

**Disaggregating Private Expenditures on Medical Care in  
Colombia: Policy Implications**

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# **Disaggregating Private Expenditures on Medical Care in Colombia: Policy Implications**

**Dov Chernichovsky<sup>1,2</sup>**

**February, 2015**

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## **Abstract**

Colombians are entitled to basic healthcare. Based on the 2011 Colombian Living Standards Measurement Survey - LSMS, their private or discretionary expenditures (DE) on healthcare appear, however, inconsistent with the full potential of this entitlement. Colombians seem dissatisfied with publicly funded care; those who can afford it, pay privately for care that substitutes or parallels entitled care. Paradoxically, some Colombians become poor and suffer catastrophic expenditures because of copayments for entitled care, out-of-pocket pay for parallel care, and private insurance premiums. Lower-middle income households, mostly part of the less privileged subsidized health insurance regime (SR), are more exposed to DE-related poverty than the higher income household, mainly of the privileged contributory health insurance regime (CR). All households are exposed to potential catastrophic expenditures. DE promote disparities as well. Basic care has a wealth gradient: DE on the parallel care is sensitive to wealth. Private insurance by the better off, mainly of CR, makes healthcare even more accessible to them while, simultaneously, copayments hinder access to basic care by the relatively poor of

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the SR. Disparities are further aggravated, possibly also in the quality of care, by DE on supplemental care that is associated with affordability, and by the relative supply of insurance and care options in urban and non-peripheral areas. The system is thus, on the margin, evidently also neither efficient in providing entitled care, nor is it effective in containing costs and serving sustainability. Supplier induced demand (SID) appears to contribute to the patterns DE. Indeed, living in an urban area, with more apparent competition and less scope for SID, reduces the chances of falling into poverty and incurring catastrophic expenditures. Policy wise, in addition to recent legislation equalizing the benefit packages to the SR and CR, the following policy measures can ameliorate the situation mirrored by DE on care in Colombia:

- Minimize, in the publicly funded system, the potential for supplier-induced demand for privately paid insurance as well as provision by (i) reducing the potential for vertical integration between plans-insurers and providers, and by (ii) regulating and enforcing tightly the public-private mix
- Prohibit ‘double insurance’, especially private insurance of care that falls under entitlement, by the same plans-insurers that oversee and provide entitled care
- Uphold clients’ rights to entitled care and informed choice
- Incentivize providers to serve the public better for public pay
- Promote managed competition, where feasible
- Subsidize discretionary insurance and minimize co-payments for the poor
- Increase supply of care in rural and remote areas.

**Keywords:** Private expenditure, Healthcare, Performance, Disparities

# **La desagregación de los gastos privados en atención médica en Colombia: Implicaciones de política**

**Dov Chernichovsky**

**Febrero, 2015**

Este estudio fue apoyado por el Nordic Trust Fund a través del Banco Mundial y conducido por el autor en el Centro de Estudios en Protección Social y Economía de la Salud –PROESA, Cali, Colombia. Este documento es parte del estudio Citizens' Right to Care.

## **Resumen**

Los colombianos tienen derecho a asistencia médica básica. Basados en la Encuesta de Calidad de Vida en Colombia del año 2011, los gastos privados o discrecionales (GP) en el cuidado de la salud, parecen, no obstante, ser inconsistentes con todo el potencial de este derecho. Los colombianos parecen estar insatisfechos con la atención en salud financiada con fondos públicos; aquellos que tienen el dinero para hacerlo, pagan por servicios de salud de manera privada, los cuales pueden ser sustitutos o paralelos al servicio al que tienen derecho. Paradójicamente, algunos colombianos se empobrecen y sufren de gastos catastróficos a causa de los copagos de servicios médicos a los que tienen derecho, de los gastos de bolsillo para recibir atención similar a la que tienen derecho, y de las primas de seguros de medicina privados. Los hogares de ingresos medios y bajos, que por lo general hacen parte del menos privilegiado régimen subsidiado (RS), están más expuestos a gastos discrecionales relacionados con la pobreza, que aquellos hogares de ingresos más altos, los cuales pertenece al privilegiado régimen contributivo (RC). Todos los hogares están expuestos a potenciales gastos catastróficos. Así mismo, el GP promueve disparidades. El cuidado básico tiene una gradiente de riqueza: el GP en el cuidado paralelo es sensible a la riqueza. Los

seguros privados de los hogares de mayores ingresos, principalmente en el RC, hacen que el cuidado de la salud sea aún más accesible a estos mientras que, simultáneamente, los copagos generan barreras al cuidado básico de los hogares e individuos relativamente pobres del RS. Las disparidades se agravan aún más, posiblemente también en la calidad del cuidado, por el GP en cuidado suplementario que está asociado con asequibilidad, y por la oferta relativa de opciones de seguros y atención en áreas urbanas y no periféricas. Por lo tanto, el sistema se encuentra al margen, ya que es evidente que no es eficiente en proveer el cuidado definido por los derechos, ni es efectivo conteniendo costos y garantizando sostenibilidad. La demanda inducida por el proveedor (DIP) parecer contribuir con los patrones del GP. De hecho, el vivir en áreas urbanas, con mayor competencia y menos margen para DIP, reduce los chances de caer en pobreza e incurrir en gastos catastróficos. En términos de política, en adición a la reciente legislación la cual igualó los paquetes de beneficios del RC y el RS, las siguientes medidas pueden mejorar la situación reflejada por el GP en la asistencia médica en Colombia:

