Status (2005)^a

Variable description	National			Urban			Rural			Poorest			Richest		
	Treated	Controls	Significance ^b	Treated	Controls	Significance ^b	Treated	Controls	Significance ^b	Treated	Controls	Significance ^b	Treated	Controls	Significance ^b
Access and utilization															
Had outpatient visit in past 12 months	68.7%	48.8%	41% ***	70.2%	53.0%	33% ***	65.7%	44.0%	49% ***	65.2%	43.3%	51% ***	70.1%	51.6%	36% ***
Birth attended by doctor	80.9%	75.5%	7% ***	90.1%	87.5%	3% ***	67.8%	63.7%	6% **	67.5%	65.3%	3% -	88.4%	85.9%	3% -
Birth attended by skilled professional	85.5%	80.1%	7% ***	93.3%	91.4%	2% **	74.0%	69.8%	6% **	73.6%	72.0%	2% -	91.9%	90.9%	1% -
Birth in health facility	86.5%	81.5%	6% ***	94.2%	92.7%	2% *	74.7%	68.4%	9% ***	74.4%	69.4%	7% *	92.5%	91.4%	1% -
Child immunization complete	40.2%	37.3%	8% **	45.0%	42.1%	7% *	32.9%	31.1%	6% -	34.9%	32.1%	9% -	43.6%	41.0%	6% -

Continued on next page

TABLE 3.2 | Propensity Score Matching (continued)

Variable description	National			Urban			Rural			Poorest			Richest		
	Treated	Controls	Significance ^b	Treated	Controls	Significance ^b	Treated	Controls	Significance ^b	Treated	Controls	Significance ^b	Treated	Controls	Significance ^b
Not receiving medical care when needed	25.1%	41.6%	***	20.8%	35.2%	***	32.4%	49.8%	***	34.1%	50.2%	***	21.9%	38.4%	***
		-40%			-41%			-35%			-32%			-43%	
		Change (%)			Change (%)			Change (%)			Change (%)			Change (%)	
Not receiving medical care when needed for supply reasons	29.9%	13.4%	***	26.7%	13.3%	***	34.8%	17.2%	***	34.8%	15.8%	***	29.4%	13.8%	***
		124%			101%			102%			121%			114%	
		Change (%)			Change (%)			Change (%)			Change (%)			Change (%)	
Number of prenatal visits	5.513	5.177	***	5.767	5.805	***	5.167	4.549	***	4.739	4.425	*	5.982	5.632	*
		6%			-1%			14%			7%			5%	
		Change (%)			Change (%)			Change (%)			Change (%)			Change (%)	
Child taken to health facility when coughing	44.5%	38.1%	***	47.7%	41.4%	***	40.4%	30.3%	***	40.5%	30%	***	49.2%	39.0%	***
		17%			15%			33%			30%			26%	
		Change (%)			Change (%)			Change (%)			Change (%)			Change (%)	
Child taken to health facility when having diarrhea	36.5%	29.6%	**	36.2%	32.6%	-	32.4%	23.5%	38%	36.8%	22.8%	**	37.9%	35.8%	-
		23%			11%			38%			61%			6%	
		Change (%)			Change (%)			Change (%)			Change (%)			Change (%)	

Continued on next page

health care facility when coughing, compared with almost 48 percent of those who are affiliated. By contrast, the difference in rural areas is a little larger—30 percent and 40 percent for unaffiliated and affiliated children, respectively. Similarly, outpatient visits increase from 44 percent to 66 percent with affiliation in rural areas, compared with a slightly more modest increase from 53 percent to 70 percent with affiliation in urban areas.

These results contrast with Panopoulou's findings (2001), which suggest a more important impact for the subsidized regime in urban areas. These differences in outcome by area may be related to the timing of the two studies: Panopoulou used data from 1997, when implementation of the subsidized regime on a massive scale had just started, whereas this study uses data from 2005, almost one decade after the reforms started. The less-developed rural areas may have needed more time to adapt to the complexities of the current health care system, not showing a significant effect from the subsidized regime when it started, but showing a marked impact a decade later. The more important impact in rural areas can possibly be explained by the overall worse health indicators in rural areas and, consequently, a greater potential for their improvement. Although the difference is modest, results show that health care utilization gains are higher for the poorest quintile than for those in the second income quintile.⁸

Results from the health status analysis are largely inconclusive. With the exception of the incidence of extremely low birth weight (as indicated on birth certificates), the remaining health status results are not robust at the national level. Unlike the analysis with unconditional means, controlling for differences in observed characteristics by using PSM demonstrates that there is no statistically significant difference between affiliated and unaffiliated patients in terms of complications after delivery; results for low birth weight are also not statistically significant. Affiliated individuals appear to have a slightly worse perception of their own health status than do those who are not affiliated with the subsidized regime (2.84 versus 2.88 on a 5-point scale).

⁸ Results reported in Giedion and Díaz (2007); further details available from the authors.

Matched Difference-in-Differences

One criticism of propensity score matching is that it can match individuals based only on observed variables. The results can be questioned if there is reason to believe that there are systematic differences between affiliated and unaffiliated subjects that are not measured and that also influence outcome variables. To test whether the previous analysis is robust with respect to this criticism, we implemented a matched difference-in-differences analysis using a repeated cross-sectional data set (Demographic and Health Survey, 1995, 2000, and 2005). This method is correct for observed and unobserved time-invariant differences between the treated and the non-treated (for further detail see Blundell and Dias, 2000). Because it looks at differences in rates of change in the outcome variables before and after the subsidized regime was implemented (1995⁹ and 2005), coefficients cannot be directly compared with those obtained with PSM.

The analysis largely confirms the previous findings. For the smaller set of outcome measures that were available in all three surveys, affiliation with the subsidized regime is consistently associated with more important improvement (that is, MDD coefficients indicate change over time) in access variables for affiliated subjects (Table 3.3). Additional improvement for affiliated people ranges from 4.2 percentage points for the probability of giving birth in a health care facility to 42 percentage points for the number of prenatal visits. Even the probability of having complete immunization has increased 6 percentage points more for affiliated subjects between 1995 and 2005. This result confirms what has been found using PSM. It is a very important finding insofar as immunization coverage is a proxy for the outcome of a reduced incidence of vaccine-preventable diseases, including tuberculosis, polio, and tetanus. The result is even more striking given that immunization coverage is free to everyone, irrespective of an individual's insurance status; we would therefore not expect better results for those insured than for those uninsured. The former result indicates that health insurance in Colombia generates some positive spillover effects that go beyond making services more affordable. All of the access variables

⁹ Health sector reform was approved in 1993, but significant implementation of the subsidized regime started only in 1996.

TABLE 3.3 Matched Double Difference Estimates of Change in Health Outcome Variables (1995–2005)

Outcome variables	National		Urban		Rural	
	Change (%)	Significance ^a	Change (%)	Significance ^a	Change (%)	Significance
Access and utilization						
Birth in health care facility	4.3	***	0.9	–	4.7	**
Birth attended by skilled professional	5.1	***	0.7	–	4.4	**
Birth attended by doctor	5.7	***	0.8	–	6.2	**
Child taken to health care facility when having diarrhea	7.4	**	9.9	**	15.1	**
Child taken to health care facility when coughing	10.7	***	9.0	***	7.8	**
Child immunization complete	6.1	***	4.1	**	11.8	***
Number of prenatal visits	42.0	***	17.2	*	39.1	**
Health status						
Extremely low birth weight (per card)	–0.1	–	0.0	–	–0.3	***
Low birth weight (per card)	–0.1	–	0.6	–	–2.2	***

Source: Authors, using Demographic and Health Survey 2005 data.

*** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$.

were statistically significant at the national and rural levels but less so in the urban area.

The more blunt health status measures showed a mixed picture: no statistically significant differences were found at the national level or in urban areas. In rural areas, however, the incidence of low birth weight and extremely low birth weight, as reported on birth cards, has dropped more among those affiliated with the subsidized regime.

Discussion

Previous studies documented the unprecedented expansion of health insurance coverage as a consequence of Colombia's 1993 health care

reforms. This study demonstrates that implementing the reforms encouraged greater use of health care services and improved access among those who were able to enroll. This conclusion is robust, as shown by our analysis using a variety of health care use and access measures, along with different methods to control for other factors that might influence these results.

A key implication of this result is that any efforts to change the current system should include precautions against losing these important gains. Any new policies should be able to show that they are likely to encourage appropriate use of health care services at least as much as the current system. This does not mean the current system is perfect, only that it has made important advances that should be recognized and built upon.

The analysis provides a number of clues to guide future policies and analysis. First, many of those affiliated with the subsidized insurance scheme still report financial barriers to using health care services. The major factors that are likely to account for this include the following:

- The subsidized insurance plan does not cover all health care services demanded by the population.
- Non-health care costs (transportation, for example) may present barriers for the affiliated population.
- Individuals may be charged for covered services by mistake or for illegitimate reasons.

Only further detailed study can determine how significant these factors are and whether they are to blame for the existence of financial barriers. Second, financial barriers are not the only obstacles preventing people from using health care services. Supply issues, particularly in rural areas, continue to be a problem for people affiliated with the subsidized regime. Social behaviors also seem to play a role: the affiliated population used even universally free services more than the unaffiliated population did.

This study sought to determine whether the existence of the subsidized regime was affecting health status, but did not find any systematic differences between affiliated residents and those lacking health insurance. The only result that holds across methods is the lower

incidence of extremely low birth weight among affiliated children. The lack of systematic differences could have a number of reasons. First, only a few health status measures were available, most of which were related to health care services that are available free of charge regardless of insurance coverage. Second, the statistical results were generally weak. Third, changes in health status for those who used health care services for conditions other than those related to maternal, infant, and early childhood illnesses were not measured in the surveys. A final implication of these results is to demonstrate the need for better data on population health status.

To analyze whether public health policies are influencing population health, a wider range of health status measures is needed—measures of adult as well as children’s health and measures of conditions directly influenced by health services, along with those influenced by environmental or social factors. Furthermore, collecting longitudinal data from panel surveys would make it possible to learn much more about how public policy affects health service utilization and health status while controlling for time-invariant individual factors that frequently confound analysis. In particular, such data would make it possible to assess whether health status is influencing health insurance participation, instead of the opposite.

Conclusions

The results of this report suggest that the Colombian subsidized health insurance scheme has not only dramatically increased health insurance coverage among the poor but has also improved access to and use of key health services. Affiliated individuals are much less likely to experience financial barriers when they need care, and they visit health care facilities much more often than similar individuals who are not affiliated. Affiliated children suffering from diarrhea or respiratory infections, still the main causes of premature death among small children in Colombia, are also more likely to visit a health care facility. In general, those living in rural areas appear to benefit more from insurance affiliation than do their urban counterparts. Similarly, those in the poorest quintile appear to benefit somewhat more from affiliation than those in the second income quintile do.

Complete immunization coverage is higher among affiliated children, despite the fact that access to vaccination is free for all and is publicly provided irrespective of insurance status. In rural areas, where immunization coverage is lower than it is in urban areas, complete vaccination has increased 12 percent among insured residents. By contrast, it has increased by 6 percent nationally and 4 percent in urban areas. This result is important because immunization coverage is not only an access indicator but also a close proxy for the outcome measures of some of the most important diseases among children in Colombia.

Public debates should recognize these gains and any future policy changes should build on them. It is also important to begin panel surveys that include health status variables that are likely to be influenced by the benefits covered under the current health insurance scheme in order to develop the kinds of longitudinal data necessary to reach reliable and valid estimates for guiding future policy decisions.

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CHAPTER 4

Public Hospitals and Health Care Reform

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Hospitals are a key component of the Colombian health care system and were central to the 1993 health system reforms, which deeply transformed the financing, organization, and delivery of health services.

First, hospitals account for a substantial proportion of health care spending in Colombia: 30.6 percent of total health expenditures over the period 1996 to 2003 were devoted to hospital care (Barón, 2007). Second, as users and drivers of the development of new health technologies, hospitals play a major role in shaping the future of the entire health system. Third, their position at the apex of the health care system means that specialists who work in hospitals often provide professional leadership to the entire health care workforce. Finally, as providers of specialized and inpatient care, hospitals play a major part in determining the health status of the population. If hospitals are ineffectively organized, however, their potentially positive impact on health is reduced or even negated.

Prior to the reforms, hospitals were organized into three distinct systems: the publicly owned and run institutions of the Ministry of Health, the social security providers, and the private institutions. The reforms brought together all hospitals under the Sistema General de Seguridad Social en Salud (SGSSS; General System of

Social Security in Health), fostering quality-based competition among providers.

This chapter describes the transformation experienced by the hospital sector during the implementation of the Colombian health sector reforms. It begins by providing a historical perspective describing the hospital system prior to the reforms and then discusses the expectations of the reformers and the difficulties encountered during the implementation of the reforms. The chapter then describes the recent program for the modernization, reorganization, and redesign of the public hospital networks and the results achieved to date. The chapter concludes by discussing the effect of the reforms on the efficiency and quality of public hospitals in Colombia and provides lessons for other countries.

Hospital Services before the Reforms of 1993

At the beginning of the twentieth century, health care in Colombia was provided either by physicians trained in Europe, who took care of the elite, or by healers who practiced folk medicine and looked after the majority of the population. The first hospitals constructed in the country were sanatoriums run by the Catholic Church (Barco, 1988).

In 1925, strong labor unions negotiated better employment benefits with their employers, including health care coverage. The police and the military were the first to obtain a prepaid package of health services that also covered their dependents. In 1945, the central government created a social security fund (Caja Nacional de Previsión), providing health coverage to government employees. Similarly, the Instituto Colombiano de Seguros Sociales (ICSS; Colombian Institute of Social Security) was created a year later to cover private-sector workers (World Bank, 1987). Other social security funds followed, covering specific professions.

In the 1950s, hospital infrastructure grew strikingly. Sanatoriums evolved into proper hospitals, but maintained their faith-related organizational and managerial culture. The Ministry of Health initiated the construction of publicly run and financed hospitals in the larger cities and departments. Simultaneously, private initiatives generated the development of private hospitals, which provided services to those who were able to pay.

As a result, in the 1960s the Colombian hospital delivery system was chaotic, excessive in some geographical areas and non-existent in others, unrelated to the population's needs, and of varied levels of quality and efficiency (Barco, 1988). The first national health survey of Colombia, conducted during 1965–66, found enormous regional differences in population health and in the availability of health services. Municipalities with more than 20,000 inhabitants, where 46 percent of the population lived, had 65 percent of the total hospital beds and 74 percent of the physicians. Large municipalities had 3.5 hospital beds and 1 physician per 1,000 inhabitants, while municipalities with fewer than 1,500 inhabitants had 0.4 hospital beds per 1,000 inhabitants and 1 physician per 6,384 inhabitants (Ministerio de Salud, 1972).

The Estudio de Instituciones de Atención Médica (Medical Care Institutions Study) covering 1968–69 confirmed significant geographical disparities in the availability and use of hospital beds. For example, Bogotá, the capital and largest city, offered 4.1 beds per 1,000 inhabitants, whereas the department of Sucre, in the north of the country, had only 0.9 beds per 1,000 inhabitants. In addition, the overall occupancy rate of hospital beds at the national level was only 66.8 percent, but reached 75.4 percent in large cities and was as low as 55.3 percent in the smaller towns (Ministerio de Salud, 1973).

Concerned with the disparities in the availability of hospital services throughout the country, in 1966 the government established the Fondo Nacional Hospitalario (National Hospital Fund), responsible for financing hospital construction and equipment. In 1969, Congress endorsed the Plan Nacional Hospitalario (National Hospital Plan), which aimed to rationalize the construction of public hospitals, complemented by the development of regional hospital plans (Vivas *et al.*, 1988).

With the objective of expanding health service coverage to the entire population, in 1975 the government created the Sistema Nacional de Salud (SNS; National Health System) (Vivas *et al.*, 1988). The SNS aimed to integrate hospitals regardless of their nature—private, public, or social security—to produce a rational supply of services. The SNS organized hospitals into three levels according to the complexity of the services provided. The organizational structure followed

the traditional pyramid system, in which the majority of care was provided at the bottom of the pyramid by small institutions offering simpler services:

- Level 1 hospitals comprised local hospitals, health centers, and health posts, providing outpatient ambulatory care and inpatient general medicine services.
- Level 2 hospitals included regional hospitals, providing inpatient services for internal, obstetric, pediatric, and general medicine services of intermediate complexity.
- Level 3 hospitals encompassed tertiary and teaching hospitals, providing inpatient services for internal, obstetric, pediatric, and specialized medical services of advanced complexity.

The design and planning of the SNS was based on the assumption that 80 percent of patient encounters would take place in level 1 hospitals. Fifteen percent of hospital visits would be to level 2 hospitals and the remaining 5 percent to level 3 hospitals.

The second national health survey, conducted in 1977, showed an overall improvement in the access to and use of hospital services, but also persistent geographical disparities. For example, Bogotá recorded a hospitalization rate of 6.5 percent, while the Atlantic region had a rate of only 4.0 percent. At the same time, affiliation with social security funds increased and about 16 percent of the population was hospitalized in institutions affiliated with social security. Affiliation with social security also meant improved access to hospital services: while individuals enrolled in social security institutions showed a hospitalization rate of 9.9 percent, those not enrolled presented a rate of 4.2 percent (Pabón, 1983).

The Estudio Nacional de Hospitales (National Hospitals Study) conducted in 1986, however, reported that public hospitals had a generally low level of productivity and that the occupancy rate for public hospital beds had decreased by 56 percent since the 1969 Medical Care Institutions Study. The gradient in bed occupancy rate according to level of complexity was also worrisome: while the occupancy rate among level 3 hospitals was, on average, 74.8 percent, it reached only 40.4 percent among level 1 hospitals.

The National Hospitals Study also reported the occurrence of periodic crises, strikes, and shutdowns, which had affected Colombian hospitals almost every year since 1964. The causes were the poor managerial capacity of hospital executives, chronic delays in transferring resources to hospitals, and widespread episodes of cronyism, nepotism, and political interference in contracting hospital personnel (Yepes, *et al.*, 1986).

During the mid-1980s, Colombia engaged in a profound administrative and political decentralization process. In 1986, Congress created independent municipalities run by elected officials responsible for the well-being of their residents and authorized to fund municipal social programs with resources raised through local taxes. Health system organization, however, continued to be the exclusive responsibility of the central government until the enactment of Law 10 in 1990. This law transferred to sub-national entities (departments and municipalities) responsibility for the delivery of health services, including the ownership of hospital infrastructure and the responsibility for managing health care personnel. Simultaneously, Colombia was rewriting its constitution, finally approved in 1991, which established “the right to health and to universal and equitable health care services,” along with the mandate for a decentralized administration and provision of health services.

At the beginning of the 1990s, 982 hospitals were functioning in Colombia, of which 705 were public institutions. The SNS was struggling to ensure the constitutional right to universal and equitable health care, however. First, the referral system designed for the SNS, in which patients accessed the system through level 1 hospitals and subsequently were referred to level 2 and 3 hospitals according to the complexity and severity of their needs, did not work as expected. Level 1 hospitals were unable to satisfy patients’ needs because of chronic deficiencies in the availability of human resources, drugs, and other medical goods. Patients therefore often went to level 3 hospitals directly, which were better stocked and perceived as providing a better quality of care. Level 1 and 2 hospitals were therefore underused and demand for hospital services was concentrated in level 3 hospitals, creating delays in the provision of services and dissatisfaction among users.

Second, notwithstanding its mandate, the SNS did not manage to integrate public, private, and social security institutions. Thus, in some geographical areas, public hospitals were duplicating the services provided by private and social security institutions, creating inefficiencies in the organization of services (Barco, 1988). Third, tertiary and teaching institutions (level 3 hospitals) were better able to leverage the political support required to secure resources, at the expenses of level 1 and 2 hospitals, which were suffering chronic shortages of human resources, medications, and other medical goods.

Inefficiencies, lack of proper cost controls, and delays in the transfer of resources produced periodic financial crises, paralysis of activities, shutdowns, and strikes. The only possibility for public hospitals to keep functioning was to rely on government bailouts (Tono, 2002).

First Phase of the Reform: 1993–2002

In 1993, in observance of the new constitutional principles of decentralization, universality, and cohesiveness in health, Congress approved Law 100, a comprehensive health care reform bill that aimed to establish universal health insurance and to foster competition among insurers and health service providers. The reforms created the General System for Social Security in Health, separating the three key functions of financing, “stewardship,” and health services delivery.

On the financing side, the reforms created the Entidades Promotoras de Salud (EPS; Health Promotion Entities). EPSs were responsible for mobilizing financial resources and, acting as insurers, using resources to purchase health services on behalf of the enrolled population. These financial resources consisted of the payroll contributions of enrollees working in the formal sector and capitated units set by the central government and paid by municipalities for the poor. The function of the EPSs in the SGSSS was called “articulation,” as they coordinated the enrolled population’s demand for health services with the providers of health services and the sources of funds. The law mandated that the enrolled population be given freedom to choose their preferred EPS. EPSs, however, could select either private or public care providers. The result was an environment in which both EPSs and health services providers would compete on the basis of the quality of services offered (Londoño and Frenk, 1997).

The Ministry of Health, and subsequently the Ministerio de la Protección Social (MPS; Ministry of Social Protection),¹ was the steward and regulator of the SGSSS. The MPS defined the licensing requirements for EPSs and providers, the health benefits plans, the amount of the payroll contribution, the value of the capitated units received by the EPSs, and so on. Finally, the departmental and municipal health secretariats were granted ownership of public hospitals and responsibility for coordinating the provision of health care services within their catchment areas.

The 1993 reforms also affected the organization, financing, and management of public hospitals. The reforms converted public hospitals from hierarchical bureaucracies into parastatal corporations with increased managerial autonomy and exposed to market competition. This was achieved by transforming public hospitals into state social enterprises that were decentralized public-sector entities with legal status, ownership of assets, administrative autonomy, and access to private-sector procurement and contracting laws. Each state social enterprise established a board of directors, with private-sector and community participation, and was given the mandate to provide health services through explicitly remunerated contracts, to cover their operational costs.

The changes for public hospitals were both revolutionary and challenging. As state social enterprises, public hospitals rapidly began to generate revenue by signing contracts for health service provision with EPSs. As of 2000, all level 2 and 3 public hospitals had been converted into state social enterprises, along with 60 percent of level 1 facilities (Sáenz, 2001).