- En el sistema financiado públicamente, se puede minimizar la potencial demanda inducida por el proveedor en los seguros privados y en la prestación: (i) reduciendo las posibilidades de integración vertical entre aseguradores y prestadores, y (ii) regulando y haciendo cumplir la mezcla público-privado.
- Prohibir el “aseguramiento doble”, especialmente de los seguros privados que están cubiertos en el plan obligatorio, ofrecidos por las mismas aseguradoras que supervisan y proporcionan los servicios del plan obligatorio.
- Respetar los derechos de los ciudadanos a recibir la atención a la que tienen derecho y a la elección informada.
- Incentivar a los prestadores a servir mejor al ciudadano que paga con dineros públicos.
- Promover competencia regulada donde sea posible.
- Subsidiar seguros discrecionales y minimizar los copagos de los pobres.
- Aumentar la oferta de prestadores en áreas rurales y remotas.

**Palabras clave:** Gasto privado, Cuidado de la salud, Desempeño, Disparidades

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**Disclaimer:** The findings, interpretations and conclusions expressed in the paper are entirely those of the author, and do not represent the views of the World Bank, its Executive Directors, or the countries they represent.

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# 1 Introduction

To improve the health of its people as well as their satisfaction with the care received, Colombia needs to continue to reform its healthcare system, while ensuring that the system is sustainable, equitable, and efficient (Chernichovsky, Guerrero, and Martinez, 2012). Recent legislation postulating uniform care benefits for the entire population is a critical and necessary step in the right direction (Congreso de la República de Colombia, 2013). To realize the potential of this legislation, however, medical resources need to be mobilized and allocated appropriately, especially in view of Colombia's rather dismal health outcomes sustained by wide socio-economic disparities across populations reflected also in access to care (Jaramillo et al, 2013).

In this context, private expenditures on medical care in Colombia constitute a challenge. Colombia spends an estimated 7- 8 percent of its gross domestic product (GDP) or about US\$650 per capita in purchasing parity power (2010) on healthcare. About 70 percent of this amount is public spending based on general taxes and mandated earmarked contributions (Barón-Leguizamón, 2007; Bernal and Montenegro, 2013; Chernichovsky, Guerrero, and Martinez, 2012; Guerrero, Duarte, and Prada, 2012).

These percentages are close to the averages of the developed OECD countries that provide universal coverage with well-functioning systems. That is, for sustainability, Colombia needs to reform, yet maintain aggregate spending on healthcare at about the current share of GDP and, simultaneously, increase the public share in funding from about 70 percent to at least 80 percent. In other words, in addition to increasing efficiency, especially of the public system, Colombians need to be swayed to give up, over time, some discretionary (private) expenditures (DE) on care to free more resources for a healthcare provided publicly.

This paper aims to identify policy options that could potentially achieve this goal by reforming the drivers of DE on care that follow unmet needs and malfunctions of the public system.

The paper is organized as follows. After introducing the Colombian health care system, the surveyed households are presented. Then, following a summary of the analytic approach, the study examines the composition, distribution, consequences, and the correlates of household DE on care in Colombia. On that basis, policy conclusions are drawn at the end of the paper.

## **2 The Colombian Healthcare System**

In spite of the recent legislation stipulating a unified benefits package, the Colombian system still comprises two major regimes: the Contributory Regime (CR) covering 40 percent of the population in the formal economy and the Subsidized Regime (SR) covering 53 percent in the less formal economy. The remainder of the population is split about evenly between those with no coverage whatsoever and those covered under specialized social insurance arrangements (e.g., teachers) (Bernal and Montenegro, 2013; Chernichovsky, Guerrero, and Martinez, 2012).

The CR is funded by employer and employee mandated contributions. The SR is funded mainly by general revenues of central and departmental (autonomous local) administrations. In addition, SR members incur co-payments, especially when seeking hospital care. Funds from both regimes are allocated to budget holders or plans, *Entidades Promotora de Salud* (EPS), according to their membership. The plans have the right to sell and provide discretionary insurance for “supplemental care.” They can procure care from different providers, including their own facilities. In the SR, the plans are obligated to buy at least 60 percent of hospital services from state-owned hospitals.

The two key insurance regimes are still distinct systems. Members can only transition from one to another by changing their formal employment status. Healthcare services available to CR members were superior to those under the SR during the survey period, and this continues to be the case today. Consequently, the ensuing analysis is by regime. This will provide a better understanding of how households in each regime respond to variations in their different conditions and what reform policies would be appropriate for each regime, as well as the system as a whole.

### 3 The Data

The data comprise the sample of 25,246 households surveyed in 2011 by Colombia's Departamento Administrativo Nacional de Estadística (DANE) for the 2011 Colombian Living Standards Measurement Survey – LSMS, known in Colombia as the Encuesta Nacional de Calidad de Vida.

The regional distribution of the population and its mean years of schooling in the 2005 Census and the LSMS survey are presented in Table 1. The regions with the lowest socioeconomic status, as measured by schooling, are Pacífica and Amazónica. The regions with the highest socioeconomic status are Bogotá, Antioquia, and Valle. Since the LSMS sampling is based on the 2005 census framework, the striking similarity between the two data sets is to be expected. The higher levels of education in the survey may signify rising levels of education with time.

**Table 1. Distribution of population and mean years of schooling, by region**

Region	Percent of population		Mean years of schooling	
	Census	LSMS	Census	LSMS
Atlántica	21.72	21.59	6.83	7.72
Oriental	17.53	17.63	7.12	7.28
Central	12.12	11.87	6.92	7.56
Pacífica	7.61	7.63	6.20	6.06
Bogotá	15.95	16.40	9.80	10.02
Antioquia	13.25	13.51	7.60	7.63
Valle	9.70	9.73	8.10	8.15
San Andrés	0.16	0.11	9.20	9.48
Amazónica	1.95	1.53	7.20	7.81
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>7.70</b>	<b>7.92</b>

Sources: PROESA staff calculations based on data from the DANE Living Standards Measurement Survey (LSMS, 2011) and Censo de Población y Vivienda (Census, 2005).

A secondary data source concerns the basic socio-economic characteristics of Colombia's administrative departments. The departments have been grouped into five "health regions" by a cluster analysis (Table 2) that is based on supply of

medical services relative to need: physicians per 1,000 capita, acute beds per 1,000 capita, infant mortality rates, and population per square kilometer.

**Table 2. Characteristics of administrative departments, by health region**

Variable	Health region				
	1	2	3	4	5
Administrative department	Antioquia, Bogotá, Valle	Atlántico, Cundinamarca, Bolivar, Santander	Boyacá, Norte de Santander, Cauca, Magdalena, Tolima, Córdoba, Nariño	Caldas, Huila, Cesar, Risaralda, La Guajira, Meta, Sucre	Caquetá, Chocó, Quindío, Arauca, Casanare, Putumayo, San Andrés Islas, Grupo Amazonía
No. of physicians per 1,000 people	2.31	1.47	0.96	1.24	0.76
No. of beds per 1,000 people	1.57	1.57	1.32	1.68	1.49
Infant mortality rate	11.72	12.77	15.45	14.46	19.80
Population per km <sup>2</sup>	201.27	83.52	72.53	65.70	12.49

Sources: PROESA staff calculations based on data from the DANE Living Standards Measurement Survey (LSMS, 2011) and the Ministerio de la Protección Social Human Resources Survey in Medicine (2009).

In comparison to the other regions, region 1 has the greatest number of physicians per 1,000 people, highest population density, and the lowest infant mortality rate. By these criteria, health region 5 is the least endowed health region. It is noteworthy that each of these regions does not form contiguous geographic or administrative entities.

## 4 The Households

The characteristics of households by annual expenditure quintiles are summarized in Table 3. The classification is by expenditures rather than by income because the former is a more reliable variable than the latter. The first-order correlation between the two variables in the sample is 0.63. Clearly, the use of household expenditures instead of income portrays a more equitable picture than the use of incomes since former tends to be more equally distributed than the latter.

**Table 3. Household characteristics, mean levels, by expenditure quintiles**

Characteristic	Expenditure quintile					All
	1	2	3	4	5	
<b>Household</b>						
Expenditure (in million pesos)	3.21	6.19	9.67	15.44	45.59	20.02
Income (in million pesos)	5.79	9.00	13.02	18.68	51.00	23.89
Maximum education (in years of schooling)	5.41	7.32	8.92	10.44	13.51	10.00
Size (in persons)	2.92	3.52	3.70	3.78	3.72	3.60
Utilities (Yes=1)	0.33	0.48	0.67	0.81	0.91	0.71
Urban (Yes=1)	0.58	0.69	0.83	0.91	0.97	0.84
<b>Head of household</b>						
Age	52.50	47.68	46.94	46.38	46.32	47.42
Gender (Male=1)	0.63	0.64	0.68	0.68	0.71	0.68
Marital union (=1)	0.47	0.56	0.61	0.62	0.67	0.61
Divorced (=1)	0.18	0.19	0.16	0.15	0.14	0.16
Level of education (in years of schooling)	3.74	5.04	6.36	7.81	11.16	7.60
<b>Social insurance regime</b>						
Contributory (=1)	0.11	0.24	0.41	0.60	0.80	0.51
Subsidized (=1)	0.76	0.65	0.47	0.32	0.14	0.40
Not affiliated (=1)	0.12	0.11	0.11	0.08	0.06	0.09
Total	1.00	1.00	1.00	1.00	1.00	1.00
<b>Health domain</b>						
Worst=5 (=1)	0.06	0.07	0.05	0.05	0.04	0.05
4 (=1)	0.14	0.18	0.17	0.13	0.12	0.14
3 (=1)	0.38	0.30	0.21	0.16	0.13	0.21
2 (=1)	0.15	0.14	0.17	0.21	0.21	0.18
Best=1 (=1)	0.26	0.31	0.40	0.46	0.51	0.42
Total	1.00	1.00	1.00	1.00	1.00	1.00

Source: PROESA staff calculations based on data from the DANE Living Standards Measurement Survey (LSMS, 2011).

Note: What is not =1 is 0.

As would be expected, households in higher quintiles have higher levels of education, measured by the highest level of education in the household, not necessarily that of the head of the household.<sup>3</sup> Better off households are urban and have more access than their poor counterparts to non-human capital, including utilities such as running water, sewage, and electricity, among others.

Demographically, the lowest quintile houses tend to be smaller, older, and built less around a marital union. This suggests that these households comprise elderly widows.