The reforms also modified the financing of hospital services, introducing the transformation of supply-side subsidies into demand-side subsidies (Londoño, Jaramillo, and Uribe 2001). Before the reforms, public hospitals received funds from central and local governments based on their historical budgets, without relationship to the level of services provided, the population's health needs, or health outcomes. Under the new system, public funds are directed to the EPSs

¹ The Ministry of Social Protection was established in February 2003, merging the ministries of health and labor.

as subsidies that finance the health insurance of the poor and are subsequently transferred to public hospitals as remuneration for the services they provide.

The hypothesis of the architects of the reforms was that the new contracting arrangements would encourage efficiency and stimulate quality (Londoño and Frenk, 1997). Thus, the transformation was envisaged to be financially neutral and to improve efficiency and quality of health services. Law 100 also mandated that the government establish a compulsory quality-assurance system based on the following principles:

- The definition of a compulsory minimum standard of care;
- The voluntary accreditation of hospitals and EPSs to certify a superior standard of care;
- The implementation of a medical auditing framework to ensure a systematic monitoring and evaluation system; and
- The dissemination of information about providers' and EPSs' quality of services to allow informed choices and quality-based competition.

In the context of the existing decentralization process, departmental and municipal health secretariats were given the responsibility of coordinating providers into networks, ensuring sufficient vertical and horizontal integration among the different levels of care, and ensuring adequate complementarities between public and private hospitals.

Public hospitals, converted into autonomous institutions, were expected to respond to the incentives set by the reforms by focusing on the delivery of high-quality services to attract demand. In the meantime, they were to re-engineer their managerial structures and enhance their managerial skills to engage in explicit remunerated contracts with the EPSs.

The health reforms were supposed to be phased in over seven years. By then the entire population was expected to be covered by health insurance. During the transition period, public hospitals were mandated to provide care for poor people not yet insured; public funds provided by central and local entities would be made available to pay for these services. Once universal coverage was reached, the transformation of

public hospital financing was to be complete. However, various factors impeded the achievement of universal coverage within the planned time frame, as described below.

Reduced Political Drive

The change of government in 1994 delayed the implementation of the reforms. The approval of the bylaws and regulations required to implement key aspects of the reforms set up in Law 100 was delayed. For example, the legislation setting up the compulsory quality-assurance system mandated by Law 100 was enacted only in October 2002² and the systematic dissemination of information on hospitals' quality did not start until 2006. Similarly, the investments needed to enhance the technical skills of public hospitals and departmental and municipal health secretariats for their new roles were delayed. Consequently, implementation of the reforms lost momentum (Londoño, 2003).

Economic and Fiscal Crisis

From 1998 to 2001, Colombia faced its worst economic recession and fiscal crisis in over a century. The recession reduced the capacity of the central government to finance the expansion of subsidized health insurance for the poor. The government suspended the transformation of demand-side subsidies into supply-side subsidies, stalling the hospital financing reform. Thus, public hospitals continued to rely on periodic emergency transfers of funds from the central government, and bailouts, just as before the reforms.

Limited Institutional Capacity

Under the adverse political and economic conditions of the late 1990s, the Ministry of Health had difficulty adapting to its new role as steward and regulator of the SGSSS. The consolidation of the decentralization process and the health reform process called for structural change within the ministry. The ministry, however, did not develop the analytical and

² See Diario Oficial No. 44.967 of October 17, 2002, and resolutions No. 1439 and 1474.

regulatory capabilities required by the new system rapidly enough. The Superintendencia Nacional de Salud, the SGSSS's newly established oversight agency, faced similar institutional capacity shortcomings (Plaza, Barona, and Hearst, 2001).

Decentralization and Limited Integration of Public Hospital Networks

The decentralization process meant a significant increase in public funds managed by departmental and municipal health secretariats. However, with few exceptions, departments and municipalities were not prepared to take over the administration of health services providers, including the network of public hospitals (Londoño *et al.*, 2001). The capacity to develop provider networks, integrating the different levels of hospital care with clear referral and counter-referral paths, was limited. Hospitals lacked planning capacity and instruments to estimate the population's health needs, and many departments and municipalities expanded the supply of hospital services in a haphazard fashion (Sojo, 2000). The new investments created duplication of existing services and increased hospital operational costs, putting the financial sustainability of the entire health system at risk.

Limited Capacity of Some Health Promotion Entities

The majority of EPSs, in fulfillment of their licensing requirements, created networks of public and private providers, with some marked integration and clear referral paths. EPSs started to behave like insurers, managing the health risk of the affiliated population, adopting cost-effective preventive, screening, and early detection measures. In contrast, however, some EPSs, especially those managing the subsidized health insurance targeted to the poor, were acting as mere financial intermediaries, transferring their enrollees' risks to the hospitals by contracting all ambulatory and hospital services in large capitated packages.

Limitation of the Managed Competition Model

The responsiveness of private hospitals and EPSs in smaller and less-developed territories was overestimated. In a country like Colombia,

with large regional disparities, the market naturally draws private-sector suppliers, particularly the high-quality ones, to serve the high-income population segment, usually covered by contributory health insurance (Ocampo, 1996). Competition was also limited by a provision of Law 344 of 1996, which restricted EPSs' freedom to contract hospital services from private providers.

Limited Hospital Autonomy and Managerial Capacity

The incomplete transformation of public finances forced hospitals to respond to two opposing sets of incentives. A portion of hospital revenue derived from the services contracted by EPSs. Thus, an EPS's patients became the focus of the hospital's attention, because these patients could switch providers. In contrast, a significant portion of hospital revenue was still transferred directly from health secretariats to cover the costs of the services used by poor patients not yet insured.

The latter source of finances responded to political rather than market forces. In some cases, public hospital managers used their autonomy poorly, hiring unnecessary personnel and authorizing wage increases above public-sector norms. These actions caused a marked increase in overall public hospital expenditures and created the basis of their financial crisis.

High Labor Costs in Public Hospitals

Although state social enterprises were autonomous institutions, rigid public-sector labor laws regulated the personnel that hospitals hired before their conversion into state social enterprises. At the time of the reforms, public hospitals had in place collective labor agreements that set public hospital workers' wages an average of 30 to 40 percent higher than those of their peers in private institutions (Londoño *et al.*, 2001). The marked increase in personnel expenditures was for the most part generated by an effort in 1995 to standardize wages in the public sector nationally. Thus, labor flexibility in the first phase of the reforms was limited and public hospitals faced a critical obstacle in competing with private-sector hospitals.

Delays in Cash Flow

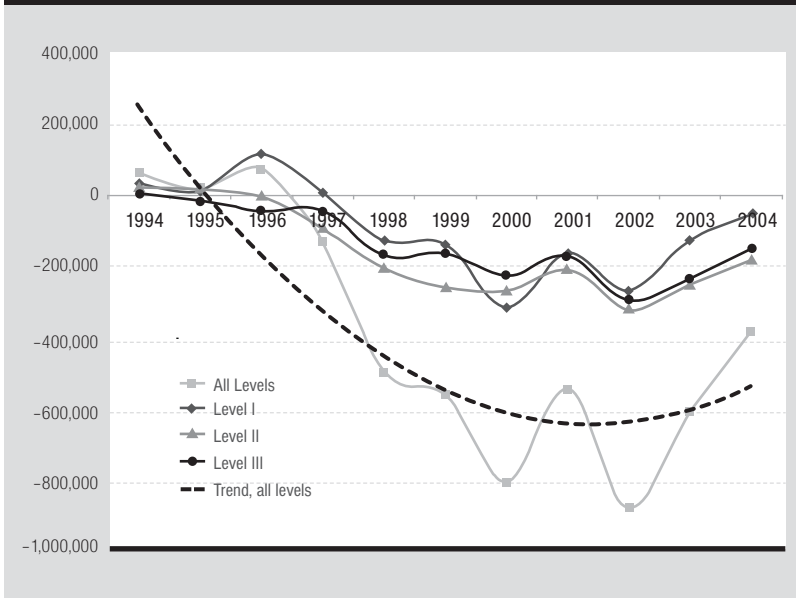
The decentralization process proposed that health subsidies directed to the poor be transferred to municipalities and subsequently to public hospitals, either directly for those not insured or through contracts signed with EPSs for insured patients. As a prerequisite for receiving these funds, however, municipalities needed to meet specific technical, financial, and institutional development requirements and be certified by the Ministry of Finance.

In contrast, the financing chain in uncertified municipalities was tortuous, involving prior authorizations from the Ministry of Finance, the Ministry of Health, the department and its assembly, the municipality and its council, and the relevant EPS. The situation was no better in a large number of certified municipalities, especially the smaller ones, which experienced significant delays in receiving the funds earmarked to subsidize the capitated units managed by the EPS, which, in turn, ran up payment arrears with health service providers. As a result, delays and arrears produced cash-flow problems for public hospitals, the final link of the resource chain (Londoño *et al.*, 2001; Sojo, 2000).

By 2002, public hospitals were undergoing a severe and generalized financial crisis. The reforms had been only partially implemented, as enrollment had reached only 58 percent of the population and the transformation of hospital financing had affected only 50 percent of hospital revenue. In contrast, hospitals' expenditures were increasing as a result of higher labor costs, uncollected revenue, and limited managerial capacity in billing EPSs and municipalities for the services provided to the population. The overall result was a marked deterioration in the financial condition of public hospitals. By 1995, public hospitals had started to manifest structural deficits, which increased continuously thereafter (Figure 4.1).

The partial implementation of the reforms trapped the central government in a costly, vicious cycle: without universal insurance coverage, it was not possible to transfer enough resources through the contracting of services to ensure the financial sustainability of hospitals. However, it was not possible to increase insurance coverage as long as resources were tied up to pay for the services used by the poor not yet insured (Giedion and López, 2000).

FIGURE 4.1 Deficit of Public Hospitals, 1994–2000
(Millions of Pesos)



Source: Ministry of Social Protection.

By 2002, the situation had forced the government to consider two alternatives. The first option was to return to the pre-reform centralized hierarchical health services delivery model, in which the central government controlled public hospital budgets, thus renouncing the demand-side subsidies introduced by the reforms. The second option was to address the roots of the problems that were impeding the effectiveness of the new model of care: strengthen hospital autonomy, increase labor flexibility, and enhance the managerial capacity of hospitals and local health secretariats.

The new administration elected in 2002 decided to maintain the original design of the 1993 health reforms. The National Development Plan for 2003–06 provided for the implementation of a national program that would aggressively redesign, modernize, and reorganize the public hospital networks.

The existing evidence supported the validity of the new model of care. For example, Sáenz (2001) showed that in Bogotá, hospitals

that had adopted modern managerial strategies were also successful in reaching financial solvency. Giedion, Morales, and Acosta (2001) confirmed that the more autonomous hospitals of Bogotá were also the ones with the least irregular behavior. Peñaloza's analysis (2004) showed that hospital competition was directly related to efficiency and that government transfers had the opposite effect.

Reorganization, Modernization, and Redesign of the Public Hospital Networks: 2002 to Date

The objective of the redesign, modernization, and reorganization program was to achieve the financial sustainability of Colombian public hospitals while improving efficiency and quality of service.

The program was based on a pilot project, implemented in 1999, that bailed out 26 indebted hospitals. That experience suggested that public hospitals could become financially viable if existing debts were paid in conjunction with both structural adjustments to render labor costs more flexible and key investments to modernize hospitals' managerial capacity. This program had been implemented in 179 hospitals as of 2007; the participation of an additional 263 hospitals is under examination.

The first stage of the program is the redesign of the hospital network of an entire department. The pilot project showed that to optimize the scale of a single hospital it is necessary to take into account the entire departmental network. Therefore, the portfolio of services provided by each institution is determined, taking into account the demographic and epidemiological profile of the population it serves, the availability of both public and private providers, and the geography of the department, including the communication and transportation networks. The proposal for network redesign defines the portfolio and volume of health services each provider produces, and it is assessed jointly by the Ministry of Social Protection and the Departamento Nacional de Planeación (National Planning Department).

The second phase is the elaboration of the reorganization proposal. The hospital, jointly with the departmental health secretariat and the Ministry of Social Protection, determines the staff required to deliver the desired portfolio of services, the cost of the severance package

required to achieve the optimal staffing level, and the amount of other outstanding debts to suppliers.

The third stage of the program is the modernization of the hospitals and health secretariats. In this phase, hospitals and health secretariats implement the investments required to improve the management processes and enhance the efficiency and the quality of the services they provide.

Once the redesign, reorganization, and modernization proposal is developed, the governor of the department, the mayor, and the directors of the hospitals participating in the program sign 10-year performance agreements with the central government. The agreements specify annual performance targets for production, quality of care, and cost reduction for every participating hospital. In exchange, the hospitals involved in the program receive the funds required for implementing the reorganization and modernization plans. If hospitals do not meet the agreed performance targets, the central government can force the departments and the municipalities to pay back the funds provided to bail out the hospitals.

Table 4.1 shows the aggregated results for the first 179 participating hospitals two years after the inception of the program. On average, hospitals increased the production of health services significantly, while reducing production costs. Hospitals managed to reduce the total annual deficit by 84.8 percent in only two years (the positive results of the program in reducing overall hospital deficit are also shown in Figure 4.1).

To verify that the results are attributable to the intervention, a quasi-experimental impact evaluation of the program was carried out. The evaluation compared hospitals that participated in the program with others of similar size and complexity (the evaluation was not truly scientific, as participation in the program was voluntary). The baseline information was from 2004; subsequent measurements were taken in 2006. The evaluation included 68 hospitals participating in the program and a control group comprising 231 comparable hospitals (Peñaloza Quintero *et al.*, 2007).

The first group of indicators relates to the production of health services, distinguishing between ambulatory, inpatient, and health promotion and disease prevention services. The second group of indicators is composed of efficiency targets, such as the turnover of operating theaters and hospital beds, occupancy rate, and average length of stay.

TABLE 4.1 | Results of the Hospital Redesign, Modernization, and Reorganization Program

Indicator	Year 0	Year 2*	Variation Year 0–2 (%)
Production			
Ambulatory care (number of visits)	2,879,560	3,583,892	24.5
Surgical care (number of surgeries and deliveries)	281,103	335,512	19.4
Total standardized hospital production units	4,444,136	5,055,679	13.8
Expenditures			
Total (2004 million pesos)	915,451	794,472	-13.2
Expenditures per hospital production unit (2004 million pesos)	205,991	157,145	-23.7
Deficit			
Deficit (2004 million pesos)	-321,015	-48,938	-84.8

Source: Consejo Nacional de Política Económica y Social (2006).

* Adjusted for inflation.

Finally, we present results related to quality indicators, such as hospital mortality and infection rates.

Table 4.2 shows the change in production of health services between the baseline year (2004) and 2006, comparing hospitals participating in the program with the control group.

Even if the results are not univocal, it is possible to appreciate that level 1 hospitals participating in the program increased production and

TABLE 4.2 | Change in Production of Health Services, 2004–06

Type of hospital	Ambulatory (%)		Inpatient (%)		Health promotion, disease prevention (%)	
	Participating	Not participating	Participating	Not participating	Participating	Not participating
Level 1	0.37	2.82	-24.14	-41.94	8.80	2.58
Level 2	3.86	-5.06	3.78	19.27	–	–
Level 3	-6.87	-0.12	30.91	6.66	–	–

Source: Peñaloza Quintero *et al.*, 2007.

performed better than hospitals not participating in health promotion and disease prevention and inpatient services, but underperformed in the production of ambulatory services. In the case of level 2 hospitals, those participating in the program performed better in the production of ambulatory services, but worse in the production of inpatient services. Finally, level 3 hospitals showed a reduction in outpatient services but larger growth in inpatient services.

Table 4.3 compares the variation in the efficiency indicators between the baseline year (2004) and 2006. In relation to the turnover of operating theaters, level 2 hospitals participating in the program underperformed hospitals not participating, but the opposite happened among level 3 hospitals. However, all three levels of hospital participating in the program managed to improve performance related to hospital bed turnover.

The results of the evaluation also indicate an important influence of the program on length of stay and bed occupancy rates, as shown in Table 4.4. Hospitals participating in the program reduced the average length of stay, on average, by 33.77 percent and increased the bed occupancy rate by 40.77 percent. In contrast, hospitals not participating in the program increased the average length of stay by 14.27 percent and bed occupancy rate by only 6.70 percent.

Finally, the analysis of a productivity index, constructed as the ratio between total expenditures and total services provided, showed that hospitals participating in the program managed to control costs better than hospitals not participating (Table 4.5).

TABLE 4.4 | Use of Hospital Beds: Variation, 2004–06

Type of hospital	Average length of stay (% change)		Occupancy rates (% change)	
	Participating	Not participating	Participating	Not participating
Level 1	-46.94	11.40	70.74	12.70
Level 2	6.59	21.77	29.57	2.03
Level 3	-50.81	9.74	-2.48	-3.24
All hospitals	-33.77	14.27	40.77	6.70

Source: Peñaloza Quintero *et al.*, 2007.

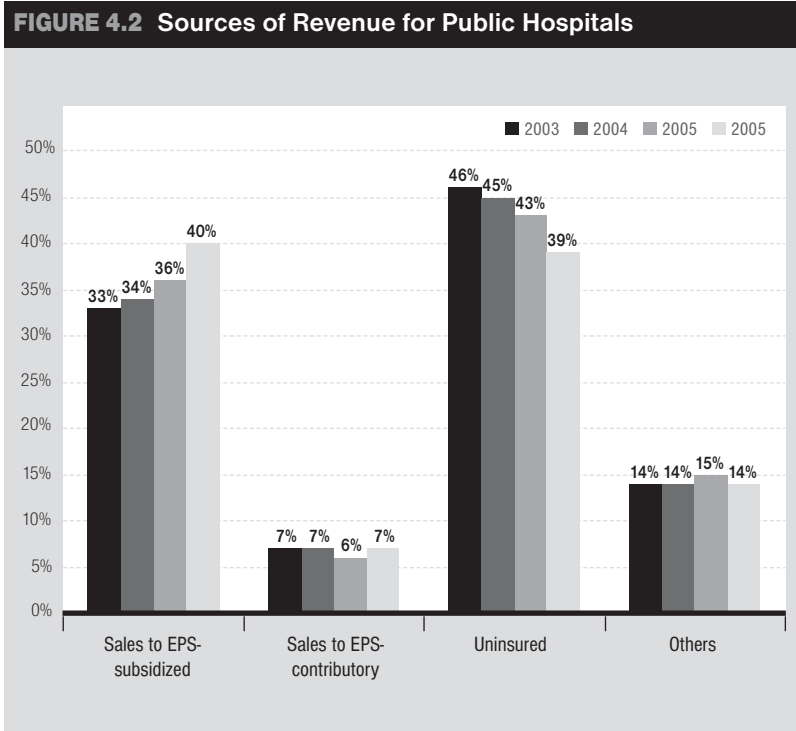
TABLE 4.5 | Productivity Index: Variation, 2004–06

Type of hospital	Variation, 2004–06 (%)	
	Participating	Not participating
Level 1	-25.26	6.48
Levels 2 and 3	-11.03	71.90
All hospitals	-20.8	21.88

Source: Peñaloza Quintero *et al.*, 2007.

As part of the evaluation of the program, a satisfaction survey was conducted in August 2006 involving 4,021 patients in 48 public hospitals. The survey was designed to represent hospitals participating in the program and constructed a control group of patients hospitalized in comparable hospitals not participating in the program. The quality of care was appraised as good, achieving 3.98 on a scale from 0 (worst) to 5 (best); the average waiting time to obtain the care required was 55.3 minutes. Hospitals participating in the program scored better than did hospitals in the control group on the various dimensions of quality of care, waiting time, facilities and equipment, and cleanliness, although the differences were not statistically significant (Cabrera Arana, 2006).

The Ministry of Social Protection information system shows that public hospitals, in aggregate, have improved performance in recent years. Figure 4.2 shows the improvement in the transformation of public

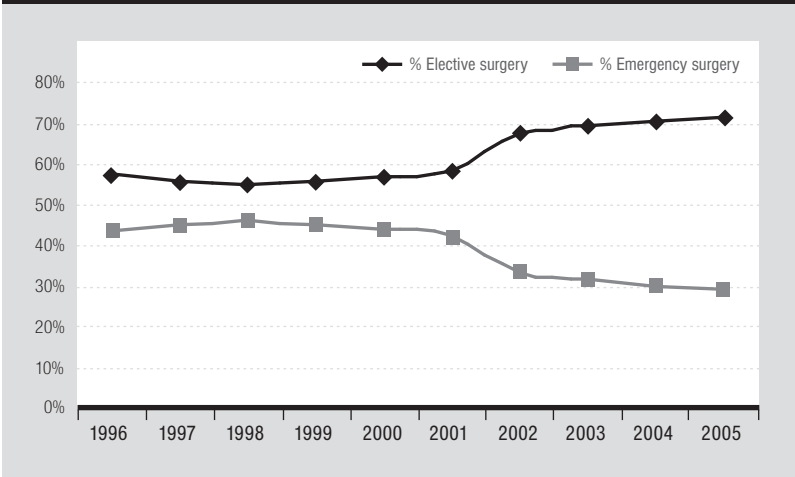


Source: Ministry of Social Protection.

hospital financing. In 2003, sales to EPSs amounted to 40 percent of public hospital revenue (33 percent for services used by the poor affiliated with the subsidized regime and 7 percent for services used by patients affiliated with the contributory regime). Transfers from the municipalities for services used by poor uninsured patients represented 45 percent of total revenue. Three years later the situation had reversed: sales to EPSs amounted to 47 percent of public hospital revenue and transfers from the municipalities had decreased to 39 percent.

The health services research literature considers the use of elective services for non-urgent care an indicator of the level of accessibility of appropriate health care services. Thus, the increased use of elective services versus emergency consultations, shown in Figure 4.3, can be attributed, all other things being equal, to improved access to appropriate types of care, improved coordination of care, and better administrative and planning capacity of both hospitals and local health

FIGURE 4.3 Percentages of Elective and Emergency Consultations

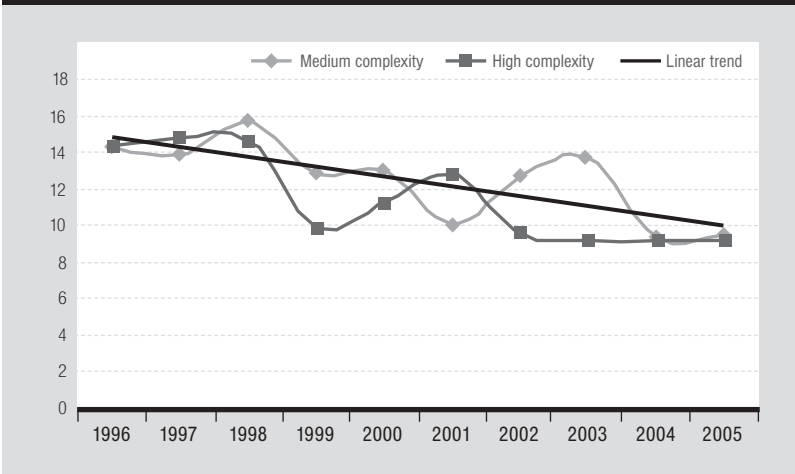


Source: Ministry of Social Protection.

secretariats (Kellerman, 1994; Sarver, Cydulka, and Baker, 2002; Ragin *et al.*, 2005).

Finally, cancellation of elective surgeries also decreased over the same period from 14 percent to 9 percent (Figure 4.4), confirming the

FIGURE 4.4 Percentage of Elective Surgeries Cancelled



Source: Ministry of Social Protection.

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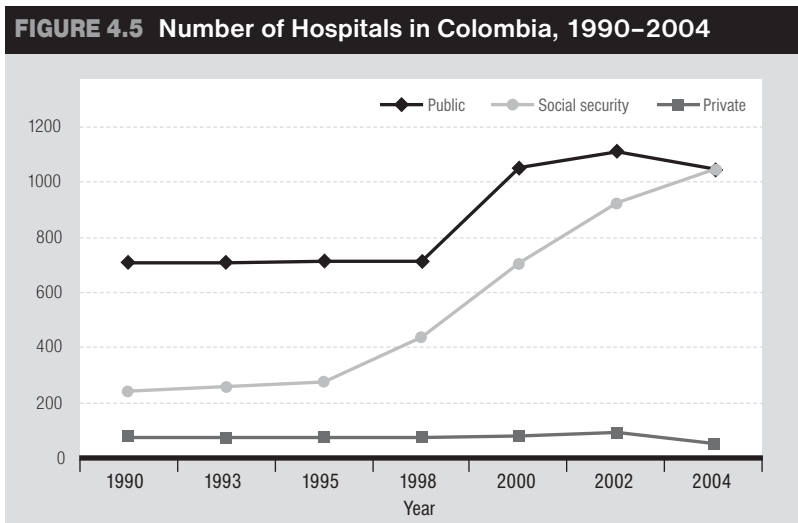
improved administrative and planning capacity of both hospitals and health secretariats.

Conclusions and Lessons for Other Countries

As McKee and Healy have stated (2002), hospitals are rigid structures, composed of imposing buildings and equipment and led by societal leaders who are markedly averse to change. Nonetheless, a population's needs and the health care sector are continuously evolving, forcing health services providers to evolve with them. Such is the case of Colombia.

The Colombian hospital sector has evolved significantly since the inception of the 1993 health sector reforms. The new hospital financing scheme and the separation between financing and care provision provided an important stimulus for the privately run institutions, which have started to increase in number since the beginning of the reforms (Figure 4.5).

In the late 1990s, departmental and municipal health secretariats supported the expansion of new hospitals, in some cases doubling the capacity of existing institutions. Only recently has the number of public



Source: Ministry of Social Protection.

and social security institutions decreased, also as a result of the hospital redesign, modernization, and reorganization program.

At the beginning of the 1993 health reforms it was estimated that a seven-year transition period was required for full implementation of the reforms. In reality, it took much longer to implement the hospital components, such as the transformation of financing and the implementation of the quality-assurance system. It is apparent that the transition period required to achieve universal health insurance coverage was underestimated, considering the complexities of the reforms. But external factors, such as the lost political momentum and a severe economic recession, also slowed the implementation of the reforms.

The implementation of the Colombian health sector reforms confirms the difficulties of launching and sustaining the implementation of any social sector reforms. According to Nelson (2000), the situation is aggravated in the absence of a prior technical consensus on the policy model to adopt, when a large number of stakeholders are involved, when a long implementation period is required, and when benefits are not immediately visible. Moreover, difficulties increase, according to Londoño and Frenk (1997), when governments do not have the capacity to implement the reforms.

Colombia's reforms adopted a model that achieved the transformation of hierarchical, budget-based hospitals into autonomous organizations with financial arrangements that would foster quality-based competition. The reforms included the organizational reform of hospital managerial autonomy (Castaño, Bitrán, and Gideon, 2004; Jakab *et al.*, 2002) and hospital corporatization (Harding and Preker, 2003). The hypothesis put forward by the architects of the reforms was that managed competition, with autonomy and managerial development, would improve the efficiency and quality of public hospitals (Londoño and Frenk, 1997; Londoño, 2003).

The expected results did not materialize, however, and by 2002 the hospital component of the reforms was questioned (Gaviria, Medina, and Mejía, 2006). After an important debate within the government, the conviction prevailed that the original hypothesis was correct and that to reap the benefits of the hospital organizational and finance reforms, full implementation was required.

The descriptive results presented in this chapter suggest that the hospital network redesign, reorganization, and modernization program improved the efficiency and quality of the hospitals participating in the program. The overall deficit of the sector decreased, contributing to the financial sustainability of the entire health system.

These results are in agreement with those of McPake *et al.* (2003) and Gamboa, Vargas, and Arellano (2004), who expressed skepticism about the Colombian reform model, yet reported evidence of increased productivity and sustained quality despite declining numbers of employees.

The findings of this chapter are consistent with those of Bogue, Hall, and La Forgia (2007), who conducted a study of results of reforms in four countries, including Colombia, confirming that autonomy and better management practices are associated with efficiency and patient satisfaction. There is evidence of a positive and significant association between competition and perceived quality of hospital care, defined as the availability of adequate options for treatment, the timing of care, quality of personal care, and health infrastructure (Pinto, 2002).

This chapter suggests that public hospital reform is a key ingredient of health care reform. However, the enactment of the legislation necessary to grant hospital autonomy, corporatization, and financing transformation is not sufficient for a successful hospital reform process if preexisting debts, a rigid labor structure, and insufficient managerial and planning capacity saddle the sector.

To be successful, the reform process should also include decisive actions to adapt the labor structure to the new level and range of services offered and to be compatible with the revenue available. In addition, measures are needed to improve the managerial and planning capacity of the system and to reduce the burden of preexisting debt. Only in this way were Colombian public hospitals able to break with the previous *modus operandi* and improve their productivity and the quality of their services.

We thank Diego Palacio and Blanca Cajigas, without whom this chapter would not have been possible.

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CHAPTER 5

Financial Protection of Health Insurance

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Renata Pardo, and Eduardo Andrés Alfonso*

According to the 2000 World Health Report, one of the three main objectives of any health system is protecting the country's population from the financial consequences of illness (World Health Organization, 2000). The report concludes that insurance provides a suitable tool to protect individuals from potentially catastrophic or impoverishing economic effects of adverse health events. Similarly, the 2007 World Bank Strategy for Health, Nutrition, and Population presents the improvement of financial protection as one of its four strategic objectives and states that to improve financial protection against the consequences of high out-of-pocket expenditures related to illness, countries must find ways to pool out-of-pocket expenditures (World Bank, 2007).

By reaching more than 80 percent of its population with health insurance, Colombia provides a unique opportunity to gather evidence on financial protection. In the early 1990s Colombia introduced a universal health insurance scheme through the introduction of Law 100 of 1993, whereby all citizens were to have access to a comprehensive health benefits package. The most recent Plan Nacional de Desarrollo (National Development Plan, 2007) prepared by the current Colombian administration (2006–10) plans to achieve universal coverage by the end of its mandate. Although financial protection is an important

goal of the Colombian health care system, there have been few assessments of the performance of the Sistema General de Seguridad Social (SGSSS; General System of Social Security) and its role in mitigating the economic consequences of illness.

The goals of this chapter are twofold: first, to estimate the incidence of catastrophic and impoverishing health spending among Colombian households and second, to evaluate whether health insurance helps to reduce the probability of facing catastrophic health payments. The chapter starts by briefly describing the Colombian social health insurance system and then reviews the evidence on the incidence of catastrophic health payments in Colombia. We then present results of the measurement of catastrophic and impoverishing health payments both for the population in general and categorized by insurance regime and income level. The next section first provides an overview of the methodology and concepts used to analyze the impact of health insurance on catastrophic health payments and then presents results from our analysis. Our conclusions wrap up the chapter.

The Colombian Health System

Hoping to reap the benefits of health insurance for its population, Colombia approved in 1993 a universal health insurance scheme (Law 100) whereby all citizens, irrespective of their ability to pay, are entitled to a comprehensive health benefits package. In Colombia's new system of universal health insurance, affiliation falls within one of two regimes, depending on income: the contributory regime, which affiliates workers and their families with monthly incomes above one monthly legal minimum salary (approximately US\$223),¹ and the subsidized regime, which affiliates persons identified as being poor through a proxy means test.

The contributory regime is financed by mandatory payroll tax contributions (11.5 percent). The government uses national and local tax revenues, and a 1.5 percent payroll tax as a solidarity contribution from the contributory regime, to purchase insurance coverage for the poor in the subsidized regime. All affiliates have access to a benefits

¹ Exchange rate: \$Col 1,945/US\$1, June 15, 2007.

package, but the contributory regime package includes all levels of care, while the plan operating in the subsidized regime covers most low-complexity care and catastrophic illnesses but provides only limited coverage for most hospital care and does not provide any short-term disability coverage. The value of the package, and the share of the payroll tax contribution going to the insurer, is approximately US\$207 for the contributory regime and US\$117 for the subsidized regime. In both the contributory and subsidized regimes, the insured individual chooses an insurer, the ownership of which may be public, private, or mixed, and which may be run for profit or not for profit.

As a result of the introduction of universal health insurance, coverage has increased from 24 percent of the population prior to the reforms (1993) to more than 80 percent in 2007, according to recently released data from the 2007 National Health Survey. This coverage rate places Colombia among the very few countries in the developing world that have reached almost universal health insurance coverage.

Previous Research on Catastrophic and Impoverishing Health Expenditures in Colombia

Only a few studies are available on catastrophic and impoverishing health expenditures in Colombia. The existing evidence presents descriptive statistics on the incidence of catastrophic and impoverishing health expenditures and compares it across different groups (by income level, age, insurance status, etc.) without making any statistical inference on the effect of variables that might protect households against the impact of catastrophic health expenses. Most importantly, no study so far has evaluated the impact of the Colombian health insurance scheme on financial protection, a knowledge gap that this study hopes to fill. Table 5.1 presents a summary of the previous evidence on the incidence of catastrophic and impoverishing health care payments in Colombia. The following paragraphs briefly present the evidence.

The first study on catastrophic health payments was carried out by Bitrán *et al.* (2004) as part of a regional effort coordinated by the World Bank, analyzing financial protection against health shocks in Latin America (Baeza and Packard, 2007). Bitrán *et al.* analyzed household data from the 2003 round of Colombia's Living Standards

TABLE 5.1 Previous Studies on Incidence of Catastrophic and Impoverishing Health Expenditures

Author	Country	Data	Principal results
Bitrán <i>et al.</i> , 2004	Colombia	<ul style="list-style-type: none"> • LSMS 2003 • Catastrophic spending defined as > 20% of household consumption • Unit of analysis: households 	<ul style="list-style-type: none"> • Incidence of impoverishing spending among uninsured individuals facing outpatient spending shock: 5%; inpatient shock: 14% • Insurance by subsidized regime decreases incidence of impoverishing spending to 4% • Incidence of catastrophic payments (> 20%) is 23% among those needing inpatient care, 3% among those needing outpatient care; among uninsured it is > 40% for those needing inpatient care, > 10% for those needing outpatient care • Incidence of catastrophic spending is lower in contributory regime than in subsidized regime
Flórez and Hernández, 2005	Colombia	<ul style="list-style-type: none"> • LSMSs 1997 and 2003 • Catastrophic spending defined as > 30% of capacity to pay • Unit of analysis: households 	<ul style="list-style-type: none"> • Incidence of catastrophic spending drops between 1997 and 2003 but impoverishing expenditure increases in same period, especially among poorest patients • Incidence of catastrophic spending is higher among uninsured and poor households • No statistically significant differences found for insured and uninsured among poorest households • Incidence of catastrophic spending, 2003: approx. 4% • Incidence of impoverishing spending, 2003: approx. 5%

Continued on next page

TABLE 5.1 Previous Studies on Incidence of Catastrophic and Impoverishing Health Expenditures

Author	Country	Data	Principal results
Baeza and Packard, 2007	6 countries in Latin America	<ul style="list-style-type: none"> Different surveys in different countries (Colombia: several sources but mainly Bitrán <i>et al.</i>, 2004) 	<ul style="list-style-type: none"> In Colombia out-of-pocket spending as proportion of total national health spending is lower than in other Latin American countries Out-of-pocket spending as percentage of income is greatest for those in lowest income brackets Incidence of impoverishing spending of uninsured households is greater than for households insured by contributory or subsidized regime
Xu, Evans, Kawabata, <i>et al.</i> , 2003	59 countries	<ul style="list-style-type: none"> Different surveys in different countries (Colombia: LSMS 1997) Catastrophic spending defined as > 20% of household capacity to pay Unit of analysis: households 	<ul style="list-style-type: none"> Places Colombia in group of countries with high rates of catastrophic spending Approximately 40% of total health spending in Colombia is financed by out-of-pocket spending 1997 incidence of catastrophic spending: approx. 6%

Source: Authors.

LSMS = Living Standards Measurement Survey.

Measurement Survey (LSMS). The study defined catastrophic health expenditures as out-of-pocket expenditures exceeding 20 percent of total household consumption expenditures. It measured impoverishment as the proportion of individuals whose consumption fell below the national poverty line as a result of health expenditures.

This analysis separated ambulatory and inpatient “health shocks” and compared results across households with and without health insurance. According to this study, 23 percent of those needing inpatient care and 3 percent of those requiring ambulatory care incurred out-

of-pocket payments that absorbed more than 20 percent of their total income in 2003. Among uninsured patients, these percentages rise to almost 40 percent for episodes requiring inpatient care and more than 10 percent for those needing ambulatory care. The percentages drop to less than 30 percent and less than 5 percent for those insured under the subsidized health insurance scheme targeted to the poor. Similarly, a health shock requiring ambulatory care drives 5 percent of uninsured patients below the national poverty line. An illness requiring inpatient care involves out-of-pocket expenditures that take 14 percent of those using this type of care below the national poverty line. The study indicates that these percentages are significantly lower for insured patients.

These findings suggest that the incidence of catastrophic and impoverishing expenditures is lower among those with insurance, but no causal relationships can be established on the basis of these descriptive statistics, however, as observable and non-observable differences between the two groups may be biasing these results.

Similarly, Flórez and Hernández (2005) estimated the incidence of catastrophic and impoverishing health expenditures in Colombian households in 1997 and 2003. Although some comparability problems exist between the 1997 and 2003 LSMSs, results shed light on the evolution of catastrophic expenditures in Colombia. In this study, catastrophic expenditures were defined as those exceeding 30 percent of a household's capacity to pay (total expenditures minus subsistence expenditures) and impoverishing effects are defined as those that cause a household to fall below the poverty line (measured by the average subsistence expenditure of households in the 45th to 55th percentiles of subsistence expenditures, also called the "endogenous" poverty line).

Flórez and Hernández found that 4 percent of households incurred catastrophic out-of-pocket health care payments and that 5 percent of all households became impoverished as a consequence of their high out-of-pocket payments in 2003. The authors also indicate that the incidence of catastrophic payments decreased from 1997 to 2003, while the incidence of impoverishing expenditures increased in the same period, possibly as a result of the economic crisis that hit Colombia during this same period. The authors also show that the incidence of both catastrophic and impoverishing out-of-pocket expenditures is higher for the uninsured population than for the insured population

but that this difference is no longer significant when focusing on the poorest quintile of the population.

Even though these results shed new light on the incidence of catastrophic and impoverishing expenditures in Colombia, they do not provide any evidence on the impact of health insurance because they do not control for observable and unobservable differences that may bias differences in sample means between insured and uninsured residents. Additional research on this topic by O'Meara, Ruiz, and Amaya (2003) focused on four Colombian cities and found that health insurance promoted an increase in the use of health services and a reduction in the financial burden of health care expenditures.

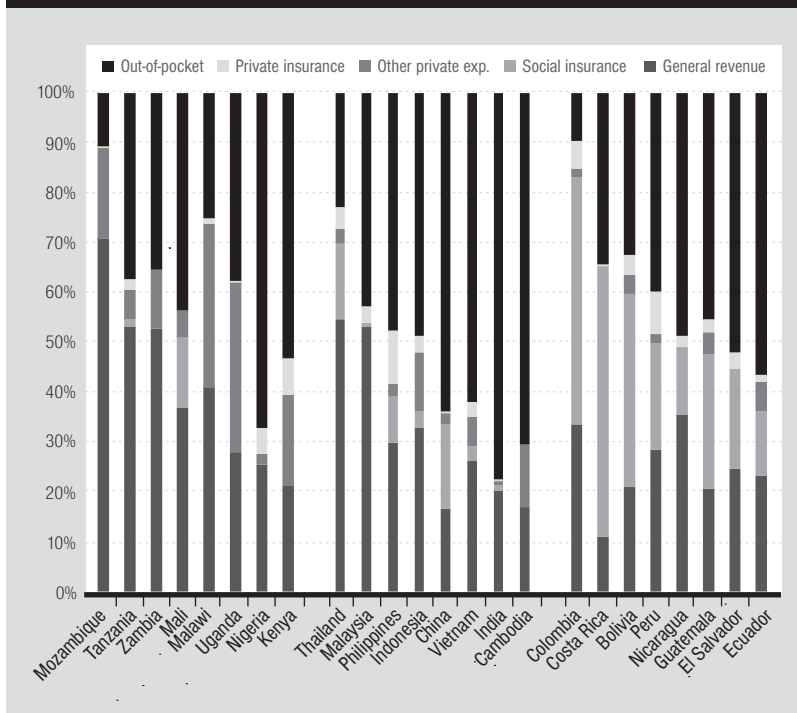
A series of other studies involve the analysis of Colombia from a multi-country perspective. Baeza and Packard (2007) conducted a study that found that Colombian households in the lowest income quintile faced out-of-pocket expenditures equivalent to 10 percent of their total income, which was lower than what was observed in Argentina (13 percent), Ecuador (18 percent), and Mexico (12 percent). The researchers noticed that the Colombian health system exhibited improved performance when compared with those of other countries in the region, such as Chile. In general, Latin American households, particularly low-income households, faced high out-of-pocket expenditures as a percentage of private health spending (85 percent). A different picture emerged in Colombia: this percentage was lower, and the country does not seem to follow the general regional pattern of low public health expenditure as a proportion of total national health expenditure, or the pattern of high out-of-pocket spending as a proportion of total national health expenditure.

Xu, Evans, Kawabata, *et al.* (2003) reported the incidence of catastrophic expenditures for 60 countries, using a 40 percent household income threshold. Contrary to the other studies mentioned above, this one did not use data from 2003, instead using data from the 1997 round of Colombia's LSMS. At that time, implementation of the social health insurance scheme had just started. These authors found that the proportion of Colombian households suffering from catastrophic expenditures amounted to 6 percent in 1997, a level similar to that found by Flórez and Hernández (2005). This analysis places Colombia among countries for which a high incidence of catastrophic payments was observed.

Finally, as shown in Figure 5.1, in comparison to the situation in other low- and middle-income countries, out-of-pocket expenditures in Colombia finance only a small share of total health expenditures, but the country relies heavily on social security expenditures to achieve this. Finally, national health accounts in Colombia show a steep decrease in the share of out-of-pocket expenditures in total health expenditures between 1993 and 2003 as a result of the 1993 health reforms (from 43.7 percent to 7.5 percent; Barón, 2007). In this sense, it may be inferred that Colombia’s health care financing structure seems to create an opportunity to provide better financial protection than the rest of the region and many other low- and middle-income countries.

As indicated above, a number of studies have started to explore how Colombia’s health policy may be related to out-of-pocket expenditures. These studies show lower incidences of catastrophic and impoverishing

FIGURE 5.1 Financial Structure of Health Systems by Region



Source: Hsiao and Shaw (2007) based on WHO data.

expenditures for insured populations than for uninsured populations. In addition, they conclude that unlike the patterns observed in other Latin American countries, out-of-pocket spending in Colombia is a less-important source of health care financing. It is important to note that these studies rely on simple means comparisons and that they are limited in their ability to determine a causal relationship between observed out-of-pocket spending patterns and health insurance. Results may be biased by potential differences in observable and unobservable characteristics between the insured and uninsured populations. In the following sections we describe how the current study fills this gap in existing research in Colombia and how it estimates the mitigating effect of health insurance on catastrophic health care expenditures.

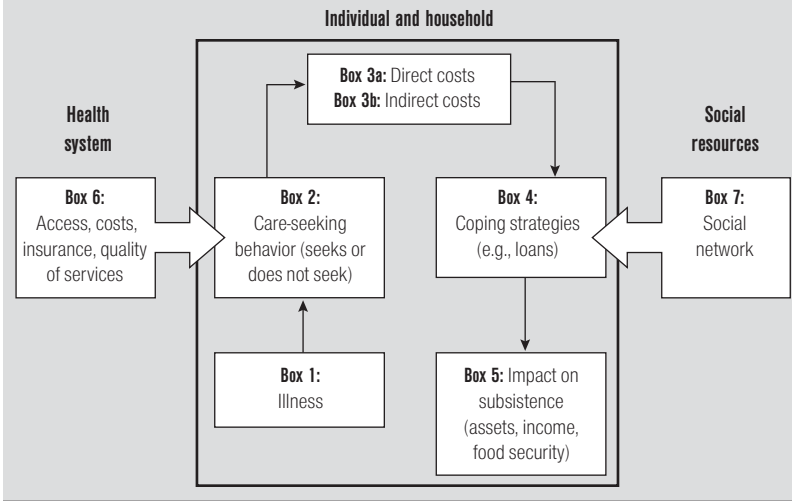
Conceptual Framework

This section starts by introducing a general framework for analyzing the economic consequences of illness to show that health shocks involve much more than out-of-pocket payments at the point of service and that the consequences of such events for the welfare of households depends on myriad factors, including health insurance. We will then place our estimates within this general framework and describe the specific methodological decisions made in this study to measure catastrophic and impoverishing expenditures in Colombia.