Household socioeconomic profile is manifest robustly by membership in health insurance regime. While 76 percent of the poorest households are in the SR, only

<sup>3</sup> The education variable can refer to children who have not completed schooling. Since the age of head of household and household size are controlled in the estimates, the education variable can be considered “schooling for age”. The comparison across quintiles would be valid also if the age distribution of household members and size of household is similar across household. This is close to be the case for all four quintiles except the first that comprises households of older members.

11 percent are in the superior CR. In contrast, 80 percent of the richest households are in the CR, while 14 percent are in the SR. It is noteworthy that there are poor people in the CR and, even more so, that there are rich people in the SR. This can be explained by the nature of the formal labor market, which allows poor workers to enroll in the CR. Similarly, the informal market may include people who are, by default, in the SR.

Better-off households reside in the better-off health regions—regions with better supply of medical services. While 51 percent of the upper quintile resides in health region 5, only 26 percent of the poorest quintile resides in this region. The majority of the poorest households concentrate in regions 3 and 2. There is, thus, a clear correlation between availability of service and household socioeconomic status, as well as between socioeconomic status and the CR.

The data are consistent with Jaramillo-Mejía et al.'s finding (2013) that the wide and persistent regional variations in infant mortality in Colombia are correlated with socioeconomic conditions and availability of medical services.

## **5 Classification of Discretionary Expenditure on Medical Care**

Discretionary, out of pocket, household expenditures on medical care comprise out-of-pocket fees and insurance premiums. From the perspective of the publicly funded system, out-of-pocket pay can be classified as follows (Chernichovsky, 2015):

- Co-payments (CO) for entitled care.
- Pay for supplemental care (SC) that is considered “publicly important” but not sufficiently of high priority enough to merit public funding.
- Pay for parallel care (PC) that is included in publicly supported entitlement, yet some citizens prefer to buy this care privately.
- Pay for consumption care (CC) that is of no public concern, beyond usual tax and welfare policies, and manifest in the household’s disposable incomes.

In the context of these categories, insurance can be broken down as:

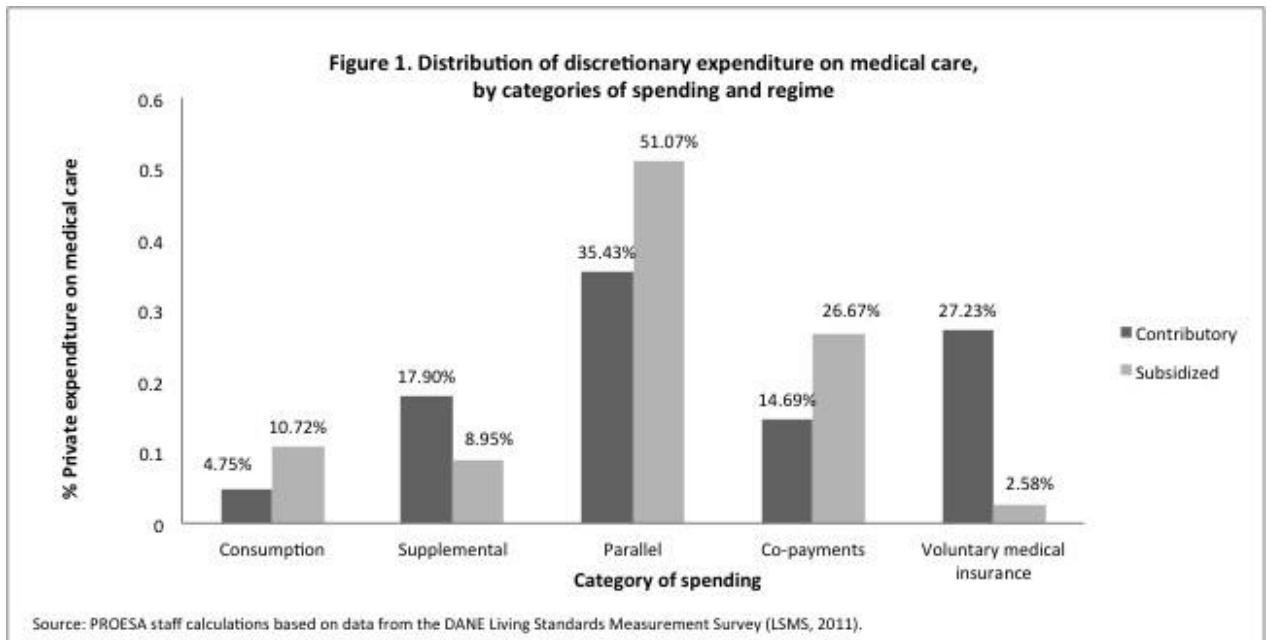
- Insurance of supplemental care expenditures.
- Insurance of co-payments, and parallel and consumption care expenditures.

According to Chernichovsky (2015), the study of discretionary household expenditures (DE) on care by this classification exposes the functioning of the public system and how well it meets the population's needs and demands.

The effort to classify the LSMS data by these categories is presented in Annex A. It is noteworthy that SR members' expenditure on care that was not available to them under entitlement in 2011 but was available to CR members is classified as expenditure on supplemental care in the SR. This classification follows the recognition by the state that such care should be subsidized (Chernichovsky 2015).

## **6 Distribution of Disaggregated Expenditures**

The largest shares of household DE on care are spent on parallel care, which is supposedly available through entitlement (Figure 1). The relatively poor households that belong to the SR spend a higher share of DE on parallel care, co-payments, and consumption care than the better off households that belong to the CR. Noticeably households under the CR spend lower shares of total DE on insurance premiums and supplemental care than their SR counterparts.