General Framework for Understanding the Economic Impact of Illness

Russell (2004) offers a broad general framework for understanding the economic consequences of illness for individuals and households. Figure 5.2 outlines this framework and shows not only how the specific decisions and characteristics of each household (education, poverty level, gender, age, etc.) but also how those of the health system (access to services, fees, access conditions, etc.) influence an individual's level of out-of-pocket expenditure when he/she is faced with an adverse health event.

Figure 5.2 indicates that an individual needing care first faces the decision of whether to seek treatment or not (Box 2). If the person decides to seek treatment, he or she must incur direct costs (prescrip-

FIGURE 5.2 Framework for Understanding Economic Impact of Illness

Source: Russell (2004).

tions, copayments, laboratory tests, transportation, lodging, and food) and/or indirect costs (income loss due to illness or disability; Box 3) that vary according to the severity of illness, the individual's decision to seek care or not, and characteristics of the health system (access, copayments, fees, insurance, quality of services; Box 3). When households lack the capacity to pay, they must use multiple coping strategies, such as selling assets, borrowing money, or obtaining support from their social network (Boxes 4 and 7). The impact of illness on a household's subsistence (Box 5) will depend on the family's specific coping strategies as well as on all the aspects indicated in boxes 1 through 3.

Figure 5.2 illustrates the complexities surrounding the analysis of the economic impact of illness. It shows how the observations on catastrophic health payments depend not only on the characteristics of the health system but also on those of the household and its social network. Furthermore, it illustrates that the impact of catastrophic payments on household welfare may show up in the medium or long term rather than only in the short term and may involve much more than a reduction in consumption.

In this context it is important to note that only time series data and in-depth case studies allow for an estimation of the real economic impact of an adverse health event on a household. Recent studies on the economic impact of important diseases prevalent in developing countries (such as HIV/AIDS, malaria, and tuberculosis) have adopted such an approach (Russell, 2004). However, this type of longitudinal data is rarely available in most low- and middle-income countries (including Colombia). Cross-sectional data are therefore often used instead to compare health-related out-of-pocket expenditures with households' capacity to pay. When these health payments exceed an arbitrarily determined threshold (k) of a household's ability to pay, health payments are considered to be catastrophic.

This approach lies at the heart of most of the literature on catastrophic payments in the developing world (see, for example, Kawabata, Xu, and Carrin, 2002; Wagstaff and van Doorslaer, 2003; Xu, Evans, Kawabata, *et al.*, 2003; Bitrán *et al.*, 2004; Knaul, Arreola-Ornelas, and Méndez, 2005). This static and more speculative vision of catastrophic payments will not shed any light on how households actually cope with catastrophic health payments or on the real impact of these coping strategies on household welfare. It offers, however, a way of identifying out-of-pocket expenditures that are high in relation to household income when no longitudinal data are available. Similarly, it helps to determine whether health insurance can make a difference to the levels of health payments.

Given the limitations of data available in Colombia, this was also the approach chosen for this study. As we will show in the next section, even within this narrower framework, many different ways exist to measure catastrophic payments in practice.

Catastrophic Health Expenditures: Concepts and Decisions

Wyszewianski (1986) was one of the first authors to discuss the concept of catastrophic health expenditures. He defined them as "situations in which the expense is significant in comparison to the patient's capacity to pay." This definition allows us to identify the following characteristics of a catastrophic expense:

- The term “catastrophic expenditure” does not refer to an absolute value but to a relative value, since it is a *ratio* between the expense and the economic capacity to face that expense.
- Whether or not an expense is catastrophic depends not only on financial expenses resulting from disease but also on the capacity to respond to them.
- The decision to consider an event catastrophic is subjective and depends on the researcher’s values.

Furthermore, the concept of catastrophic health expenditures is composed of various elements: unit of observation, disease-related expenditures, capacity to pay, time horizon, and catastrophic costs. As Wyszewianski indicates, the interpretation of any of the elements discussed below will influence the way catastrophic payments are measured and the results that are obtained.

Unit of Observation

The unit of observation for measuring catastrophic payments can be the individual, family, or extended family. The unit’s definition has important implications in a study, since one disease could have catastrophic consequences on an individual but not on the family or the community. In general, most studies on this topic select households as the unit of observation. As Russell (2004) indicates, “the household is the preferred unit of analysis for assessing the costs of illness because decisions about treatment and coping are based on negotiations within the household, illness costs are incurred by caregivers as well as the sick, and costs fall on the household budget.” Based on the former discussion, the unit of analysis in this study is the household.

Disease-Related Expenditures:

Non-Medical Expenses and Productivity Loss

A review of available literature on the economic burden of illness in developing countries shows no consensus on the definition of direct and indirect disease-related costs. Most studies include direct expenses, some include indirect expenses such as transportation or lodging costs,

and still others go even further by taking into account income loss due to illness (Russell, 2004). In some countries, indirect expenses such as transportation and food are higher than direct expenses, and income loss related to illness can have important economic consequences. Results will most probably vary substantially according to whether or not these other costs are included.

Capacity to Pay

There is a lack of consensus regarding the meaning of “capacity to pay” and how it should be measured. As Wyszewianski notes, the term must reflect the type of resources (net of living expenses) that an individual or household must use to cover disease-related expenditures and the household’s resulting financial burden. A recent World Health Organization report adheres to Wyszewianski’s definition, indicating that a household’s capacity to pay is “a measure of the non-subsistence effective income (net of subsistence expenditure) of the household” (Xu, Kawabata, Evans, *et al.*, 2003).

Such an income-based approach as a measure of the capacity to pay is practical when assessing the impact of health expenditure on households, since income and household expenditure data are readily available from household surveys. According to Russell (2004), however, such an approach is limited, since a household’s capacity to pay depends not only on its asset portfolio but also on the resources that may be obtained through social networks. For example, households may be able to resort to credit to smooth their consumption patterns and increase their real capacity to pay.

Time Horizon

Isolated health shocks may have less-adverse economic consequences than a series of subsequent shocks. This is a problem when using household-survey-type cross-sectional data: reference periods usually refer only to health expenditures related to the latest health shock or to health shocks within a limited period (“last month,” for example, and sometimes for inpatient services, “last year”). By using this type of data, instances in which catastrophic expenses were generated by a

succession of many expenses over a long period (for example, with a chronic illness) are ignored.

Wyszewianski (1986) suggests that adding up expenditures over a disease episode may be more satisfactory than limiting the analysis to an arbitrary time frame. In most household surveys, no such addition of expenditures over time is possible. Similarly, no consensus exists on the time frame for measuring the capacity to pay—should capacity to pay be measured, for example, by yearly or monthly income? No straightforward answer seems to exist on this issue and, to complicate things even further, the answer may well depend on the specific context and group being analyzed. Capacity to pay is determined on a monthly basis in this study.

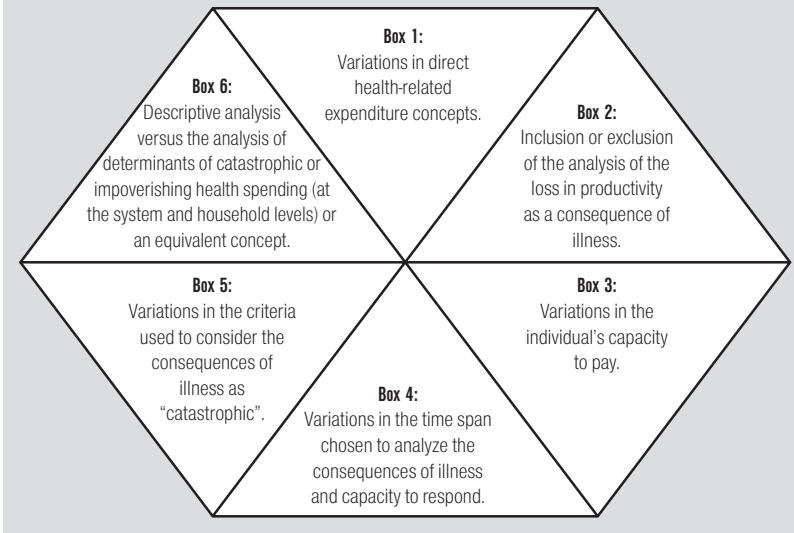
Catastrophic Expenditures

Berki (1986) defines expenditures as catastrophic when they “endanger the family’s ability to maintain its customary standard of living.” He proposes thresholds at 5, 10, and 15 percent of total annual family income. Similarly, Xu, Kawabata, Evans, *et al.* (2003) define health spending as catastrophic when a household must reduce its basic expenditures over period of time to cope with health costs. Thresholds are arbitrary and generally range between 5 percent and 20 percent of total household income. The establishment of thresholds depends on the researcher and may affect the results of the study.

The previous description clearly indicates the lack of consensus around key elements related to the notion of catastrophic health expenditure. Researchers must therefore make a series of decisions when measuring catastrophic health expenditure, all of which are likely to influence their results. Figure 5.3 summarizes the key methodological decisions needed to analyze the economic consequences of illness on households in this context. The following paragraphs indicate the specific decisions taken in this study.

Box 1: Variations in direct health-related expenditure concepts. Two types of direct costs result from illness: medical expenditures (consultations, medications, tests, etc.) and treatment-related expenditures (for example, transportation and lodging for the caregiver). The LSMS

FIGURE 5.3 Methodological Decisions Used to Evaluate Economic Impact of Illness on Households



Source: Authors.

2003 fails to provide a complete breakdown of health expenditures and excludes lab tests, vaccinations, and orthopedic devices, which may result in an underestimation of the total cost of the illness (this expense breakdown is included in LSMS 1997).

Box 2: Loss of income due to illness-related incapacity to work. Unlike most studies of financial protection in Latin American health systems, this study seeks to calculate income loss both to understand the impact of this important consequence of illness on households and to show how inclusion or exclusion of this concept may influence results. The LSMS 2003 gathered information on the number of days a patient was unable to perform normal activities. Household income information is provided in order to calculate income loss resulting from illness or hospitalization instances. However, patients in the contributory regime will not be affected by this analysis, since their benefits package covers sickness leaves.

Box 3: Variations in capacity to pay. The concept of capacity to pay can be divided into two categories: direct capacity (income minus subsistence

expenses) and indirect capacity (household assets and support from social networks to cover debt). In this study, household expenditures are used as a proxy for income variables because variance for current expenditures is lower than income variation and because expense data are considered more reliable than income data, particularly in developing countries. When estimating capacity to pay, liquid assets used to pay for health debt—indirect capacity to pay—must be taken into account. Although the LSMS includes electrical appliances and automobiles in this category, their values are unknown. Therefore, this study does not take into account indirect capacity to pay.

As indicated earlier, capacity to pay can be calculated by subtracting basic subsistence expenditures from total income. Basic subsistence expenditures can be estimated using three indicators: food expenditure, an endogenous poverty line, and an exogenous poverty line. The results are based on the approximation of an endogenous poverty line. In this case, basic household subsistence expenditures are defined by an endogenous poverty line adjusted to household size. An endogenous poverty line is defined as the mean food expenditure of households whose proportion of food expenditure in relation to total expenditures is between the 45th and 55th percentiles, adjusted by household size² (Xu, Evans, Kawabata, *et al.*, 2003).

Box 4: Variations in analysis time span. The LSMS accounts for outpatient services and regular prescription expenditures on a monthly basis, inpatient expenditures yearly, and direct health costs monthly. Hospitalization expenditures are measured for the previous 12 months using the 1986 National Health Survey, which offers the most up-to-date national information. A frequency of 1.09 hospitalizations per year and a sample of 9.08 percent (1.09/12) of hospitalized individuals were selected. This assumption accounts for the fact that hospitalizations are not seasonal but are distributed randomly throughout the year. Direct health expenditures may be underestimated, since outpatient expenditures refer exclusively to severe health events and inpatient expenditures

² Subsistence expenditure is adjusted to household size using adult equivalent scale: $\text{equi-size} = \text{hhsiz}^B$ where $B = 0.56$, estimated by Xu, Evans, Kawabata, *et al.* (2003) from household surveys in 59 countries.

refer to the last hospitalization. Consequently, if the individual has had recurrent adverse health events, only one is accounted for.

Box 5: Variations in catastrophic expenditure threshold. Two different approaches can be used to calculate catastrophic expenditure threshold: 1) select different threshold levels (for example, 10, 20, 30, or 40 percent of capacity to pay); or 2) construct differential percentages according to a household's poverty level, assuming that capacity to pay cannot be expressed as a sole percentage for the whole population. Our analysis considers the fact that the capacity of a household to assign a percentage of its income to cover health costs (once subsistence expenditures are covered) increases directly with income level. However, with the benefit of international comparisons, this study uses different thresholds (10, 20, 30, and 40 percent of capacity to pay) to define expenditures as catastrophic.

Box 6: Descriptive analysis versus analysis of determinants. In line with the objectives of the study, 1) catastrophic and impoverishing health incidents, and not health determinants, are the focus; and 2) the mitigating effects of insurance on a household's response to adverse health events were measured. A descriptive analysis characterizing the population in terms of insurance and use of health services facilitated the selection of households at risk of facing catastrophic and impoverishing expenditures, followed by an estimation of the incidence of these expenditures.

As stated, this study will explore different estimates for some of the main components of catastrophic expenditures. The objective is to shed some light not only on the different criteria that can be used when measuring catastrophic expenditures, but also on the effect these criteria have on the final results.

Data and Methodology

As indicated earlier, the key question addressed in this study is whether health insurance in both the subsidized and contributory regimes has been able to reduce the incidence of catastrophic and impoverishing

health-related out-of-pocket payments. To answer this question, the study relied mainly on household data provided by the Living Standards Measurement Survey from 2003. This data set, compiled by the Departamento Administrativo Nacional de Estadística (DANE; National Administrative Statistics Department), offers the most up-to-date and complete information on out-of-pocket payments related to health shocks and total expenditure levels, both of which are needed for this analysis. The sample size of the LSMS amounts to 22,949 households and is representative at the national level as well as the sub-national rural and urban levels. It captures information on the socioeconomic characteristics of households, health insurance status, utilization of health services, health-related out-of-pocket expenditures, and total household expenditures. (Unfortunately, previous LSMSs are not comparable and could not be used because the wording of questions on out-of-pocket expenditures has changed over time.)

As a first step, we restricted our sample to households using *formal* health services, because we are not looking at the effect of health insurance on catastrophic payments for the population in general; rather, we want to know whether health insurance makes a difference when patients use the formal health system. Furthermore, we focus on the population using formal health services because health benefits cover only this kind of services. Consequently, our descriptive statistics section presents results both for the population in general as well as for the population using formal health services, and our econometric methods inform on the impact of health insurance on the incidence of catastrophic payments for the population using formal services.

To evaluate the impact of health insurance on catastrophic payments, a comparison between insured and uninsured populations is needed. Because insured individuals may differ from uninsured people in both observable and unobservable ways that may also be related to the incidence of catastrophic payments, simple means comparisons may be biased. Under these circumstances we would like to compare the same household both with and without insurance, to determine the influence of health insurance. Such counterfactual possibilities do not exist in the real world, however.

The gold standard in this context is a randomized trial that includes a control group and a randomly assigned treatment group.

When no such data are available, or when data from a randomized trial cannot be extrapolated to represent the impact of a policy at the global level, quasi-experimental methods must be used to select a control group similar to the one obtained under a controlled experimental setting. Among these quasi-experimental methods, a propensity score matching (PSM) technique was applied in the subsidized regime and an instrumental variable approach was used to evaluate the impact in the contributory regime.

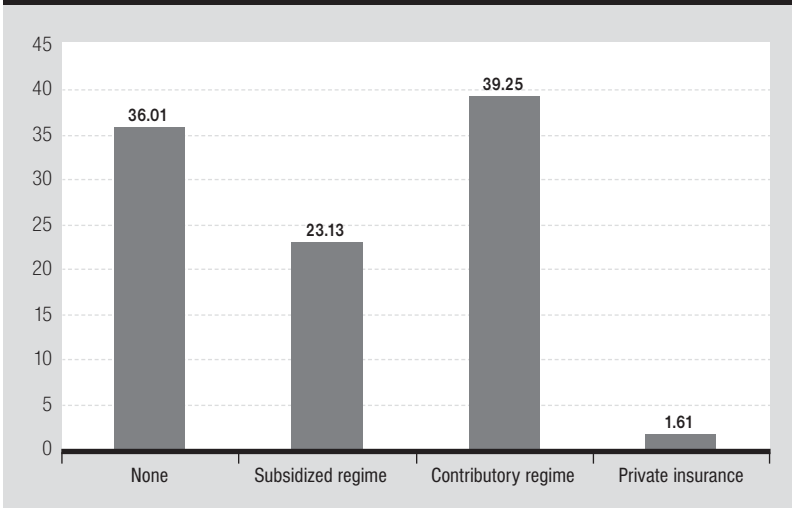
PSM was selected for the subsidized regime because only cross-sectional data were available and other more sophisticated impact evaluation methods using panel or repeated cross-sectional data, such as double difference and matched double difference, had to be discarded. The instrumental variable method was also discarded as a suitable instrument for the subsidized regime. (The instruments used in the contributory regime are not useful for the subsidized regime, since affiliation with the subsidized system does not depend on labor variables; affiliation with the contributory system does.) The particular situation of Colombia in 2003, where a substantial number of poor households were still unaffiliated, provided an ideal setting for the implementation of PSM because this methodology is demanding in terms of the sample size for the treatment (affiliated individuals) and control groups (similar unaffiliated individuals).

In the contributory regime, a large majority of the target population was already insured, so the construction of a sufficiently large control group using PSM was not possible. As well, since a suitable instrumental variable was both found and tested, the researchers decided to use that approach to evaluate the impact of health insurance on catastrophic payments in the contributory regime.

Descriptive Analysis

Data from the 2003 LSMS show that in that year, 64 percent of the Colombian population was affiliated with an insurance system (39 percent with the contributory regime, 23 percent with the subsidized regime, and 2 percent with a private system); 36 percent of the population was not insured (Figure 5.4).

The estimates for insured and uninsured populations are in line with the substantial coverage increase observed by other authors in

FIGURE 5.4 Insurance Coverage in Colombia, 2003

Source: Authors' calculations, based on LSMS 2003 data.

the last decade (see Flórez and Hernández, 2005; Flórez and Acosta, 2007; and Giedion, Díaz, and Alfonso, 2007). As presented in Table 5.2, Giedion *et al.* (2007) found an increase in coverage from 26 percent in 1993 to 62 percent in 2003. The increase was fundamentally attributed to the increase in the affiliation of the population with the subsidized regime.

The coverage increase is also reflected in an increase in equity. A study completed by Flórez and Acosta (2007) concluded that the levels

TABLE 5.2 Evolution of Coverage by Regime Affiliation

	Percentage of population affiliated		
	CASEN 93	LSMS 1997	LSMS 2003
Contributory regime	22.4	34.7	35.1
Subsidized regime	*	19.9	23.1
Private insurance	3.2	2.6	3.6
Uninsured	74.4	42.8	38.2

Source: Giedion *et al.* (2007).

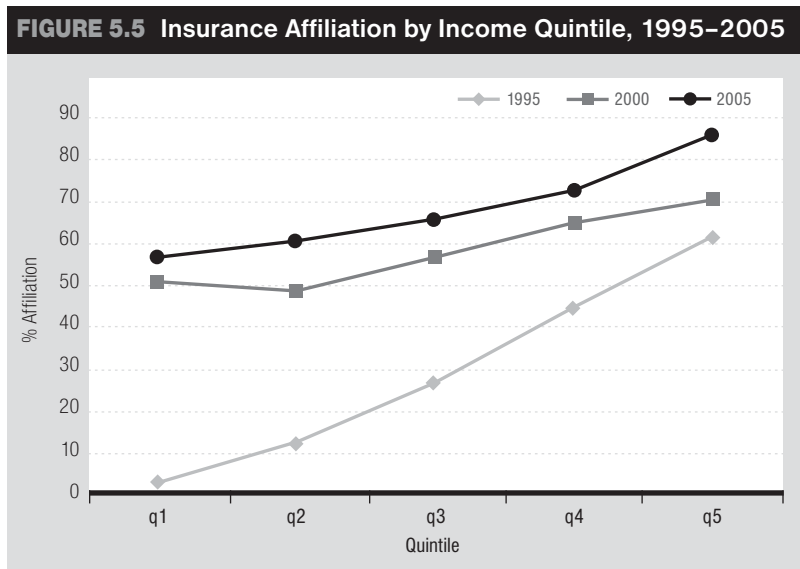
* Data not available.

CASEN = Encuesta de Caracterización Socioeconómica Nacional; LSMS = Living Standards Measurement Survey.

of insurance increase (although observed in all income groups) were higher in low-income populations than in high-income groups, leading to a significant decrease in inequality. Insurance coverage differences between rich and poor populations were prevalent in 1995 (Figure 5.5): the highest income quintile had an affiliation level more than 20 times higher than that of the lowest quintile. The data show that this difference decreased in 2005 and, as a result, the insurance equity gap in Colombia was reduced. This result is important in the context of this study, since the goal of insurance is to reduce out-of-pocket expenditures for households facing adverse health events.

Health insurance coverage increases are in line with the government's goal of reaching 100 percent coverage by 2010. Despite these improvements, Colombia continues to face challenges insuring its population, particularly those in the two lowest income quintiles. This is because the number of health services included in the subsidized regime (known as the Plan Obligatorio de Salud) is approximately half the number of services included in the contributory system.

Through the universalization of insurance and the balancing of the benefit plans between the subsidized and contributory systems, it



Source: Flórez and Acosta (2007).

might be possible to solidify the financial structure of the health and social security systems in terms of efficiency and equity. This will result in increased financial protection for populations at risk of facing adverse health events. The government's goal is to equalize subsidized and contributory regime benefits by 2019.

Household Use of Health Services

The analysis for households with uniform health care system affiliation (that is, all household members have the same affiliation status) focused on households at risk of facing catastrophic or impoverishing health expenditures from using outpatient and inpatient services.

The data showed that 1,892,266 households (25 percent of total households) required outpatient services and that of this total, 1,579,559 (84 percent) used these health services (Table 5.3). Although the proportion of households needing these services is similar across populations regardless of their insurance status, the use of outpatient services reflects greater barriers for uninsured households: of those needing services, 63 percent of uninsured households, 88 percent of households affiliated with the subsidized regime, and close to 94 percent of those

TABLE 5.3 | Need for and Use of Health Services by Regime Type

Insurance regime	Total number of households	Households requiring health services (number, %)	Households accessing outpatient services (number, %)	Monthly access to inpatient services (number, %)	Total number of households accessing health services
None	2,490,360	563,398	355,457	36,559	386,179
	–	22.6%	63.1%	1.5%	–
Subsidized regime	1,520,740	367,313	323,442	28,895	344,089
	–	24.2%	88.1%	1.9%	–
Contributory regime	3,649,506	961,555	900,660	90,875	965,386
	–	26.3%	93.7%	2.5%	–
Total	7,660,606	1,892,266	1,579,559	156,328	1,695,654
	–	24.7%	83.5%	2.0%	–

Source: Authors' calculations, based on LSMS 2003 data.

in the contributory regime used outpatient services. In contrast, the use of inpatient services across differences in health insurance status is similar. Although differences between groups may be related to better access to health services for insured patients, it may also be associated with a problem of selection bias: those who are insured may be systematically different from those not insured, in observed or unobserved characteristics that also provide better access. At this stage of analyzing descriptive statistics, we cannot therefore make any inference on the impact of health insurance on the incidence of catastrophic expenses.

Capacity to Pay

The catastrophic status of an expenditure arising from an adverse health event is based on the relationship between the household's out-of-pocket health expenditures and the family's capacity to pay. The capacity to pay (estimated using an endogenous poverty line) calculated for all households using health services is equivalent to 70 percent of their total income. In other words, on average, subsistence expenditures account for 30 percent of all households' expenditures. But as expected, this percentage varies across income levels: high-income households have a greater ability to pay for items beyond those required for subsistence. While households with higher income levels have a capacity to pay equivalent to 89 percent of their total income (income minus subsistence expenses), this proportion is lower for households in the lowest income group (44 percent of income).

In absolute terms, the average capacity for payment for households using these health services amounts to US\$309 per month, equivalent to 2.7 minimum monthly wages in 2003 (Table 5.4).³ The average capacity for payment of households in the first income quintile (US\$70) is equivalent to 61 percent of the minimum wage. In summary, the evidence points to a greater vulnerability of households with low income when facing the financial impact of adverse health events, since

³ In 2003, the legal minimum monthly wage was equivalent to US\$115.40; exchange rate: \$Col 2,877.50/US\$1.

TABLE 5.4 Capacity to Pay of Households Using Health Services (US\$)

	Total	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Total household income	443	160	245	342	497	1,055
Capacity to pay ^a	309	70	77	189	360	936
Percent of income	70%	44%	31%	55%	72%	89%

Source: Authors' calculations, based on LSMS 2003 data.

^a Estimated using an endogenous poverty line.

their capacity to respond to these shocks is much weaker than that of families with higher incomes.

The data show that Colombian households spend, on average, almost 6 percent of their total income and just over 8 percent of their capacity to pay on health expenditures (top of Table 5.5). Meanwhile, percentages almost double for households that actually used health services (about 10 percent and 14 percent, respectively, bottom of Table 5.5). For these households, expenditures for outpatient services are the most important component of out-of-pocket expenses: 6 percent of the household's capacity to pay is allocated for outpatient services (almost four times the percentage of participation observed in the household total). It is worth noting that private expenditure on total health costs is currently 28 percent (Barón, 2007). Also, given that health affiliation payments are unrelated to the use of services, households—regardless of their use of services—spend, on average, 3 percent of their income (5 percent of their capacity to pay) on insurance coverage.

There are large variations in out-of-pocket expenditures among households: average monthly out-of-pocket expenditures in Colombian households amount to almost US\$9. This amount reaches US\$29 with a standard deviation of almost US\$166 among households using outpatient and inpatient services (Table 5.5). Additionally, differences are more evident if income quintile is accounted for. The average out-of-pocket health expenditures in the lowest and highest quintiles amount to US\$8.50 and US\$80.60, respectively. This shows that average out-of-pocket expenditures are not enough to assess the household's financial burden resulting from adverse health events.

TABLE 5.5 | Descriptive Statistics on Monthly Household Health Expenditures, 2003

	Average, US\$	Standard deviation	Min., US\$	Max., US\$	Total expenditure, %	Capacity to pay, %	Health expenditures, %
Total households							
Total income	380	453	0	21,060	—	—	—
Capacity to pay	266	438	0	20,990	70.0	—	—
Health expenditures (I+II)	22	88	0	20,921	5.9	8.4	—
I. Insurance expenditure	13	33	0	1,334	3.5	5.0	59.9
II. Out-of-pocket expenditures (A+B)	9	80	0	20,921	2.4	3.4	40.1
A. Direct out-of-pocket expenditures	8	79	0	20,921	2.1	3.0	88.2
1. Most severe outpatient expenditures	4	72	0	20,851	1.1	1.5	51.6
2. Monthly medication expenditures	3	13	0	799	0.8	1.1	36.4

TABLE 5.5 | Descriptive Statistics on Monthly Household Health Expenditures, 2003 (continued)

	Average, US\$	Standard deviation	Min., US\$	Max., US\$	Total expenditure, %	Capacity to pay, %	Health expenditures, %
3. Latest hospitalization expenditures	1	25	0	3,823	0.3	0.4	12.1
<i>Continued on next page</i>							
B. Income loss due to incapacity	1	15	0	1,551	0.3	0.4	11.8
Observations	16,358						
Population outreach	7,660,606						
Households using health services (inpatient and outpatient)							
Total income	443	486	15	21,060	—	—	—
Capacity to pay	309	472	0	20,990	69.7	—	—
Health expenditures (+I)	44	171	0	20,921	9.9	14.2	—
I. Insurance expenditure	15	31	0	590	3.4	4.8	34.0

Continued on next page

TABLE 5.5 | Descriptive Statistics on Monthly Household Health Expenditures, 2003 (continued)

	Average, US\$	Standard deviation	Min., US\$	Max., US\$	Total expenditure, %	Capacity to pay, %	Health expenditures, %
II. Out-of-pocket expenditures (A+B)	29	166	0	20,921	6.5	9.3	66.0
A. Direct out-of-pocket expenditures	26	164	0	20,921	5.9	8.4	90.3
1. Most severe outpatient expenditures	17	152	0	20,851	3.9	5.6	66.4
2. Monthly medication expenditures	4	18	0	417	1.0	1.4	17.1
3. Latest hospitalization expenditures	4	53	0	3,823	1.0	1.4	16.5
B. Income loss due to incapacity	3	27	0	1,551	0.6	0.9	9.7
Observations	3,202						
Population outreach	1,695,654						

Source: Authors' calculations, based on LSMS 2003 data.

TABLE 5.6 Relationships between Distribution Percentiles of Out-of-Pocket Expenditures

Out-of-pocket spending percentile comparisons	Times greater for higher percentile	
	All households	Households facing adverse health events
90 th / 10 th	66.67	109.09
90 th / 50 th	7.20	8.00
10 th / 50 th	0.11	0.07
75 th / 25 th	8.75	14.90
75 th / 50 th	2.80	3.08
25 th / 50 th	0.32	0.21

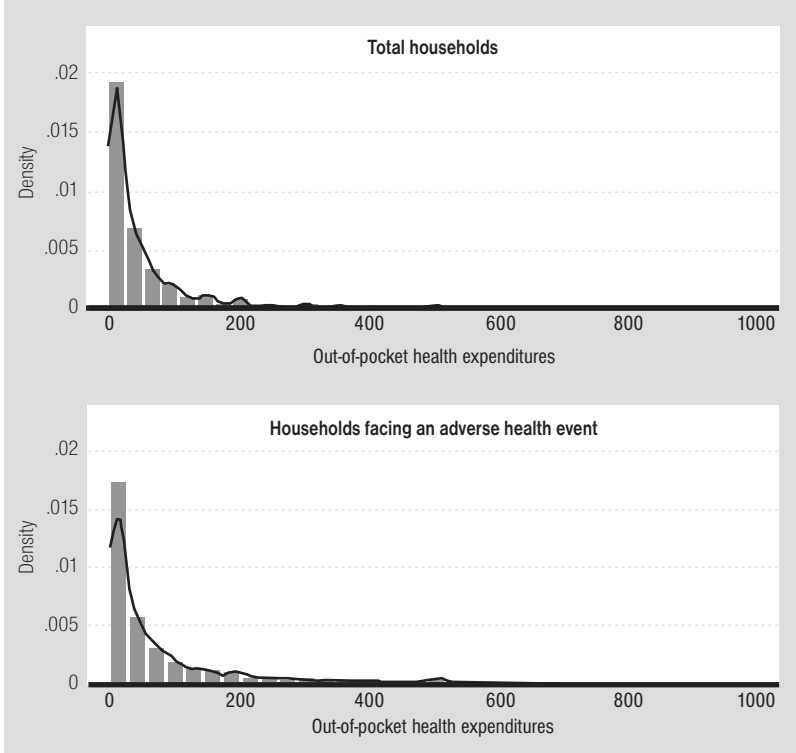
Source: Authors' calculations, based on LSMS 2003 data.

An indicator frequently used as an inequality measurement is the relationship between population spending percentiles. Table 5.6 shows the distribution percentiles of out-of-pocket expenditures that illustrate the magnitude of the difference between households that face high out-of-pocket expenditures and those that do not. Among those that face an adverse health event, the relationship between the 90th percentile and the 10th percentile demonstrates that households in the highest tenth of expenditure distribution spend approximately 109 times more than households in the lowest tenth. This strong concentration of expenditures in relatively few households is evident by observing the relationship between the 75th and 25th spending percentiles, in which the difference in spending is drastically reduced to about 15 times more for the 75th percentile.

In addition, out-of-pocket expenditures are concentrated not only in fewer households but also on lower-cost expenses. The probability density function in Figure 5.6 shows that the greatest density of out-of-pocket health expenditures is predominantly between 0 and 200,000 Colombian pesos.

Catastrophic Health Expenditures

So far, the data indicate that the financial burden resulting from adverse health events is greater for poor households and uninsured

FIGURE 5.6 Probability Density for Out-of-Pocket Health Expenditures

Source: Authors' calculations, based on LSMS 2003 data.

families. The first part of this section analyzes the incidence of catastrophic expenditures for households that use inpatient and outpatient health services as a consequence of adverse health events; the second part provides an analysis for all households. The latter group is included to allow comparisons with international publications that have more often decided to include this wider group of households for analysis.

As previously explained, catastrophic expenditures refer to out-of-pocket expenditures resulting from an adverse health event that exceed a given proportion of the household's ability to pay (threshold k) and are therefore considered harmful.

*Incidence of Catastrophic Expenditures for Households
Using Health Services*

Using the thresholds of catastrophic expenditures identified earlier, we observed that 32 percent of households that used inpatient or outpatient health services exceeded the 10 percent payment capacity threshold, less than half of these households exceeded the 30 percent threshold, and 11 percent exceeded the 40 percent threshold (Table 5.7). This last statistic is alarming because it shows that, using the less conservative definition of the threshold, a tenth of households facing an adverse health event incur catastrophic expenditures. In addition, the proportion of households exceeding this threshold is higher among the poorest segment of the population (12 percent), than among the richest households (5 percent). Consequently, since a high percentage of these households' payment capacity needs to be allocated to basic costs such as education and payment of public services, we conclude that a significant portion of poor households with health problems face catastrophic expenditures.

Data from Table 5.7 suggest that the incidence of catastrophic expenditures is higher for uninsured people. Using the 10 percent threshold as a reference, approximately 64 percent of uninsured households facing adverse health events suffer the consequences of a catastrophic expenditure. This proportion is 38 percent in the subsidized regime and 17 percent in the contributory regime. Although the descriptive data fail to control for differences in the household characteristics of these groups, making it difficult to establish causality between health insurance and financial protection, these results give an indication of this pattern.

Incidence of Catastrophic Expenditures for All Households

The results of the analysis of the incidence for all households, including those that do not require health services and those that needed but did not use them owing to barriers to entry, are shown in Table 5.7. The estimations observed are similar to those of households that used health services. As expected, the proportion of households crossing the catastrophic cost threshold is much lower. These results are a little

TABLE 5.7 Incidence of Catastrophic Expenditures by Threshold

Insurance type	k = 10%			k = 20%			k = 30%			k = 40%		
	User households	Total households	User households	Total households	User households	Total households	User households	Total households	User households	Total households	User households	Total households
Total, %	31.9	11.0	20.8	7.0	14.5	5.0	10.9	4.0	34.0	23.9	17.5	6.2
Uninsured, %	63.9	16.6	45.4	10.9	20.8	7.4	34.0	5.9	34.0	23.9	17.5	6.2
Subsidized regime, %	37.9	14.0	27.6	9.9	20.8	7.4	20.8	6.2	20.8	17.5	17.5	6.2
Contributory regime, %	16.9	6.9	8.5	2.9	4.4	1.5	4.4	1.1	4.4	3.4	3.4	1.1
Income quintiles												
Quintile 1, %	37.6	12.3	25.0	7.3	16.4	5.0	16.4	4.0	31.7	26.2	11.5	8.3
Quintile 2, %	51.2	17.8	40.5	13.6	31.7	10.4	31.7	8.3	31.7	26.2	11.5	8.3
Quintile 3, %	29.7	11.1	19.0	6.6	11.6	3.9	11.6	2.4	11.6	6.6	5.0	1.7
Quintile 4, %	20.5	8.0	10.0	3.4	6.2	2.1	6.2	1.7	6.2	5.0	5.4	1.4
Quintile 5, %	20.4	6.8	9.3	2.5	6.6	1.7	6.6	1.4	6.6	5.4	5.4	1.4

Source: Authors' calculations, based on LSMS 2003 data.

Note: "User" households are those using inpatient and outpatient services.

k = Threshold of catastrophic payments based on relation of health-related out-of-pocket expenditures and capacity to pay.

higher than those of Flórez and Hernández (2005), who found that the incidence of catastrophic expenditures (using a 30 percent threshold) decreased from 13 percent in 1997 to 3 percent in 2003.

Impoverishing Health Expenditures

The previous section focused on the incidence of catastrophic expenditures in Colombian households but did not offer information about the impact of these burdens on poverty. A health-related out-of-pocket expenditure is considered impoverishing if it is high enough to drive a household below the poverty line. To evaluate impoverishing health expenditures, two poverty lines are considered: the national poverty line and an endogenous poverty line (following Xu, Kawabata, Evans, *et al.* [2003], the endogenous poverty line is defined as the point at which a household's average food expenditure reaches the 45th to 55th percentile in relation to total expenses).

Incidence of Impoverishing Expenditures for Households Using Health Services

The proportion of poor households using health services is much higher under the national poverty line than under the endogenous poverty line⁴: 39 percent vs. 17 percent (Table 5.8). However, estimates of the incidence of impoverishing expenditures is similar for the two definitions: approximately 3 percent of households using health services cross the endogenous poverty line as a result of adverse health events and almost 4 percent do so under the national poverty line (Table 5.8).

The perception of the effects of health insurance on the incidence of impoverishment is similar to that observed in the prior section: the proportion of non-poor households crossing the poverty line (either the national or endogenous one) is higher among uninsured than among insured households. Seven percent of uninsured households, 6 percent of households in the subsidized regime, and only 1 percent of those in the contributory regime crossed the endogenous poverty line as a

⁴ The endogenous poverty line calculated is equivalent to \$Col 118,431 (2003); the national poverty line for that year was \$Col 224,255 for urban areas and \$Col 146,186 for rural areas.

TABLE 5.8 | Impoverishing Expenditures for Households Using Outpatient and Inpatient Services, by Insurance Type

	Already poor, %	Crosses poverty line, %	Poor after health shock, % ^a
Using endogenous poverty line			
Total user households	17.0	3.3	20.3
Uninsured	29.2	6.9	36.1
Subsidized regime	40.1	6.3	46.4
Contributory regime	3.9	0.8	4.7
Using national poverty line			
Total user households	39.3	3.7	43.0
Uninsured	52.6	9.5	62.1
Subsidized regime	70.9	5.6	76.5
Contributory regime	22.6	0.7	23.4

Source: Authors' calculations, based on LSMS 2003 data.

^a Absolute impoverishment.

consequence of out-of-pocket health expenditures. The proportions are 10 percent, 6 percent, and 1 percent, respectively, under the national poverty line (Table 5.8).

When observing the small difference between uninsured households and those in the subsidized system, we must take into account the fact that a high percentage of the households in the latter group are close to the poverty line: 44 percent belong to the lowest income quintile of the population (against only 34 percent of those uninsured) and therefore have a higher probability of falling below the poverty line. In fact, when using as a reference the national poverty line, which is higher than the endogenous poverty line, it is possible to observe a higher incidence of impoverishment for uninsured households than for those affiliated with the subsidized regime (10 percent and 6 percent, respectively).

Incidence of Impoverishing Health Expenditure for All Households

When pooling the total sample instead of looking only at households using health services, we find that close to 1 percent of all Colombian households were impoverished as a result of their health-related out-of-pocket

TABLE 5.9 | Impoverishing Expenditures for All Households, by Insurance Type

	Already poor, %	Crosses poverty line, %	Poor after health shock, % ^a
Using endogenous poverty line			
Total households	21.2	1.1	22.3
Uninsured	31.7	1.9	33.6
Subsidized regime	45.1	2.1	47.2
Contributory regime	4.1	0.2	4.3
Using national poverty line			
Total households	42.2	1.2	43.4
Uninsured	57.0	1.9	58.9
Subsidized regime	71.0	1.8	72.8
Contributory regime	20.2	0.4	20.6

Source: Authors' calculations, based on LSMS 2003 data.

^a Absolute impoverishment.

expenditures. (Again, poverty levels are higher under the national poverty level than under the endogenous poverty line, but the incidences of impoverishing health expenditures are similar.) Differences between those uninsured and those insured by the subsidized health insurance scheme are no longer perceivable (Table 5.9). This might be explained, at least in part, by the small sample size.

Impact of Health Insurance on Financial Protection

In the following section, we present the results obtained from the propensity score matching (PSM) methodology used in the subsidized regime and the results from the instrumental variable approach used in the contributory regime, to measure the mitigating effect of insurance on catastrophic and impoverishing expenditures.

Subsidized Regime

As mentioned earlier, the impact of subsidized health insurance in Colombia on the incidence of catastrophic and impoverishing out-of-

pocket expenditures was obtained using a PSM methodology. PSM pairs households in the subsidized regime with non-affiliated households based on the latter's probability of participation in the subsidized regime. In other words, the methodology statistically selects insured and uninsured households with similar observed characteristics that influence affiliation with the subsidized regime and the outcome variables (that is, the incidence of catastrophic and impoverishing expenditures).

Thus, the first step of PSM is to estimate the probability of affiliation with the subsidized regime, for which a probit model is used. The differences obtained from the average outcome variables of these two groups can then be attributed to affiliation in the subsidized regime. The variables (observed characteristics) included in the probit model consist of 1) place-of-residence characteristics such as urban/rural location, municipal population, local health resources, and municipal development; and 2) household characteristics, including household size, access to public services, household per capita income, and other socioeconomic characteristics such as age, gender, and education of the head of the household.

Results of these estimates confirm what descriptive statistics showed: subsidized health insurance reduced the incidence of catastrophic payments. The results shown in Table 5.10 indicate that health insurance reduces the incidence of catastrophic payments exceeding 10 percent of a household's capacity to pay. Similarly, a higher threshold of 20 percent or 30 percent reduces the incidence by 16 percent and 11 percent, respectively. Health insurance still seems to make a difference, albeit a smaller one, when raising the threshold to 40 percent of a household's capacity to pay (-5 percent).

Results are not conclusive regarding the mitigating effect of subsidized health insurance for the poor on the incidence of impoverishing health expenditures. As Table 5.10 indicates, none of the estimated differences between uninsured and insured households are statistically significant. The lack of significance could be related to the small sample size of households falling below the poverty line as a consequence of health-related out-of-pocket expenditures. Indeed, given that the subsidized health insurance scheme is targeted to the poor, only a small portion of insured households and matched unaffiliated counterparts are above any of the defined poverty lines. This situation implies that

TABLE 5.10 Propensity Score Matching Results of Catastrophic and Impoverishing Expenditures (Not Controlling for Differences in Health Status Perception)

	Simple means comparisons				Propensity score matching				Significance
	Households in SR	Uninsured	Difference	Treated	Controls	Difference	Difference	Difference	
Catastrophic expenditure (10% capacity to pay)	0.379	0.639	-0.26	0.441	0.633	-0.19		-0.19	***
Catastrophic expenditure (20% capacity to pay)	0.276	0.454	-0.18	0.293	0.453	-0.16		-0.16	***
Catastrophic expenditure (30% capacity to pay)	0.208	0.34	-0.13	0.226	0.333	-0.11		-0.11	***
Catastrophic expenditure (40% capacity to pay)	0.175	0.239	-0.06	0.183	0.232	-0.05		-0.05	*
Households that cross endogenous poverty line	0.071	0.078	-0.01	0.070	0.059	0.01		0.01	—
Households that cross national poverty line	0.048	0.091	-0.04	0.078	0.093	-0.01		-0.01	—
Households that cross endogenous and national poverty lines	0.026	0.029	0.00	0.116	0.135	-0.02		-0.02	—

Source: Authors' calculations, based on LSMS 2003 data.

SR = subsidized regime.

*** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.10$.

only a small fraction of the sample is at risk of falling below the poverty line as a result of their health expenditures. Although differences between insured and uninsured populations might exist, they would not be captured by our model estimates, owing to the small sample size.

In consideration of this problem, a new variable for impoverishing out-of-pocket expenditures was constructed, taking a wider reference measure. The new variable includes households that become poor by crossing the official poverty line, as well as those that, already being below this line, become more impoverished by crossing the endogenous poverty line, too. Nevertheless, results for this variable are not significant either.

Results from Additional PSM Estimates, Controlling for Differences in Health Status

The above results match insured households with uninsured households along a series of observed characteristics without controlling for differences in health status. Sicker households may be more likely to suffer from catastrophic health expenditures than healthier households and sicker households may not be equally distributed among our insured families. Given this, and to further control for differences across insured and uninsured households, we repeated our PSM estimates, adding a health status perception variable to our matching procedure.

To this end, a health status variable was constructed at the household level based on the percentage of individuals perceiving their health status as either “poor” or “very poor.” Simple average comparisons (Table 5.11) indeed indicate that those affiliated with the subsidized regime are more likely to have a poor or very poor health status perception (6 percent) than are non-affiliates (4 percent). By restricting the sample to households using formal health services, we find an increase in group differences, potentially indicating that illness severity is worse among insured groups than uninsured groups, since those in the subsidized regime are likely to perceive themselves as being unhealthy. (See the Data and Methodology section for an explanation of sample selection.) Assuming that health status perception acts as a valid proxy for health status, when including it in our PSM we anticipated that within our new and adjusted counterfactuals, health status would deteriorate,

TABLE 5.11 | Proportion of Household Members with Poor or Very Poor Health Perception

	Number of observations	Percentage
Total for all households (including those that did not use health services)		
Uninsured	2,490,297	4.0
Affiliated with subsidized regime	1,524,022	6.1
Total for households using health services		
Uninsured	386,178	5.4
Affiliated with subsidized regime	345,233	10.0

Source: Authors' calculations, based on LSMS 2003 data.

increasing the probability of incurring catastrophic health expenditures among uninsured counterfactuals and, as a result, differences between groups would increase.