The share of DE on care in total household expenditure increases with income quintiles (Table 4). This finding, however, is not typical of all DE categories. The categories most related to income are discretionary insurance premiums—typical only of the three highest quintiles—supplemental care, and parallel care. At the same time, the shares of expenditure on co-payments and consumption care in total household expenditures fall as these expenditures or income rise. CO is thus akin to a regressive tax (Chernichovsky 2015).

**Table 4. Discretionary expenditure on medical care as percentage of total household expenditure**

Quintile	Spending categories					Total
	Insurance	Co-payments	Supplemental	Parallel	Consumption	
Poorest=1	0.003	0.732	0.095	0.465	0.393	1.688
2	0.004	0.884	0.144	0.686	0.336	2.054
3	0.047	0.690	0.285	0.952	0.291	2.266
4	0.141	0.690	0.292	1.154	0.247	2.524
Richest=5	1.152	0.503	0.699	1.466	0.150	3.971
<b>All</b>	<b>0.784</b>	<b>0.578</b>	<b>0.546</b>	<b>1.303</b>	<b>0.195</b>	<b>3.407</b>
<b>Quintile 5/Quintile 1</b>	<b>364.900</b>	<b>0.687</b>	<b>7.390</b>	<b>3.154</b>	<b>0.382</b>	<b>2.352</b>

Source: PROESA staff calculations based on data from the DANE Living Standards Measurement Survey (LSMS, 2011).



## 7 Determinants of Discretionary Expenditure on Medical Care— Hypotheses

Grossman's (1972) model of investment in health underpins this study. He hypothesized that DE on care is influenced by the need for care, socioeconomic determinants, the supply of health services, or the cost of accessing care. These, in turn, are driven by the functioning of the public health care system, entitlements in the systems, as well as by household and community characteristics.

In the absence of data about health status, this study approximates households' medical need with household size in standard units according to Colombia's risk adjustment (capitation) mechanism, the *Unidad de Pago por Capitación* (UPC), which is used to allocate funds to the plans in the CR (Annex B). This variable is correlated with the age of the head of households ( $R^2 = 0.46$ ) as well as with household size ( $R^2 = 0.57$ ), indicating the increased need for care with old age as well as with a higher number of family members.

Three variables are hypothesized to influence the demand for care and thereby DE on care: affordability and willingness to pay, gender of head of household, and holding of insurance. The variable of affordability and willingness to pay, all other things equal, is measured by the "highest level of education in the household."<sup>4</sup> This variable appears to represent well the households' wealth and permanent income. The first order correlation of this measure of education with total household expenditure is 0.45. It is also associated with the household's demand for human capital, including investment in health and education, and even investment in related physical capital; "highest level of education in the household" correlates with access to basic utilities such as tap water and sewage (0.36).

The head of household being female is highly correlated with her being single ( $R^2 = 0.56$ ). This variable can thus be associated, all other things constant, with a loss of efficiency in household activity, including consumption, or with a lower real

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<sup>4</sup> Maximum level of education or schooling in the household may indicate yet-incomplete schooling of children in an environment where basic schooling is yet spreading. This life cycle effect of the household is controlled for by UPC units that are associated with age of head of household as well as its size. Alternately, it is maximum level of schooling, given household size and age of head of household.

income. It can also indicate a lower level of household support and social capital that has a positive influence on health (Putnam, Leonardy, and Nannety, 1993; Putnam, 1995). That is, the head of the household being a *male* is postulated to be associated with a positive income or wealth effect on demand for care but with a potential negative effect because of lower need.

“Holding discretionary insurance” is associated with paying insurance premiums and, at the same time, lower out-of-pocket pay. Interpreting the impact of this variable on DE is therefore complicated. Even if the potential effect of adverse selection and related issues of co-determination of (expected) DE and insurance premiums are disregarded, it remains that insurance coverage – which determines out-of-pocket pay (OOP) -- is determined at least by some of the same variables that affect OOP. That is, insurance coverage is an independent and dependent variable in the same system, and is influenced by an unidentifiable latent variable. Chernichovsky (2015) argues that “holding insurance,” especially where there is a wide scope of supplier-induced demand, can capture a positive income effect on expenditures, and hence be associated, at the end of the day, with higher out-of-pocket expenditures, possibly on “different” care.

Supply of care is approximated by two variables: residence in an “urban area” and in a particular “health region” (Table 2). The two barely correlate statistically in the data, since urban areas, albeit of different nature, exist in all regions. Compared with rural areas, urban areas represent a higher supply of service that are of better quality.<sup>5</sup> Given urbanization, a higher level health region (e.g., health region 5, comprising Bogota, Antioquia, and Valle) represents low (travel) cost of accessing care of given quality; a low-level region implies difficulty in reaching care even in the urban area in the health region.

## 8 Findings

Total DE on care and the individual expenditure categories are regressed on the explanatory need, demand, and supply variables. In the case of total DE, we use the Ordinary Least Squares regression model since practically all households report

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<sup>5</sup> Urban residence is highly correlated with the household utilities (0.59) and hence stands for availability and infrastructure including, probably, quality medical services as well as their quantity in any cluster.

DE of this type or another. For the individual spending categories, we use the Tobit regression model to deal with situations in which only a small fraction of the sampled households report spending.

To allow for non-linearity, and based on preliminary estimates, logarithmic transformation is used for all continuous variables. To facilitate the discussion, we show the results of the singular effects of different variables across spending categories by regime. The full regression estimates are reported in Annex C.

## 8.1 MEDICAL NEED

Household medical needs are more readily addressed, all other things equal, by DE in the Contributory Regime (CR) than in the Subsidized (SR) (Table 5). A 10.0 percent increase in (UPC) size across households (around the mean of 3.9 in both regimes) brings about a 5.85 percent increase in discretionary spending in the CR as opposed to a 4.85 percent increase in the SR<sup>6</sup>. In general, the rise in expenditures is led by expenditures on co-payments and on parallel and supplemental care. Need does not affect, statistically speaking, expenditures on consumption care and insurance premiums.

**Table 5. Tobit regression coefficients of (Ln of) UPC units, with household discretionary expenditure as dependent variable, by category and regime\* (t-Statistic in parentheses)**

Regime	Category of medical expenditure					Total**
	Insurance	Co-payments	Supplemental	Parallel	Consumption	
Contributory	<b>1.005</b> (0.81)	<b>1.601</b> (3.42)	<b>1.402</b> (5.47)	<b>1.571</b> (7.64)	<b>-0.294</b> (0.72)	<b>0.585</b> (18.59)
Subsidized	<b>0.523</b> (1.20)	<b>1.203</b> (3.86)	<b>0.955</b> (0.29)	<b>1.293</b> (2.90)	<b>-0.424</b> (0.77)	<b>0.485</b> (10.17)
All	<b>0.776</b> (1.42)	<b>1.361</b> (3.77)	<b>1.127</b> (5.09)	<b>1.360</b> (7.58)	<b>-0.395</b> (0.27)	<b>0.529</b> (17.77)

Source: PROESA staff calculations based on data from the DANE Living Standards Measurement Survey (LSMS, 2011).

\*Coefficients indicate marginal effects at observed censoring rate conditional on being uncensored.

\*\*Dependent variable "Total health expenditure" is estimated with ordinary least squares.

<sup>6</sup> Given the Tobit regression model, the estimated coefficient suggests both increase probability to participate in spending as well as an increase in spending level by participating households. See discussions by Chernichovsky (2014), Mullahy (1998), Austin et al. (2000).

Families of the CR respond more to need—expressed in expenditure on co-payments and supplemental care—than families of the SR.<sup>7</sup>

## 8.2 DEMAND FOR CARE

The positive effect of the **wealth** variable “maximum education of the household” is highly significant in impact and statistically. This effect is slightly more meaningful, but with no statistical difference, for households of the SR than for their counterparts of the CR (Table 6). A 10.0 percent increase in years of maximum schooling (controlling for size of household in UPC units) brings about a 7.3 percent increase in discretionary health care expenditure across households in the CR and a 10.0 percent increase in the SR.

**Table 6. Tobit regression coefficients of (Ln of) maximum education of the household, with household discretionary expenditure as dependent variable, by category and regime\* (t-Statistic in parentheses)**

Regime	Category of medical expenditure					Total**
	Insurance	Co-payments	Supplemental	Parallel	Consumption	
Contributory	<b>3.719</b> (13.77)	<b>0.108</b> (1.20)	<b>0.909</b> (5.86)	<b>0.568</b> (4.80)	<b>0.486</b> (9.74)	<b>0.732</b> (20.48)
Subsidized	<b>1.328</b> (4.85)	<b>0.606</b> (9.79)	<b>0.919</b> (6.46)	<b>0.914</b> (9.65)	<b>0.551</b> (18.20)	<b>0.995</b> (25.74)
All	<b>2.508</b> (14.28)	<b>0.503</b> (10.75)	<b>0.917</b> (9.55)	<b>0.797</b> (11.89)	<b>0.535</b> (22.10)	<b>0.958</b> (35.52)

Source: PROESA staff calculations based on data from the DANE Living Standards Measurement Survey (LSMS, 2011).

\*Coefficients indicate marginal effects at observed censoring rate conditional on being uncensored.

\*\*Dependent variable "Total health expenditure" is estimated with ordinary least squares.

Overall, level of education (wealth) is a strong and the statically most significant predictor of payment of insurance premiums, especially in the CR: the impact is three-fold larger in the CR than in the SR. As suggested below, this differential impact between regimes is conditioned by the availability of insurance in urban and central areas, where CR members are concentrated.<sup>8</sup>

<sup>7</sup> Level of education is controlled in the estimates. Nonetheless, there may be some aspects of efficiency in household consumption not captured by this variable.

<sup>8</sup> It is likely that children in the higher quintiles may eventually achieve higher levels of schooling than in the lower quintiles. Thus the variable of choice may underestimate the impact of wealth, measured by highest level of schooling in the household, on DE on care.

Level of schooling is also positively associated with expenditures on supplemental and consumption care about equally in the two regimes. Level of education matters, however, more for households in the SR than in the CR with regard to parallel care and co-payments.

**Holding insurance** has a positive and statistically significant effect on all spending categories except for expenditure on consumption care (Table 7).<sup>9</sup> Overall, holding insurance has the strongest impact on expenditure on parallel care, with equal impact in the two regimes, followed by the impact on supplemental care in the CR and copayments in the SR.