It is important to keep in mind that this variable might suffer from endogeneity, as health status may not only be influencing health insurance status (sicker individuals may choose to affiliate first, something that our descriptive statistics, detailed above, seem to indicate), but health insurance may itself have an impact on health status (it may improve health status perception by improving access). Therefore, introducing a health status perception variable in our matching procedures could bias the results. Nevertheless, if by including this variable we find a positive impact of subsidized health insurance we may conclude that there is in fact a mitigating effect of the subsidized regime on the incidence of catastrophic expenses.

When introducing health status as an additional control variable (Table 5.12), the impact increases as expected. Subsidized health insurance now reduces the incidence of catastrophic costs by 21 percent when using 10 percent of the capacity to pay as a threshold (instead of 19 percent). The differences estimated for catastrophic expenditures with higher thresholds do not seem to change dramatically and the statistical significance of our results still holds.

Interestingly, when including a health status proxy in our PSM estimates, results regarding the impact of insurance on impoverishment become significant. When using the official national poverty line as a reference, there is evidence of a positive impact of subsidized health

TABLE 5.12 Propensity Score Matching Results for Catastrophic and Impoverishing Expenditures (Estimate on Observations; Includes Health Status Proxy)

	Simple means comparison				PSM (includes health status proxy)			
	Households in SR	Uninsured	Difference	Treated	Controls	Difference	Significance	
Catastrophic expenditure (10% capacity to pay)	0.379	0.639	-0.26	0.394	0.608	-0.21	***	
Catastrophic expenditure (20% capacity to pay)	0.276	0.454	-0.18	0.278	0.420	-0.14	***	
Catastrophic expenditure (30% capacity to pay)	0.208	0.34	-0.13	0.203	0.314	-0.11	***	
Catastrophic expenditure (40% capacity to pay)	0.175	0.239	-0.06	0.159	0.196	-0.04	*	
Households that cross endogenous poverty line	0.071	0.078	-0.01	0.061	0.051	0.01	—	
Households that cross national poverty line	0.048	0.091	-0.04	0.064	0.100	-0.04	*	
Households that cross endogenous or national poverty line	0.026	0.029	0.00	0.099	0.141	-0.04	*	

Source: Authors' calculations, based on LSMS 2003 data.
 *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.10$.

insurance: whereas the probability of falling below the poverty line as a consequence of health expenditures is 6.4 percent among insured households, it is 10 percent among their uninsured counterparts when using a threshold of 10 percent. Similarly, by considering both the national and the endogenous poverty lines as references (last row in Table 5.12), the results again suggest that affiliation with the subsidized health insurance scheme provides financial protection for households facing adverse health events. The probability of falling into poverty is lower for households affiliated with the subsidized regime than for unaffiliated families (9.9 percent vs. 14.1 percent). Finally, when one considers only the endogenous poverty line, results are no longer statistically significant.

Finally, when comparing results from our PSM estimates (both with and without controlling for differences in health status) with results from our descriptive statistics, we observe a small reduction in the magnitude of the effect of health insurance. Comparisons indicate that simple descriptive statistics seem to provide a systematic upward bias but that this bias is not very substantial. This result indicates either that the selection bias is a problem, but not a very important one, or that our methodology does not control for all variables that influence insurance status as well as our outcome variables. It is important to remember in this context that PSM controls for differences only in observable characteristics. It might be hypothesized that other differences influence the affiliation process. In this context, more research is clearly needed.

Contributory Regime

An instrumental variable method was used to evaluate the impact of the contributory regime on financial protection of households. To identify variables that may serve as instrumental variables, we have to understand what determines affiliation with contributory health insurance in Colombia. This understanding is important because a valid instrument needs to be related to health insurance status and unrelated to our outcome variables (the exclusion restriction). In the contributory regime, affiliation is strongly related to employment status. By law, salaried workers must be affiliated by their employers; health insurance

coverage is part of labor contracts for most formal sector workers. In contrast, self-employed workers need to take the initiative themselves to affiliate (even though, in theory, they are required to do this by law), giving them more room to decide whether to do so.

As a result, the determinants of participation in the contributory regime will be different in these two groups. We therefore decided to make separate estimates and different instrumental variables for each group. We divided our sample into 1) households in which the head of the household indicated he or she was employed; and 2) households in which the head indicated he or she was self-employed.⁵ We established independent models and selected different instruments for each group.

Instrumental variables were chosen on the basis of variable strength and identifying restrictions. In the case of self-employed people, firm size was selected (using the firm for which people worked on contract). Firm size and a dummy for formality of employment (a written contract) were selected variables for employed people. Both variables relate to the degree of formality as a key determinant of the likelihood of affiliation.

It is important to note that the validity of the empirical strategy depends critically on the selected instrumental variables. For the method to be valid, every instrument must influence the affiliation decision—there should be a strong relation between the instrumental variables and the affiliation variable, even after controlling for other variables included in the outcome model. As well, instruments should not be related to the outcome variable either directly or indirectly, except through affiliation to health insurance. In particular, the instrument must not be related to unobservable variables that should be included in the outcome equation. These are the main assumptions of the instrumental variable approach, and every instrumental variable should be assessed, both theoretically and empirically, to determine if it complies with these requirements.

⁵ Categories in the LSMS questionnaire to identify employed household heads were private-sector employee or government employee. Categories for self-employed household heads were: laborer, housemaid, or servant; independent professional; independent worker or self-employed; business owner; or farm worker.

The selected instrumental variables comply with the first requirement. Conceptually, our instruments are highly related to the formality of employment and, as mentioned before, affiliation in the SGSSS is largely determined by employment status and the formality of the employment; hence, instruments should be highly related to affiliation, as required. Furthermore, our instruments performed well in the empirical tests: they have proven to be partially correlated with affiliation after other exogenous variables entering the outcome equation have been netted out.⁶

Regarding the second requirement, we argue that our selected instruments are also valid. Neither company size nor having a written contract has a direct influence on the likelihood of catastrophic expenses or impoverishment, since neither of these variables is theoretically related to the probability of an adverse health event, its severity, or its associated cost. However, the formality of employment could influence the likelihood of catastrophic expense or impoverishment, owing to its association with household income level. In this sense, we could conclude that company size and written contracts might not be good instrumental variables because they might be violating the exclusion restriction. If the instruments were associated with our outcome variables through unobserved or excluded factors in the outcome variable model, our results would not be valid. This is not the case, since the study controls for a series of variables that capture the socioeconomic conditions of households for catastrophic and impoverishing expenditures (head of household's education and the highest education level of one of the members of the household, property, housing conditions, household size, and access to services, among other variables).

In addition to these conceptual considerations, we also tested the validity of our instruments by following a procedure similar to the

⁶ In the first-stage probit regression, selected instruments were significantly different from zero, both individually and jointly. Estimated marginal effects and standard errors in the first-stage probit for a sample composed of households headed by employed workers are: 0.0029/[0.0025] for company size and 0.1232 [0.0343] for written contract. For households headed by self-employed workers, the first stage showed a marginal effect of 0.0290/[0.0138] for the company-size instrument.

over-identified restrictions test,⁷ which is useful to indirectly test the exclusion restriction when there are two or more instruments. This test is extensively used to choose the instrumental variables from among all the proposed candidates. In the sample in which the head of the household indicated he or she was employed, we finally chose two instruments (company size and having a written contract) and therefore were able to apply the over-identification test, in which the selected instruments performed well.⁸ For households headed by self-employed individuals, although we finally selected only one instrument and hence it is not possible to calculate the identification test, it is important to note that the instrument is the same.

To summarize, we can conclude that theoretically and empirically (up to the point at which it is feasible to test), our selected instrumental variables comply with the methodological requirements and therefore our results should be corrected for endogeneity and selection bias.

For both groups (employed and self-employed) and for each outcome variable (catastrophic payments with different thresholds or impoverishing expenditures based on different poverty lines), two models were estimated.

The first was a probit model, including a series of control variables (municipal variables such as population, health resources, health facilities supply, municipal development, contributory regime coverage, and an index of competition in the health insurance market in the municipality). Also included were household variables such as urban/rural location, housing characteristics, access to public services, household size, household per capita income, and other socioeconomic characteristics such as age, gender, and education of the household's head.

The second was a two-stage probit and bivariate probit model that used our instrumental variables and thereby controlled for the potential endogeneity problem in health insurance status. To deter-

⁷ We followed Waters (1999) and used one of the instrumental variables to identify the affiliation equation; the others were included in the outcome equation. If the estimated coefficient on the instrument included in the outcome equation was significantly different from zero, that variable was rejected as an appropriate instrumental variable.

⁸ The estimated coefficients for the two instrumental variables (alternating the variable tested) are 0.0040/[0.0134] for company size and 0.0508/[0.0498] for written contract. Neither was significantly different from zero, suggesting they are good instruments.

mine whether endogeneity was indeed a problem in this instrumental variable approach, a Hausman test was calculated for the two-stage probit models and a rho-Wald test for exogeneity was computed for the bivariate model.

Table 5.13 shows the results for the impact of contributory health insurance on the probability of incurring catastrophic expenditures for both employed and self-employed households (keep in mind that we restricted our sample to patients using formal health services).

Households Headed by Formally Employed Workers

Results from our endogeneity tests indicate that contributory health insurance status is not endogenous to catastrophic expenditures in the case of employed workers. This situation seems to be consistent with the fact that employed workers do not participate in the decision to affiliate—their affiliation depends on the employer and is tied to the worker's contract rather than to individual decisions and characteristics. Therefore, no instrumental variable approach is needed to control for endogeneity in the health insurance status of employed workers and their families. In this case we prefer a probit model with control variables.

Since we found no evidence of endogenous affiliation in these models, we can conclude that no unobservable or excluded variables simultaneously influence the outcome and the affiliation; therefore, there is no need to correct for selection bias (or other sources of endogenous affiliation) using an instrumental variable technique. Moreover, it has been shown that using an instrumental variable when there are no endogenous regressors results in large, overestimated standard errors and therefore unreliable hypothesis testing. Those reasons led us to choose a probit model instead of the instrumental variable approach. The probit model with control variables yields smaller standard errors than those we would have obtained using an instrumental variable approach.

Our results show that health insurance coverage provided by the contributory regime significantly reduces the probability of incurring catastrophic payments among households headed by formally employed workers: coverage reduces the probability of catastrophic costs by 27 percent when using a threshold of 10 percent of a household's

TABLE 5.13 | Impact of Contributory Regime on Incidence of Catastrophic Expenditures

	Employed				Self-employed			
	Simple diff	Probit controls	IV probit	Biprobit IV	Simple diff	Probit controls	IV probit	Biprobit IV
Catastrophic expenditure (10% capacity to pay)	-0.3281 [0.0747]***	-0.2712 [0.0775]***	-0.2408 [0.0826]**	-0.3143 [0.1567]*	-0.4685 [0.0539]***	-0.5212 [0.0699]***	-0.6278 [0.2064]**	-0.6227 [0.1565]***
N	1,117	1,117	1,117	1,117	1,031	1,031	1,031	1,031
Hausman test	-	-	-0.1226	-	-	-	-0.1785	-
Rho-Wald test	-	-	-	0.118	-	-	-	0.6952*
Catastrophic expenditure (20% capacity to pay)	-0.2165 [0.0529]***	-0.131 [0.0376]***	-0.0716 [0.0275]**	-0.0786 [0.0633]	-0.3685 [0.0436]***	-0.3274 [0.0440]***	-0.5644 [0.1827]**	-0.6127 [0.0870]***
N	1,117	1,117	1,117	1,117	1,031	1,031	1,031	1,031
Hausman test	-	-	0.3579	-	-	-	-0.8916	-
Rho-Wald test	-	-	-	-0.2479	-	-	-	0.8032*

Continued on next page

TABLE 5.13 Impact of Contributory Regime on Incidence of Catastrophic Expenditures (continued)

	Employed				Self-employed			
	Simple diff	Probit controls	IV probit	Biprobit IV	Simple diff	Probit controls	IV probit	Biprobit IV
Catastrophic expenditure (30% capacity to pay)	-0.141 [0.0371]***	-0.0419 [0.0228]	-0.0186 [0.0128]	-0.0174 [0.0221]	-0.292 [0.0396]***	-0.2727 [0.0350]***	-0.4283 [0.1153]***	-0.5174 [0.1070]***
N	1,117	1,117	1,117	1,117	1,031	1,031	1,031	1,031
Hausman test	—	—	0.4097	—	—	—	-0.7733	—
Rho-Wald test	—	—	—	-0.3551	—	—	—	0.2356
Catastrophic expenditure (40% capacity to pay)	-0.1091 [0.0326]**	-0.0392 [0.0254]	-0.0185 [0.0116]	-0.0213 [0.0355]	-0.1861 [0.0410]***	-0.1394 [0.0303]***	-0.1467 [0.1041]	-0.2029 [0.1326]
N	1,117	1,117	1,117	1,117	1,031	1,031	1,031	1,031
Hausman test	—	—	0.124	—	—	—	0.1077	—
Rho-Wald test	—	—	—	-0.2528	—	—	—	0.2094

Source: Authors' calculations, based on LSMS 2003 data.

Note: Each variable includes results of Hausman and rho-Wald tests, which test the exogeneity of the variable. The first corresponds to the probit model (biprobit IV); the second corresponds to the derived probit model (biprobit IV). If you reject the test, affiliation is not exogenous in the original models and IV is needed. If you accept the null hypothesis, probit models with controls are kept, since the test indicates that affiliation is not endogenous. If participation is not endogenous, the selection bias of the resulting variable is given only for observable variables, which are included in the model. Using the probit model including these controls is sufficient.
IV = instrumental variable.

capacity to pay and by 13 percent when using a threshold of 20 percent. As expected, the mitigating effect decreases as the threshold of catastrophic expenditure increases; results are no longer significant when using a threshold of 40 percent.

Households Headed by Self-Employed Workers

Contrary to what we found for households headed by formally employed workers, the health insurance status for households headed by self-employed people does indeed appear to be endogenous to catastrophic expenditure (bottom of Table 5.13). Consequently, an instrumental variable approach was preferred for this group. Our results provide evidence of a significant positive impact of contributory health insurance on the probability of having to make catastrophic payments. For households headed by self-employed workers, the contributory regime seems to reduce the probability of facing catastrophic health expenditures, irrespective of the chosen threshold.

Similar to what we found for households headed by employed workers, the positive impact of health insurance seems to decrease as the size of the catastrophe increases: affiliation with the contributory regime reduces the probability of a catastrophic expenditure exceeding 10 percent of the household's capacity to pay by 62 percent, a percentage that drops to 13 percent when using a threshold of 40 percent.

Impact of Contributory Regime on Impoverishing Expenditures

Table 5.14 shows the results for the impact of contributory regime affiliation on impoverishing expenditures. Similar to the results for the subsidized regime, the distribution of the population around the selected poverty lines and a small sample of households experiencing impoverishment make it difficult to identify the mitigating effect of insurance. However, the results do indicate a positive impact for contributory regime affiliation on households with self-employed heads, reducing the probability of crossing the national poverty line by four percentage points (-4.1 percent). Using a less stringent criterion of poverty that considers both households that crossed the national poverty line *or* the endogenous poverty line, affiliation with the contributory regime reduces

TABLE 5.14 Impact of Contributory Regime on Incidence of Impoverishing Expenditures

	Employed				Self-employed			
	Simple diff	Probit controls	IV probit	Biprobit IV	Simple diff	Probit controls	IV probit	Biprobit IV
Cross endogenous poverty line	-0.0398 [0.0226]	-0.0287 [0.0166]	0 [0.0000]	0 [0.0000]	-0.0579 [0.0302]	-0.0127 [0.0073]	-0.0109 [0.0141]	-0.0155 [0.0270]
N	1,117	1,117	1,117	1,117	1,031	1,031	1,031	1,031
Hausman test	—	—	0.102	—	—	—	0.2549	—
Rho-Wald test	—	—	—	0.0047	—	—	—	0.0801
Cross national poverty line	-0.0389 [0.0228]	-0.0004 [0.0012]	-0.0001 [0.0003]	-0.0003 [0.0009]	-0.0799 [0.0212]***	-0.041 [0.0132]**	-0.0568 [0.0288]*	-0.1784 [0.1536]
N	1,117	1,117	1,117	1,117	1,031	1,031	1,031	1,031
Hausman test	—	—	0.744	—	—	—	-0.5664	—
Rho-Wald test	—	—	—	-0.1545	—	—	—	0.7486
Cross endogenous or national poverty line	-0.0387 [0.0228]	-0.0004 [0.0010]	-0.0001 [0.0002]	-0.0002 [0.0008]	-0.1282 [0.0246]***	-0.0599 [0.0198]**	-0.0704 [0.0409]	-0.244 [0.2265]
N	1,117	1,117	1,117	1,117	1,031	1,031	1,031	1,031
Hausman test	—	—	0.7603	—	—	—	-0.3244	—
Rho-Wald test	—	—	—	-0.1657	—	—	—	0.8199

Source: Authors' calculations, based on LSMS 2003 data.
IV = instrumental variable.

the incidence of impoverishment by almost 6 percentage points. On the contrary, results do not show any impact of the contributory regime on impoverishment for households headed by employed workers.

Summary of Results

Results discussed in this chapter indicate that the contributory regime provides important financial protection against catastrophic costs. This impact is more important among households headed by self-employed workers. This situation could be related to the fact that these households exhibit higher incidences of catastrophic and impoverishing expenditures and appear to be more vulnerable to financial difficulties resulting from health shocks and, therefore, have more room for improvement when health insurance exists.

We can furthermore conclude that the mitigating effect of insurance decreases with the size of the catastrophe. The contributory regime has an explicit and limited benefits plan that has the capacity to mitigate adverse health events treatable with technology covered in the benefit plan. Technology not covered by benefit plans could be associated to health events that generate catastrophic costs of at least 40 percent of households' capacity of pay; this possibility may explain why the impact of health insurance drops significantly when reaching this threshold.

The results relating to impoverishment due to adverse health events, though less significant, are similar to those obtained for catastrophic expenditures: insurance has a greater significance for those who are self-employed.

Conclusion

Existing research on the topic of catastrophic and impoverishing health care expenditures is limited to analyses of the difference in incidence of such expenditures between insured and uninsured populations. The goal of this study was to analyze the impact of universalized health insurance in Colombia on the financial protection of its citizens. Propensity score matching was used to evaluate the impact of subsidized health insurance on catastrophic and impoverishing expenditures and

an instrumental variable approach was used to measure the impact of the contributory regime.

Although measuring the economic impact of illness is complex and the data available to analyze the economic consequences of illness are limited, the study relied on methods that could achieve a comprehensive analysis of the impact of health insurance on financial protection. The following challenges for this analysis were considered: first, the lack of longitudinal data limits research to estimates of the *potential* impact and not the real impact of adverse health events on households. In a similar manner, the sample was limited to households in which members are all under the same affiliation regime. Second, methods were included to make adjustments to estimates to convert all expenses (outpatient and inpatient) to the same period of reference. Finally, owing to the lack of international consensus regarding the threshold defining “catastrophic,” different thresholds of capacity to pay were used to measure the impact of health insurance.

Health insurance coverage has increased dramatically in Colombia since the health reforms in 1993. Low-income groups were most favored by this health system. However, in 2003, more than a fifth of the population that required services was no longer able to gain access to them for supply and demand reasons. These barriers mostly affected the insured population, including a high number of subsidized regime affiliates. Thus, catastrophic expenditures could be underestimated if one limits the analysis to the incidence of catastrophic expenses for the population as a whole, since the poorest without access to health services might not be included. For this reason, the study focuses on the analysis of households using health services and those that are likely to face catastrophic expenditures by having to incur out-of-pocket expenses to cover health costs.

The incidence of catastrophic costs is higher for uninsured people than for those insured in the subsidized or contributory regimes. Using a low catastrophic expenditure threshold (10 percent of a household’s capacity to pay), we find that 64 percent of uninsured households, 38 percent of those in the subsidized regime, and 17 percent of those in the contributory regime experienced catastrophic health expenditures. Similarly, expenditures resulting from adverse health events led 7 percent of uninsured households, 6 percent of subsidized regime households,

and 1 percent of contributory regime households to cross the poverty line. Self-employed workers in the contributory regime were the ones who benefited most from health insurance.

These differences suggest that insurance mitigates the financial impact and impoverishment resulting from adverse health events. PSM and instrumental variable results ratify the hypothesis and correct potential selection bias. Using a 10 percent threshold for catastrophic expenditures, the resulting difference in incidence of such expenditures between uninsured self-employed individuals and contributory regime affiliates amounts to 62 percent. For formally employed workers and contributory regime affiliates the difference amounts to 27 percent, and for uninsured workers and subsidized regime affiliates the difference is 21 percent.

The mitigating effect of insurance, under both regimes, is better for protecting households from low expenditures and common out-of-pocket expenditures than from high costs. Insurance's financial protection decreases as the catastrophic expenditure threshold increases. For self-employed people, the contributory regime decreases the likelihood of a catastrophic expenditure by 62 percent when the catastrophic expenditure threshold equals 10 percent of capacity to pay, 61 percent when a 20 percent threshold is selected, and 13 percent when a 40 percent threshold is used. For the subsidized regime, the positive impact decreases from 21 percent to 4 percent as the threshold increases.

It is clear that the Colombian health insurance system offers households financial protection from the impact of health expenditures. Furthermore, self-employed workers benefited more than formally employed people, showing that the risk of suffering a financial catastrophe resulting from health events is different for each population group. The benefits of financial protection resulting from health insurance are also different for each population group. To improve health policy effectiveness, it will be important to study the determinants of catastrophic expenditures. This would allow for evaluation and modification of the current financial protection design in the present Colombian system as it relates to the main risk factors found in this study.