**Table 7. Tobit regression coefficients of private insurance (=1), with household discretionary expenditure as dependent variable, by category and regime\* (t-Statistic in parentheses)**

Regime	Category of medical expenditure				Total**
	Co-payments	Supplemental	Parallel	Consumption	
Contributory	<b>0.613</b> (3.42)	<b>1.294</b> (5.47)	<b>1.589</b> (7.64)	<b>0.074</b> (0.72)	<b>0.732</b> (9.94)
Subsidized	<b>1.643</b> (3.86)	<b>0.216</b> (0.29)	<b>1.534</b> (2.90)	<b>0.196</b> (0.77)	<b>1.374</b> (4.23)
All	<b>0.584</b> (3.77)	<b>1.009</b> (5.09)	<b>1.360</b> (7.58)	<b>0.025</b> (0.27)	<b>0.765</b> (7.25)

Source: PROESA staff calculations based on data from the DANE Living Standards Measurement Survey (LSMS, 201

\*Coefficients indicate marginal effects at observed censoring rate conditional on being uncensored.

Marginal effect is for discrete change of dummy variable.

\*\*Dependent variable "Total health expenditure" is estimated with ordinary least squares.

**A male-headed household** has higher DE on care, mainly on consumption care, than a female-headed household (Table 8). Otherwise, the impact of this variable is statistically significant only in the case of expenditure on copayments in the SR: male-headed households spend less than female-headed ones on copayments.

<sup>9</sup>To minimize the simultaneity bias that may be associated with insurance premiums, the variable in use is dummy variable "holding insurance".

**Table 8. Tobit regression coefficients of gender of the head of household (Male=1), with household discretionary expenditure as dependent variable, by category and regime\* (t-Statistic in parentheses)**

Regime	Category of medical expenditure					Total**
	Insurance	Co-payments	Supplemental	Parallel	Consumption	
Contributory	<b>0.230</b> (1.33)	<b>-0.153</b> (1.51)	<b>0.162</b> (1.05)	<b>0.177</b> (1.38)	<b>0.199</b> (3.52)	<b>0.216</b> (5.32)
Subsidized	<b>0.004</b> (0.02)	<b>-0.309</b> (3.41)	<b>-0.017</b> (0.10)	<b>-0.094</b> (0.74)	<b>0.228</b> (4.83)	<b>0.098</b> (1.63)
All	<b>0.199</b> (1.60)	<b>-0.223</b> (3.54)	<b>0.116</b> (1.11)	<b>0.049</b> (0.58)	<b>0.227</b> (6.55)	<b>0.157</b> (4.06)

Source: PROESA staff calculations based on data from the DANE Living Standards Measurement Survey (LSMS, 2011).

\*Coefficients indicate marginal effects at observed censoring rate conditional on being uncensored.

Marginal effect is for discrete change of dummy variable.

\*\*Dependent variable "Total health expenditure" is estimated with ordinary least squares.

### 8.3 SUPPLY OF CARE

Controlling for other variables, **residence in urban areas**, when compared with rural areas, carries a positive impact on all DE categories (Table 9). The impact of urbanization on supply of care is, overall, more pronounced in the CR, led by the effect on the expenditures of this regime's households on supplemental care. Most noticeable is the impact of urbanization on paying insurance premiums in the two regimes—the SR in particular.

**Table 9. Tobit regression coefficients of residence in urban area (=1), with household discretionary expenditure as dependent variable, by category and regime\* (t-Statistic in parentheses)**

Regime	Category of medical expenditure					Total**
	Insurance	Co-payments	Supplemental	Parallel	Consumption	
Contributory	<b>1.186</b> (3.54)	<b>0.217</b> (1.49)	<b>0.811</b> (3.28)	<b>0.445</b> (2.34)	<b>0.156</b> (1.92)	<b>0.528</b> (9.11)
Subsidized	<b>1.559</b> (4.40)	<b>-0.184</b> (1.98)	<b>0.625</b> (3.37)	<b>0.503</b> (3.79)	<b>0.003</b> (0.06)	<b>0.301</b> (4.91)
All	<b>1.201</b> (5.59)	<b>-0.090</b> (1.25)	<b>0.751</b> (5.43)	<b>0.523</b> (5.25)	<b>0.020</b> (0.51)	<b>0.340</b> (7.88)

Source: PROESA staff calculations based on data from the DANE Living Standards Measurement Survey (LSMS, 2011).

\*Coefficients indicate marginal effects at observed censoring rate conditional on being uncensored.

Marginal effect is for discrete change of dummy variable.

\*\*Dependent variable "Total health expenditure" is estimated with ordinary least squares.

Living in a **marginal health region** has a negative effect on all expenditure categories (Table 10). In particular, where cost of outreach is high, given urbanization, DE is lower across the board.

**Table 10. Tobit regression coefficients of health region 5 (=1), with household discretionary expenditure as dependent variable, by category and regime\* (t-Statistic in parentheses)**

Regime	Category of medical expenditure					Total**
	Insurance	Co-payments	Supplemental	Parallel	Consumption	
Contributory	<b>-1.331</b> (4.76)	<b>-1.000</b> (6.26)	<b>-1.427</b> (5.46)	<b>-1.631</b> (7.77)	<b>0.160</b> (1.85)	<b>0.003</b> (0.05)
Subsidized	<b>-0.015</b> (0.03)	<b>-1.927</b> (11.74)	<b>-1.609</b> (5.23)	<b>-1.512</b> (6.90)	<b>-0.267</b> (3.44)	<b>-1.147</b> (11.53)
All	<b>-0.888</b> (4.40)	<b>-1.484</b> (14.10)	<b>-1.450</b> (8.02)	<b>-1.503</b> (10.88)	<b>-0.104</b> (1.90)	<b>-0.762</b> (12.49)

Source: PROESA staff calculations based on data from the DANE Living Standards Measurement Survey (LSMS, 2011).