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CHAPTER 6

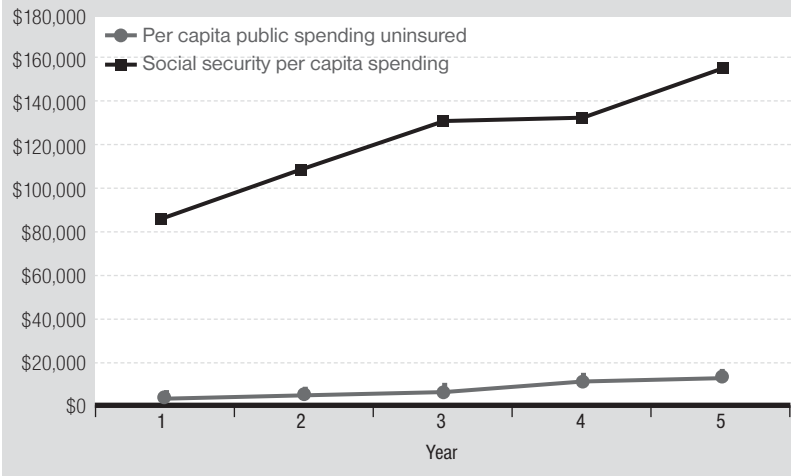
Ten Years of Health System Reform: Health Care Financing Lessons from Colombia

*María-Luisa Escobar, Ursula Giedion,
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Prior to the changes introduced by the health and financial decentralization reforms in 1993, public financing for health in Colombia was characterized by atomized risk pools, low efficiency, and public subsidies that did not reach the poor. This chapter presents evidence of the impact of the changes in health financing on the level, composition, distribution, and equity of health financing in Colombia. The chapter also examines threats to the reform's financial sustainability and draws lessons for Colombia and the world, using evidence from 10 years of reform implementation.

Before the Reforms

Prior to the reforms, the economic cost of care was the most important barrier to access: more than half of the population in the poorest income groups was not able to obtain medical assistance when needed because of the cost. The private sector was important both in the financing and provision of health services before the reforms. Forty percent of all health interventions and 45 percent of all hospitalizations were provided in

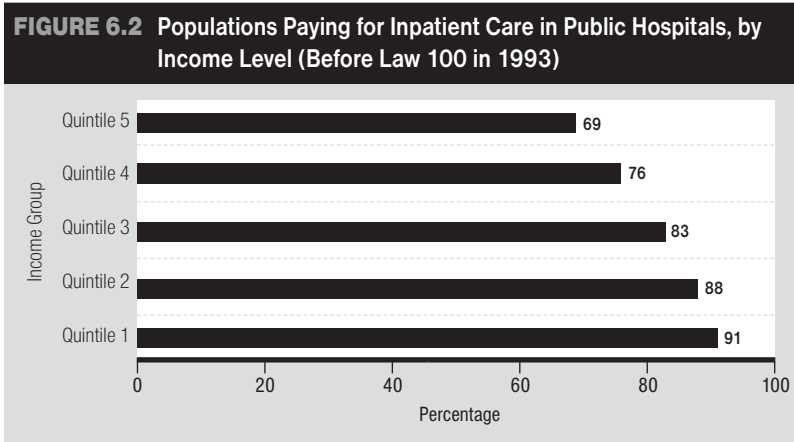
FIGURE 6.1 Per Capita Public and Social Security Expenditure, 1986–90

Source: Authors, based on data from DANE (1993).

the private sector [Figure 6.1; Departamento Administrativo Nacional de Estadística (DANE), 1992].

Despite a large government-owned health care service delivery network, the poor not only had less access to health care than the rich but paid a larger proportion of their income for health care. Public subsidies were not reaching the poor. For example, only 20 percent of individuals hospitalized in public hospitals were from the poorest income quintile, while almost 60 percent were middle- or high-income individuals from the fourth and fifth income quintiles (DANE, 1992). Moreover, while 91 percent of the poorest patients admitted to public hospitals incurred out-of-pocket expenses, only 69 percent of the wealthiest did so (Figure 6.2).

The pre-reform National Health System comprised three separate and independent sub-sectors: the “official” or public sector (government-owned facilities), the social security sector for formally employed workers, and the private sector, used by both insured and uninsured patients. Health financing relied on general and local tax revenue, payroll contributions, and out-of-pocket expenditure, with no pooling of the three sources of financing, resulting in little solidarity and high inequality.



Source: Escobar and Panopoulou (2002); DANE (1993b).

Public sub-sector financing, funneled through historical budgets, supported public hospitals, primary care, and vertical programs that addressed malaria, tuberculosis, leprosy, immunization, and maternal/infant and reproductive health, as well as disease surveillance and the administrative expenses of the central and decentralized Ministry of Health offices. Beyond the vertical programs, there was no separate allocation of resources for disease prevention and health promotion activities or for community health activities. Table 6.1 explains the structure and characteristics of the financing of the pre-reform health system in Colombia.

Public spending on health prior to the reforms was low compared with spending in neighboring countries (United Nations Development Programme, 1992). Public health spending was 2.3 percent of gross domestic product (GDP) in Mexico, 2.1 percent in Chile, 2 percent in Venezuela, 1.7 percent in Brazil, 1.5 percent in Argentina, and less than 1 percent in Colombia in 1988. By 1993 public expenditure in Colombia was 1.4 percent of GDP and 22 percent of total health expenditures (Molina *et al.*, 1993). According to the World Health Organization (WHO), in 2008 countries such as Guatemala and El Salvador and to some extent Bolivia and Ecuador had low levels of government expenditure and high out-of-pocket payments, a composition of expenditure similar to that in Colombia before the reforms. Similarly, Uganda, Kenya, and India have government expenditures

TABLE 6.1 | Health System Financing before 1993

Before reform	Public funding	Social security & other insurance	Out-of-pocket payments
Main source of revenue	<ul style="list-style-type: none"> • General tax financing earmarked for health and education and allocated through transfers from treasury (<i>situado fiscal</i>) • Transfers from central government (“sin taxes”^a) • Departmental and municipal resources 	<ul style="list-style-type: none"> • 8% payroll contribution from formal sector employees • Variety of contribution levels for smaller schemes • Only 21% of population covered, mostly without family coverage • Only a minority had private insurance 	<ul style="list-style-type: none"> • Family income
Pooling	<ul style="list-style-type: none"> • Limited pooling of general tax funding 	<ul style="list-style-type: none"> • No pooling of resources among rich and poor, or employed and non-employed uninsured, or among social security groups 	<ul style="list-style-type: none"> • No pooling
Distribution	<ul style="list-style-type: none"> • Great differences among regions: highest per capita allocation by a department was 81.5 times the lowest allocation (1984) • Most of the budget financed public facilities 	<ul style="list-style-type: none"> • Mostly urban • Great differences among regions 	<ul style="list-style-type: none"> • High inequity • Most important barrier to accessing care was economic: 57% of poorest patients not able to obtain care when needed because of cost
Level	<ul style="list-style-type: none"> • Very low direct public expenditure compared with other countries in region: 1.4% of GDP (service delivery, water, surveillance, research, etc.) • 22% of total health expenditure (1993) 	<ul style="list-style-type: none"> • 1.6% of GDP • 26% of total health expenditure covering less than 25% of population (1993) 	<ul style="list-style-type: none"> • 4% of GDP • 52% of total health expenditure (1993), causing further impoverishment and having no redistributive effect

Source: Authors, using information from National Health Accounts; DANE (1993a); the general comptroller’s office, and Molina *et al.* (1993).

^a Taxes on alcohol, tobacco, and lotteries and other gambling, collected by local governments on behalf of national government (*rentas cedidas*).

GDP = gross domestic product.

as a percentage of total health spending in line with what Colombia had before the reforms.

Health Reforms of 1993

Law 100 of 1993 transformed the financing and delivery of health care, building a new architecture under which financial arrangements converged with the consolidation of an ongoing decentralization process.¹ The main characteristics of this new architecture include:

- Improved mobilization and collection of funds by increasing the sources of public funding and raising the payroll contribution rate while reducing out-of-pocket expenditures;
- Improved resource pooling with the creation of a national equalization fund;
- The introduction of a targeting mechanism to ensure that public subsidies reach the poor;
- Transformation of supply-side subsidies into demand-side subsidies, making resources follow the patient;
- Moving away from historical budgeting toward strategic purchasing of a mandatory health benefits package, with insurers contracting public and/or private service providers.

The new system is characterized by mandatory universal health insurance with two regimes. Formally employed and independent workers with a pre-determined minimum income level must enroll in the contributory regime and contribute payroll taxes totaling 12.5 percent,

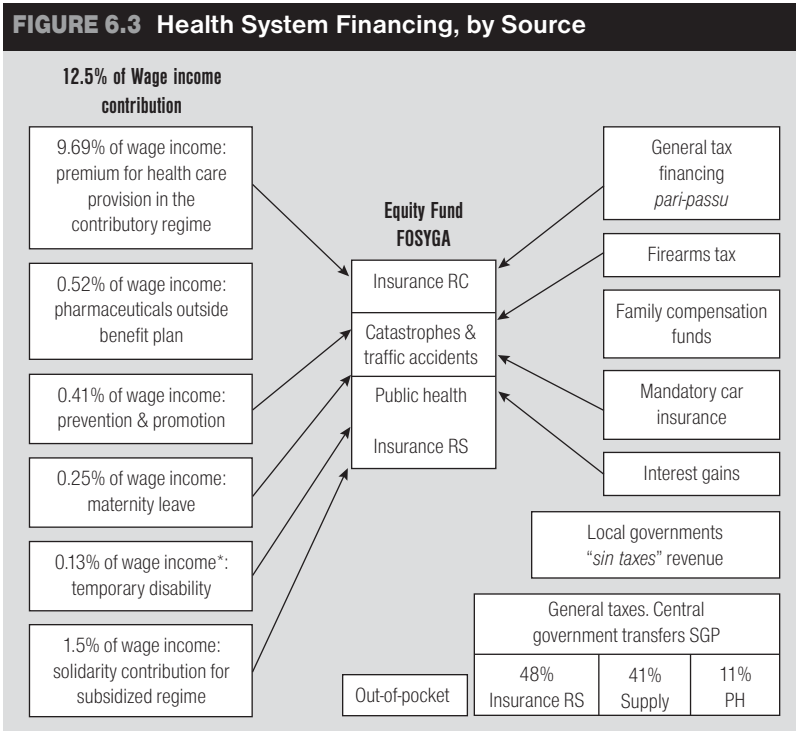
¹ Although decentralization started in the 1980s, Law 10/1990, constitutional reform in 1991, and Law 60/1993 consolidated it. The 1991 constitutional reform made a commitment to social spending, earmarking a portion of the national budget for social sectors (*situación fiscal*) with decentralized administration of resources and progressive allocation of resources to departments and municipalities. Taking decentralization to national territories, Law 60 defined population-based allocation rules and allowed fiscal decentralization. Constitutional amendments (1995 and 2001) and Law 715/2001 introduced changes to the decentralization process by clarifying functions of different levels of government and reforming the transfer system. Two main sources of revenue were merged into one system of transfers to sub-national governments with three separate windows: demand subsidies for insurance, supply-side subsidies for hospitals, and public health. In 2008, 23.5 percent of government transfers were allocated to health.

collected by their insurer of choice. Poor and indigent people do not make any insurance contributions and are covered under the subsidized regime. Payroll contributions go to the national equalization fund, which has four accounts:

1. The compensation account acts as a virtual risk pool for the contributory regime and plays an important role in the pooling of resources nationally. It finances insurance for its enrollees after 11 percent payroll tax contributions are transformed, through its compensation or equalization process, into individual risk-adjusted premiums paid back to insurers.
2. The solidarity account co-finances insurance premiums for the poor in the subsidized regime, with a 1.5 percent payroll tax contribution and matching funds from general tax revenue (*pari passu*).
3. A third account pays for catastrophic expenses.
4. The fourth account finances public health activities.

Separately, the treasury also provides decentralized transfers for insurance premiums in the subsidized regime, to finance public hospitals, and for public health activities. Such transfers for insurance premiums complement resources from the solidarity account and are additional resources for insurance for the poor outside the equalization fund. Local municipal revenue is also allocated to insurance.

Insured individuals in both regimes choose their insurer and care providers within the insurer's network and receive a health benefits package purchased by insurers from public and private providers through contracts. The benefits plan for the contributory regime is generous and covers all levels of care with an average premium equivalent to US\$207 in 2007. Primary care, some inpatient care, and catastrophic care are covered under the subsidized regime with a premium equivalent to US\$117. Tertiary hospital care is not covered by the plan and is provided by the public hospital network, as is care for the uninsured. According to the law, the supply-side subsidies will gradually be transformed into demand-side subsidies as insurance coverage expands and eventually reaches universal coverage with a uniform package for all.



Source: Source: Authors.

Note: Sistema General de Participaciones (SGP) distribution for 2004; National Planning Department data.

* As reimbursed in 2006.

FOSYGA = Fondo de Solidaridad y Garantía; RC = contributory regime; RS = subsidized regime; PH = public health.

Figure 6.3 summarizes the financial architecture, showing how decentralized transfers and resources in the equalization fund complement each other to finance national social health insurance. Low levels of both out-of-pocket expenditures and other private expenditures complement the system's financial architecture.

Results of the Reforms

Level and Composition of Spending

Ten years after the reforms, Colombia spent 1.6 percent of GDP more on health care for its population, increasing its per capita health spend-

ing in real terms by as much as the real growth of its GDP in the same period (Table 6.2). As a result, total spending grew from 6.2 percent of GDP in 1993 to 7.8 percent of GDP in 2003 (Barón, 2007).

The composition of health financing changed dramatically with the reforms. Out-of-pocket spending by households was reduced by

TABLE 6.2 | Ten Years of Reform

	1993	2003	% Change
Total population	37,127,293	44,583,577	+20
Employment (number of individuals employed)	14,674,507	17,466,865	+19
Number of individual contributors	4,975,706	6,757,644	+36
GDP (constant millions of 2000 \$Col)	151,055,173	187,959,651	+24
GDP (constant millions of 2000 US\$) ^a	77,148	95,996	+24
Total health expenditure (constant millions of 2000 \$Col)	9,494,096	14,270,063	+50
Total health expenditure (constant millions of 2000 US\$) ^a	4,850	7,289	+50
Total health expenditure, % GDP	6.2	7.8	+26
Direct public expenditure, % GDP	1.4	2.2	+57
Social insurance expenditure, % GDP	1.6	4.3	+169
Private and out-of-pocket expenditure, % GDP	3.3	1.2	+64
Per capita health expenditure (constant 2000 \$Col)	255,717	320,074	+26
Per capita health expenditure (constant 2000 US\$) ^a	131	163	+26
Average per capita out-of-pocket expenditure (constant 2000 \$Col)	111,633	24,044	-78
Average per capita out-of-pocket expenditure (constant 2000 US\$) ^a	57.02	12.30	-78
Insured population, %	23	63	+174

Source: Authors' calculations based on National Health Accounts, DANE population data 1951–2015; Banco de la República & DANE for employment and exchange rates; insurance data ENH 1992 and Encuesta Nacional de Calidad de Vida 2003.

^a Exchange rate: US\$1 = \$Col 1,958.

GDP^a = gross domestic product.

78 percent between 1993 and 2003 and was gradually replaced by social security contributions, solidarity funding, and increased government spending. By 2003 more than 84 percent of total spending was public and 66 percent was allocated to insurance (World Health Organization, 2007).

Distribution of Spending

The distribution of spending changed dramatically after the reforms and this had a positive impact on poverty alleviation. Colombians received, on average, 1.2 percent of their income as transfers from the health sector in 1992 (Molina *et al.*, 1993) and 1.9 percent of income in 2003. The poorest 20 percent of the population received health system benefits equivalent to 6.2 percent of income before the reforms. Ten years later, this group received a health subsidy equivalent to 50 percent of their income, while the richest 20 percent of the population transferred 2.9 percent of their income to those worse off. The poorest households in the subsidized regime received health subsidies equivalent to 120 percent of their income in 2003 (Acosta *et al.*, 2007b).

Significant fiscal effort was required to subsidize the poor. The subsidized regime received around US\$1.4 billion in 2005, equivalent to 1.1 percent of the GDP (Pinto, 2006). At the beginning of the reforms, the subsidized regime relied mostly on solidarity resources in the equalization fund. Over time, the subsidized regime became less dependent on payroll tax contributions and 65 percent of the regime's revenue is now financed by general tax revenue. This became possible as a result of the following factors: the constitutional mandate to gradually increase transfers to local governments for education and health (Sistema General de Participaciones; SGP/General System of Participation), the transformation of supply-side subsidies into demand-side subsidies, higher co-financing from local governments, and the fiscal restrictions imposed on the use of resources in the Fondo de Solidaridad y Garantía (FOSYGA) solidarity account as a result of the economic crisis.

Despite the many advantages associated with the reforms, however (Box 6.1), universal insurance coverage as originally envisioned in 1993 has not yet been attained. Limitations on the allocation of solidarity resources, and on the levels of complementary government matching funds

BOX 6.1 | New Financial Architecture Advantages

- Improved equity by:
 - Decreasing out-of-pocket spending drastically
 - Financially protecting more Colombians and their families
 - Decreasing financial gaps among geographic regions
 - Allocating the same level of resources for health to all individuals regardless of income
 - Making public subsidies for health the best-targeted government spending
- Increased the level of resources for health by:
 - Increasing government spending
 - Mobilizing more resources from payroll contributions
 - Increasing the number of dependent and independent workers contributing to the system
- Protected resources for health under fiscal and economic crisis with anti-cyclical effect through the equity fund
- Improved value for money by:
 - Pooling resources in an equity fund
 - Transforming supply-side subsidies into demand-side subsidies
 - Making benefits explicit and allowing purchasing from public and private providers

for health insurance, significantly reduced the ability to expand coverage among the poor (Escobar and Panopoulou, 2002). In addition, the complex political economy surrounding the transformation of subsidies has made this process slow and cumbersome (Giedion, López, and Riveros, 2005), further reducing the pace of achieving universal coverage. As a result, those in the subsidized regime still receive a smaller insurance plan than those in the contributory regime, and among the poorest residents there are still approximately four million people uninsured.

Colombian Health System Financing in the International Context

Colombia spent US\$522 (purchasing power parity, PPP) per capita on the health system in 2003, close to the amount spent by Mexico, Brazil, and Panama (UNDP, 2004), which have higher per capita GDPs than Colombia does but much lower public expenditure on health as a percentage of GDP. Countries with higher per capita spending on health than Colombia, such as Chile (US\$707 PPP) and Argentina (US\$1,067 PPP) finance their systems with a large proportion of private and out-of-pocket spending. The composition of total health expenditures in Colombia is quite different from that of most countries in Latin America

but is very similar to that of Organisation for Economic Co-operation and Development (OECD) countries that spend four or five times more per capita. The relative size of government health spending as a portion of total health spending in Colombia is among the highest in Latin America and is similar to that of the best OECD performers (World Bank, 2007; WHO, 2007).²

Private spending in Latin American countries accounts for more than half of total health spending, except in Costa Rica, Cuba, and Colombia, with 23, 14, and 14 percent in 2004, respectively. Private and out-of-pocket expenditures as a percentage of GDP in Colombia are among the lowest worldwide (Economic Commission for Latin America and the Caribbean, 2006; WHO, 2007). Although private expenditure as a percentage of total health spending in the United Kingdom in 2004 was only 0.3 percent lower than in Colombia, the United Kingdom's private spending as a proportion of its GDP was higher than in Colombia (World Bank, 2007).³

Concerns

Although the increase in insurance coverage and the equity gains in a decade have been an important accomplishment, there is concern about the financial sustainability of the system and the feasibility of universal coverage under present arrangements (Box 6.2). Without an important increase in formal employment and an improvement in the inclusion of self-employed workers, the level of revenue from payroll contributions may not increase in years to come and might even decrease. These factors, in combination with a slow transformation of supply-side into demand-side subsidies, a generous benefits package, and an aging population in the contributory regime, mean the financial sustainability of the system is seriously jeopardized. It is unlikely that the treasury will continue increasing the volume of the decentralized

² Public health spending as a percentage of total health spending in 2004: Switzerland 58%, Netherlands 62%, Canada 70%, Spain 71%, Germany 77%, France 78%, Japan 81%, Denmark 82%, Norway 83%, Sweden 85%, Colombia 86%, United Kingdom 86.3%.

³ Out-of-pocket expenditures as a percentage of total health spending in 2004: United Kingdom 13.7%, Denmark 17.7%, Japan 19%, France 21.6%, Germany 23%, Spain 30%, Canada 30.2%.

BOX 6.2 | Concerns about the New Financial Architecture

- High level of complexity:
 - Many sources of funding, increasing the risk of having resource flows entering the system at different times, complicating planning
 - Highly complex resource flows from the treasury and the equity fund to insurers and then to providers of care in the subsidized regime
- Uncertain financial sustainability:
 - Strong dependency on the labor market
 - Difficulty in enrolling informal workers with ability to pay
 - Level and availability of solidarity resources from the equity fund are highly exposed to fiscal policy decisions by government administrations
 - Slow transformation of supply-side subsidies into demand-side subsidies
 - Aging population in the contributory regime
 - Generous benefits package and abuse of patient rights legal defense system
 - Generalized escalating cost of medical technology and care worldwide

transfers after 2008, which may affect the financing of the subsidized regime if the transformation stagnates.

Discussion***Equity in Financing***

The benefit incidence analysis of public expenditure provides information on how well public subsidies are targeted to the neediest residents. Equity of financing is improved when those less able to pay receive more benefits than do those who are able to pay. Results are considered an indication of overall health system performance (WHO, 2000).

Improved Targeting

The distribution of public subsidies for health had not changed in Colombia in two decades prior to the reforms (Selowsky, 1979). About a quarter of the population was insured, 60 percent of all public subsidies for health benefited middle- and upper-income groups, and more than 10 percent of subsidies benefited the richest patients (Molina *et al.*, 1993). The 1993 reforms made public subsidies for health the best-targeted government subsidy in the country (Lasso, 2006).

There is consensus on the substantial improvement in targeting government resources under the new system; Sánchez and Núñez (2000) found that, according to Living Standards Measurement Survey data, two-thirds of public subsidies for health channeled through the subsidized regime reached the poorest 40 percent of the population and that there was leakage of only 2 percent of these subsidies to the richest 20 percent of the population in 1997 (DANE, 1993b, 1997, 2003). Targeting of supply-side subsidies is still less efficient than targeting of subsidies used to finance insurance, also called demand-side subsidies. A study confirmed these findings for 2003 (Lasso, López, and Núñez, 2004): the poorest 20 percent of the population enrolled in the subsidized regime receives 41 percent of all public resources through demand-side subsidies, whereas the richest quintile receives only 3 percent. Meanwhile, the poorest receive 28 percent and the richest receive 8 percent of supply-side subsidies. The progressiveness of health sector subsidies as measured by a concentration index has increased from 0.26 before the reforms to -0.4 for the subsidized regime and -0.2 for the resources still handled under the previous supply-side subsidy system (Lasso, 2006).

New Financial Engineering

The new financial engineering for managing public subsidies has had an important impact on the distribution of income and has helped reduce poverty. Colombia, together with Brazil, Mexico, and Chile, shows the most unequal distribution of income in Latin America (UNDP, 2004). According to the National Planning Department, 52 percent of the population was living below the national poverty line and 17 percent below the national extreme poverty line in 2003. Half of the population received only 14.2 percent of total income, as reflected by the Gini coefficient of almost 0.6 in 2005 (Montenegro, 2006).⁴

Given the substantial income inequality and poverty in Colombia, it has been of central interest to national policymakers to evaluate whether the 1993 health sector reforms have helped to reduce inequality

⁴ The Gini coefficient is a measure of inequality in the distribution of income, with 0 representing perfect equality and 1 total inequality.

and mitigate poverty. Several authors (Acosta *et al.*, 2007b; Lasso, 2006; Sánchez and Núñez, 2000) have concluded that the reforms have indeed reduced income inequality and poverty. Before the reforms, both rich and poor received subsidies from the health sector (Molina *et al.*, 1993; Selowsky, 1979). After the reforms, the rich provided net transfers to the poor; the level of transfers increases with income. According to Lasso (2006), while health sector demand-side subsidies represent only 9 percent of total public social sector subsidies, they explain 18 percent of the total redistributive impact and reduce the Gini coefficient by 0.015.

Along similar lines, other researchers have found that subsidies from both payroll and general tax revenues reduced income poverty by 3 percent and the national Gini coefficient fell from 0.58 to 0.55. The largest benefit is observed among those in the subsidized regime, where the Gini coefficient drops from 0.46 to 0.39, indicating that inequality among enrollees was reduced more than for the population as a whole (Acosta *et al.*, 2007b).

Redistribution of Income within the Contributory Regime

The risk-pooling design of the Colombian contributory regime has important effects on the redistribution of income. Benefits received are independent of payments made through payroll taxes, and of family size, socioeconomic characteristics, and risk factors of those enrolled. Acosta *et al.* (2007a) show that the poorest in the contributory regime receive a subsidy equivalent to more than 20 percent of their income, provided by the net transfer representing more than 6 percent of the income of the richest two quintiles. As a consequence, the Gini coefficient for the 16 million beneficiaries of this regime is reduced from 0.51 to 0.49 (Ministerio de la Protección Social, 2006). In other words, the mechanics of health financing within the contributory regime reduces income inequality in this group.

Financial Protection

Given that the most important barrier to receiving care before the reforms was its economic cost, financial protection was pivotal to the

design of the new system. Robust evaluation of the impact of the reforms on financial protection has been of great interest to researchers and policymakers alike, even despite the methodological difficulties that arise from the differences in benefits plans and in affiliation processes across regimes. Motivated by the challenge, some studies have been produced since 2001. The World Health Organization methodology for estimating the incidence of catastrophic expenditures and impoverishment has been widely used (WHO, 2001; Xu, 2005). Following this approach, authors find that, on average, 10 percent of Colombian households incur catastrophic expenditures, defined as costs exceeding 10 percent of disposable income. The incidence falls to 3 percent if the threshold for catastrophic expenditure is 40 percent of the disposable income level (Baeza and Packard, 2007; Kawabata, Xu, and Carrin, 2002; Xu *et al.*, 2003).

Although comparability among studies is limited, all studies particular to the Colombian case (Bitrán, Giedion, and Muñoz, 2004; Castaño *et al.*, 2002; Flórez, Giedion, and Pardo, 2007; O'Meara, Ruiz, and Amaya, 2003; Panopoulou, 2001; Trujillo and Portillo, 2005) agree on the following:

- The incidence of catastrophic expenditures in Colombia decreased after the reforms.
- The insured population has a lower incidence of catastrophic expenditures than does the uninsured population.
- The incidence of catastrophic expenditures increases as income decreases.
- The most vulnerable group has a higher incidence of catastrophic expenditures and probability of falling below the poverty line.

Moreover, Bitrán *et al.* (2004) found that among the uninsured, the incidence of catastrophic expenditures was higher for expenses related to inpatient care than for ambulatory care in 2003. Flórez and Hernández (2005) found that the incidence of catastrophic expenditures decreased from 1997 to 2003 but that the probability of the poorest group falling below the poverty line increased in that period as a consequence of the economic crisis. Using a prospective analysis of a population cohort in four Colombian cities, Ruiz and Venegas (2007) found that insurance

increases the probability of using services and reduces catastrophic expenditures, particularly for the poor.

Inequality and Financial Protection Analysis

Given the great inequality in Colombia, it is important to analyze financial protection by income level. Not surprisingly, the rich are better protected than the poor and the insured are better protected than the uninsured. As useful as incidence results of this type might be, however, two considerations are in order.

First, results might be underestimating the incidence of catastrophic expenditures because the method does not take into account the fact that not all who fall ill actually use health care services: on average, 20 percent of those who became ill did not seek care in 2003. Ill poor people and the uninsured use services less often than the rich do (Giedion and Díaz, 2007; Ruiz and Venegas, 2007). When only those who used services are considered, researchers find that 28 percent of households incur catastrophic expenditures, if catastrophic is defined as 10 percent of disposable income. This estimate falls to 8.3 percent when 40 percent of disposable income is used as the threshold. The results in Table 6.3, sorted by income level, show the importance of taking this access effect into account.

Second, differences in the incidence of catastrophic expenditures between the insured and the uninsured cannot be directly interpreted as the result of insurance. Differences in observed and unobserved characteristics of both the insured and the uninsured can bias incidence results, and therefore causality cannot be established.

Impact of Insurance on Catastrophic Expenditures and Impoverishment

Establishing causality requires evaluation of the impact of insurance on financial protection using either controlled experiments or semi-parametric models. Matching individuals of similar characteristics but different insurance statuses is necessary to establish causality with some degree of confidence. Results from the only analysis of this kind for the Colombian case (Giedion, Flórez, and Díaz, 2008) show that insured people have a lower probability of facing catastrophic expenditures

TABLE 6.3 Incidence Estimates for Catastrophic Expenditures, 2003

Income level	Incidence of catastrophic expenditure, all households, %	Incidence of catastrophic expenditures, households using services, %
Quintile 1 (poorest)	12	41
Quintile 2	12	38
Quintile 3	9	25
Quintile 4	7	19
Quintile 5 (richest)	6	19
Total population	10	28

Source: Flórez *et al.* (2007).

TABLE 6.4 Insurance Impact on Catastrophic Expenditure and Impoverishment, 2003

Insured	Difference in probability of facing catastrophic expenditure, %		Difference in probability of falling below national poverty line, %
	10% income threshold	40% income threshold	
Subsidized regime	-21	-4	-4.00
Contributory regime, dependent workers	-40	-1 ^a	Not significant
Contributory regime, self-employed and informal workers	-71	-8	-3.35

Source: Flórez *et al.* (2007).

Note: Propensity score matching results for subsidized regime; instrumental variable or probit results for contributory regime.

and of impoverishment than uninsured people do. As expected, these probabilities decrease as the income threshold used increases from 10 percent to 40 percent of disposable income.

Table 6.4 shows (using 10 percent of disposable income as the threshold for catastrophic expenditure in the case of the subsidized

regime) that those enrolled have a 21 percent lower probability of facing catastrophic expenditures and a 4 percent lower probability of further impoverishment than their uninsured peers do. For formally employed workers enrolled in the contributory regime, the probability of incurring catastrophic expenditures is 40 percent lower than for those not enrolled. Meanwhile, the self-employed or informal workers in the contributory regime have a probability of facing a catastrophic expenditure 71 percent lower, and of impoverishment 3 percent lower, than their uninsured peers.

Overall, there is evidence that the Colombian reforms provide financial protection by significantly mitigating the financial impact of health shocks on households. The contributory regime protects better than the subsidized regime does, which is to be expected given the differences in the benefits packages and the fact that independent/informal workers are much better off when insured.

Financial Sustainability

The 1993 reforms enabled public and private insurers to collect social security contributions on behalf of the government. Having many agents collecting a payroll tax enabled the system to quickly raise considerable revenue. The design and implementation of the reforms have several characteristics that affect the system's financial sustainability; these characteristics deserve some attention. This section discusses some of them in light of the system's financial function (WHO, 2000).

Collection of Funds

Implementation issues. The economic reality during the 1990s differed from the positive macroeconomic expectations in 1993 of economic growth and positive effects on labor markets for the rest of the decade (Ministerio de Salud, 1994; DANE, 1993a). Projections showed annual growth of 3.5 percent in employment, 2.1 percent in self-employment, and 1.8 percent in overall salaries, along with low levels of payroll contribution evasion. Under these circumstances the system would have been fully sustainable, with universal coverage providing the same benefits for all.

Informal employment rates remained high (Herrera, 2005) and the economy went into a major economic recession only five years after the introduction of the reforms. Unemployment reached 18 percent and dependency rates climbed during the economic crisis, limiting enrollment in the contributory regime (DANE, 1993a; Pinto, 2006). The number of contributors to the system fell in 2000 and then slowly recovered to 7.5 million in 2005. According to the Ministry of Social Protection, more than 40 percent of the population receives subsidies, while contributory regime enrollment is far from the original 70 percent of the population target.

Unfulfilled promises have been one implementation problem. During the reform's implementation the treasury did not allocate to insurance the level of resources that Law 100 mandated. For example, solidarity contribution matching funds were reduced, part of the solidarity contribution's revenue in the equalization fund was used to manage the fiscal deficit, and the transformation from supply-side to demand-side subsidies was halted, limiting the expansion of insurance. Divergence between the design and the actual implementation rules regarding the government's allocation and use of health system finances illustrates the vulnerability of government funding, particularly under fiscal tightening and the complexities of the political economy surrounding large-scale reforms.

Evasion of payroll contributions, both in terms of not enrolling and of under-reporting salaries, has its roots in both the design and implementation of the reform. Weak enforcement by the government and lack of sophisticated information systems are among the implementation problems contributing to evasion. Enrollment and salary reporting irregularities in the contributory regime were believed to explain a 30 percent gap between expected and actual revenue collected from contributions in 2000 (Panopoulou, 2001; Bitrán *et al.*, 2002).

Design issues. Lack of appropriate incentives for insurers to collect contributions based on actual wages contributes to evasion. Bitrán *et al.* (2002) estimated that misreporting of income in 2000 resulted in contribution revenue being 10 percent lower than it should have been. The equalization process for the contributory regime in the national fund is an excellent solidarity enhancement mechanism. At the same time, however, it makes

the fund bear all the financial risk of income misreporting and of higher dependency rates. Neither insurers nor contributors have an incentive to generate contribution revenue based on actual earnings. Recently, the government has taken particular measures to identify evaders, which seems to be paying off: the 30 percent gap was reduced to 17 percent in 2003 (Acosta *et al.*, 2007a). However, incentives must be created for insurers to collect on the basis of actual earnings.

There is concern about high labor costs in Colombia, their effect on employment, and therefore on resource mobilization for health. One study suggests that increased payroll taxes as a result of the 1993 reforms have negatively affected employment (Kugler, 2002). One of the major economic crises the country has faced coincided with the period of study, however; similar analyses need to be done after the economy experiences several years of growth.

Lack of automatic mobility between insurance regimes upon a change in labor status among the poor is considered one of the causes of slow growth in formal employment and enrollment in the contributory regime (Gaviria, Medina, and Mejía, 2006). The effect seems to be pronounced with temporary formal employment opportunities among the poor, resulting in the introduction of government measures to facilitate mobility across regimes. However, problems associated with salary levels, skill mix, and temporary employment in some segments of the population cannot be addressed through the health system alone.

The effects of payroll contributions on employment levels deserve further study to analyze the tradeoff between payroll taxes and formal employment, in parallel with those associated with increased general taxation in the economy at large. Interestingly, survey data show that during the first 10 years of the reforms the number of contributors grew 36 percent, while employment grew only 20 percent. Contributors from among the self-employed and independent workers grew more than contributors from any other group (Giedion *et al.*, 2008). The fast pace of enrollment in the contributory regime has slowed drastically in recent years, however.

Although there is no empirical evidence for the Colombian case, public hospitals acting as safety nets for all citizens could be a disincentive for the uninsured to enroll (Chernew and McLaughlin, 1997). Although the minimum contribution period for eligibility of benefits

is legislated, controlling adverse selection becomes very difficult when patients choose to ride the system for free, enroll when ill (insurers are obligated to enroll all who seek insurance), and obtain legal support for their expectations.

Pooling

Design and implementation mechanisms supporting sustainability. The workings of health care financing within the reformed system's architecture have positively contributed to efficiency and to financially protecting a large portion of the population. The mixing of resources from the solidarity contribution with general tax revenue allows national cross-subsidizing for the poor in the subsidized regime. In 10 years, 36 percent more payroll tax contributors allowed the system to insure 80 percent more people in the contributory regime alone.

The equalization fund has proven effective as an anti-cyclic financing mechanism. A drop in collections as a result of reduced average salaries, increased unemployment, and higher dependency ratios would not affect the level of resources available to provide insurance as long as there are adequate reserves, as was the case during the 1998–2001 economic crisis. Once reserves were exhausted in early 2002, a downward adjustment of the insurance premium in real terms was necessary for 2003, which, combined with a period of economic growth, re-established the reserves in the fund. Macroeconomic downturns are adequately neutralized, depending on the extent to which this anti-cyclic financing mechanism is preserved (Castaño, 2004).

Purchasing

Design and implementation issues. The definition and costing of a benefits package could be one of the most difficult and controversial aspects of the reform but is a determining factor of financial sustainability. The generous social security benefits existing before the reform influenced the approval of a generous package for the contributory regime, imposing a large financial burden for universal coverage with one benefits plan. As much as it is desirable, overcoming differences in the level of coverage in the two regimes is difficult in the short term; more than a

decade later, it is clear that the contributory package's depth and breadth require serious revision to achieve the reform's goals. Furthermore, using a legal system intended to reasonably protect patients' rights but often ruling against the system, making it responsible for benefits outside the mandatory package, poses serious threats to financial sustainability (Giedion, 2006). Unless changes are introduced to the benefits package, in parallel with aggressive restructuring of public hospitals for a faster transformation of supply-side to demand-side subsidies, universal coverage with one insurance plan for all is still far away.

Regulating contracts between insurers and public providers of care in the subsidized regime (Ministerio de la Protección Social, 2007) can generate artificial inflation and inefficient allocation of resources. Forced contracting does not permit insurers to compare quality and cost of services or to choose the best providers; it also limits choice among the poor and prevents public hospitals from improving efficiency, since their services would be purchased by law. Data are necessary to evaluate the impact of this measure.

Conclusions

Results show that 10 years after the 1993 health care reform, the level, distribution, and relative composition of health financing in Colombia had improved dramatically. On average, all population groups benefited from the reform, but the poor benefited the most.

Evidence supports the theory that the financial engineering of the Colombian health system has brought along a substantial redistributive effect, reducing income inequality as well as providing financial protection for a large portion of the population. The Colombian experience shows that switching from supply-side to demand-side subsidies has been beneficial for the poor, given the system's redistributive capacity and its targeting performance. Furthermore, the national equalization fund has been pivotal not only in improving solidarity but also for its anti-cyclical effect during bad economic times.

Despite these accomplishments, however, the transformation of the old health system into the new has been arduous and it is still incomplete. Consistency in government policy is necessary for the reform's consolidation but it was not always present during 1993–2003.

Perhaps 1993 reformers underestimated the political economy complexity of the transformation of supply-side to demand-side subsidies and its implications for the reform's goals. Decentralized financial management and ownership of public facilities, severe labor rigidity related to fixed capacity, and powerful special interest groups are only a few of the challenges faced by the system as it further reshuffles its financing to achieve universal coverage. The slower-than-expected transformation of supply-side to demand-side subsidies required more support than the legislation on hospital reform contained in Law 100/1993 and the treasury's resource allocation of the "one-to-one" matching of solidarity contributions. Political will, complex negotiations with local governments, and foreign investment have been some of the ingredients supporting a necessary, highly complex, and ongoing public hospital restructuring process.

Regulations to protect patients' rights are important, as long as the system's finances do not become crippled by the ethical dilemma of providing to insured patients services not even contemplated in the already generous benefits plan.

The consolidation of the reform's vision requires persistence to maintain its financial sustainability, considering in parallel several of its determining aspects:

- the benefits package and the enforcement of its limits;
- the efficiency of public spending calling for an accelerated transformation of public subsidies and restructuring of public hospitals;
- the alignment of incentives for attaining the highest possible collection of revenue from all, according to income level and independently of labor market choices; and
- the implementation of innovative strategies to expand coverage by attracting the informal sector to the contributory regime and only partially subsidizing the near-poor.

Lessons for Colombia

Improving the allocation of public subsidies is greatly facilitated by targeting using the Sistema de Identificación de Beneficiarios (SISBEN).

Determination both of how often it should be updated and how to handle changes in eligibility of those already insured, as well as its financial implications, is still pending.

Difficulties in enforcing the boundaries of an already-generous benefits package resulting from the prevailing mechanism to defend patients' rights could easily become a threat to the system's financial sustainability and equity. Universal coverage with no limits is not sustainable.

The effect of pooling in the contributory regime best demonstrates its benefits not only in terms of cross-subsidization but also in terms of the fund's anti-cyclic effect on revenue.

Solidarity is a very important principle of the Colombian health care system. However, contributions based on wage income but not adjusted for family size in the contributory regime make the finances of the system tighter, while providing few incentives to either the contributor or the insurer to maintain accurate information on wages and family size.

The transformation of supply-side subsidies into demand-side subsidies has proven to be a necessary but insufficient mechanism for changing the budgeting processes in the health system and for improving equity. Experience shows that it is necessary to continue supporting this process while restructuring public hospitals, to further improve the allocation and efficiency of public funding.

Multiple insurers collecting payroll contributions has been shown to be an effective way to raise significant resources in short periods. The small tax base and weak tax collection system of 1993 would not have been able to support an equivalent mobilization of resources for health if the system had relied on general taxation alone. However, given the concerns about high labor costs and the ongoing strengthening of general tax collection and administration systems, it might be possible to start identifying alternative ways to finance the Colombian health system of the future.

The introduction of the "all in one" method for collecting payroll contributions—unifying individuals' wage income base for pensions and health—seems to be a move in the right direction for alignment of incentives and for increasing revenue.

Changes in the demographic profile are already being identified in the contributory regime. Aging affiliates in its highest income group

could become a greater financial burden for the system in a few years. In 2008, the finances of the regime depended heavily on the contributions of these older members. It is necessary to start strategizing how to handle the financial implications of aging.

Lessons for the World

It is possible to improve the level and distribution of public spending on health; the financial structure and mechanics of resource flows are major determinants of success. Political will and support are necessary to maintain financial arrangements to benefit the poor. Before the reform, the composition of health expenditures in Colombia was comparable to that of Kenya, India, and several countries in Latin America.

Payroll tax collection in a social insurance scheme presents challenges in economies with large proportions of informal employment. Alternatively, general tax-based financing alone may require fiscal reform to achieve a progressive tax system with an ample tax base to prevent damaging equity. The equity/efficiency implication of alternative sources of funding has to be analyzed within the particular country's own context. It is impossible to think of the financial sustainability of a health system separately from the overall performance of the economy, regardless of the system's main source of funding.

Two parallel insurance schemes create equity as well as portability challenges. Frequent updating of targeting scores and monitoring of labor market changes might improve mobility between insurance regimes, lowering the risk associated with accepting temporary employment.

Defining a positive list of benefits is a politically difficult task, but enforcing its limits is even more challenging. Under tight resource constraints in developing countries, a less comprehensive benefits package for all is more likely to be feasible and to lack negative implications for financial sustainability and equity in the long run.

Achieving universal coverage faces several hurdles, not only because of financial considerations in the economy as a whole, but also because of the existence of safety-net providers that act as

substitutes for insurance and provide incentives to ride the system for free.

The resistance of public hospitals to forgoing supply-side subsidies cannot be underestimated, owing to the political visibility of hospitals and the challenges posed by decisions made in the past.

Acknowledgments

We would like to thank all researchers in Colombia who have dedicated their time and effort to the analysis of the Colombian health system reforms since 1993. We are also grateful to all the institutions in Colombia and abroad that contributed during the past 15 years to the development of technical analysis of diverse aspects of the Colombian experience. Some of the research findings reflected here received support at different times from organizations including Fundación Corona, Asociación de Entidades de Medicina Integral (ACEMI), Centro de Proyectos para el Desarrollo (CENDEX) at the Universidad Javeriana, the Economics Department of the Universidad del Rosario, the Center for Economic and Development Studies (CEDE) of the Universidad de los Andes, la Fundación para la Educación Superior y el Desarrollo (FEDESARROLLO), the World Bank, the Inter-American Development Bank, and the Economic Commission for Latin America and the Caribbean (ECLAC). We also thank Nelcy Paredes for her contribution, Amanda Glassman for her valuable comments on earlier versions of this work, Yamillet Fuentes and all others at the Health Financing Task Force, and the Global Health Initiative at The Brookings Institution in Washington, D.C., for their support.

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HEALTH

From Few to Many is the first comprehensive look at Colombia's 1993 health system reforms. It describes the implementation of universal health insurance, including a subsidized system for the poor, and examines the impact of this and other reforms during a time when Colombia experienced crushing recession and internal conflict that displaced half a million people.

Prior to the reforms, a quarter of the Colombian population had health insurance. Subsidies failed to reach the poor, who were vulnerable to catastrophic financial consequences of illness. Yet by 2008, 85 percent of the population benefited from health insurance.

From Few to Many describes the challenges and benefits of implementing social health reforms in a developing country, exploring health care financing, institutional reform, the effects of political will on health care, and more. The reforms have provided important lessons not only for continued reform in Colombia, but also for other nations facing similar challenges.

* * * *

"Among the efforts to achieve universal health insurance coverage in low- and middle-income countries, Colombia stands out both for the long interval of implementation (since 1993) and for the thoroughness with which the experience has been analyzed and evaluated. Everything a researcher or policymaker might want to know about the country's progress, setbacks and adaptations to changing economic and political circumstances is here in one impressive volume."

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