\*Coefficients indicate marginal effects at observed censoring rate conditional on being uncensored.

Marginal effect is for discrete change of dummy variable.

\*\*Dependent variable "Total health expenditure" is estimated with ordinary least squares.

Noticeable differences between regimes are the rather strong negative effect on paying for insurance in the CR, and on copayments in the SR.

#### **8.4 DISCRETIONARY EXPENDITURE ON MEDICAL CARE AND POVERTY**

About a half of the SR households are estimated to be below the poverty line, in sharp contrast to only one-tenth in the CR. DE on care minus expenditures on consumption care (DE-C) push an estimated extra 0.8% or about 99,000 Colombian households below the poverty line (Table 11).<sup>10</sup> Clearly the impact is more pronounced in households of the SR, which stand a four-fold higher chance to fall into poverty because of DE on care than households of the CR. Since the households in the first quintile are already below the poverty line, as expected,

<sup>10</sup> For the underlying rationale for this approach, see Chernichovsky 2014.

households in the second and third quintiles, the former in particular, which border on poverty, have the highest chance of falling into poverty because of DE.

**Table 11. Percent of households falling into poverty because of discretionary spending, by category of spending, regime, and income quintile**

Group	Spending categories				Total
	Co-payments	Insurance	Supplemental	Parallel	
<b>Regime</b>					
Contributory	0.0593%	0.0008%	0.0079%	0.0762%	0.1442%
Subsidized	0.2518%	0.0023%	0.0396%	0.2343%	0.5281%
Not affiliated	0.0094%	0.0052%	0.0032%	0.0267%	0.0446%
<b>Expenditure quintiles</b>					
Poorest=1	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
2	0.3473%	0.0032%	0.0584%	0.2438%	0.6527%
3	0.0212%	0.0059%	0.0000%	0.1265%	0.1535%
4	0.0000%	0.0000%	0.0000%	0.0066%	0.0066%
Richest=5	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
<b>All</b>	<b>0.3685%</b>	<b>0.0091%</b>	<b>0.0584%</b>	<b>0.3769%</b>	<b>0.8128%</b>

Source: PROESA staff calculations based on data from the DANE Living Standards Measurement Survey (LSMS, 2011).  
 Note: Total does not include out-of-pocket expenditure on "consumption" care.

For all households, spending on parallel care and copayments are the major contributors to falling into poverty. While the effects are more pronounced in the SR, the relative impact of spending on these two categories remains the same within each regime. As expected, likelihood to fall into poverty increases with the rise in need, measured by household size measured in UPC units (Table 12). All other things equal, affiliation with the CR and living in an urban area, as well as in a marginal region, reduce the risk of falling into poverty because of DE on care.

Expenditure on parallel care is the prime contributor to the probability of falling into poverty because of DE.



**Table 12. Probit regressions. Probability to become poor due to health expenditure**

Independent variables	(t-Statistic in parentheses)				
	(1) Insurance	(2) Co-payments	(3) Supplemental	(4) Parallel	(5) Total health
(Ln of) UPC units	<b>-0.05600</b> (0.80)	<b>0.0221</b> (1.46)	<b>-0.00941</b> (0.24)	<b>0.01160</b> (0.82)	<b>0.0191</b> (1.81)
Gender of head of household (Male=1)	<b>-0.09790</b> (0.38)	<b>-0.119</b> (1.50)	<b>-0.17100</b> (0.94)	<b>-0.00995</b> (0.14)	<b>-0.0596</b> (1.09)
(Ln of) Maximum education of the household	<b>0.21600</b> (0.81)	<b>-0.0105</b> (0.20)	<b>0.06170</b> (0.47)	<b>-0.04510</b> (0.97)	<b>-0.0322</b> (0.89)
Contributory regime (=1)	<b>0.16500</b> (0.59)	<b>-0.0502</b> (0.57)	<b>-0.50000</b> (1.78)	<b>-0.12500</b> (1.50)	<b>-0.1210</b> (1.96)
Insurance (=1)				<b>-0.26300</b> (0.83)	<b>0.14400</b> (0.98)
Urban residence (=1)	<b>-0.05300</b> (0.16)	<b>-0.27000</b> (3.29)	<b>0.02580</b> (0.13)	<b>-0.14000</b> (1.90)	<b>-0.15500</b> (2.72)
Health region 2		<b>-0.01090</b> (0.08)	<b>-0.07070</b> (0.21)	<b>-0.17200</b> (0.96)	<b>-0.19300</b> (1.56)
Health region 3	<b>0.07790</b> (0.24)	<b>-0.07900</b> (0.81)	<b>0.00278</b> (0.01)	<b>0.19700</b> (2.05)	<b>0.06270</b> (0.91)
Health region 4	<b>0.11100</b> (0.29)	<b>0.01630</b> (0.14)		<b>0.11500</b> (0.99)	<b>0.07740</b> (0.94)
Health region 5	<b>0.10200</b> (0.26)	<b>-0.62200</b> (2.84)		<b>-0.2870</b> (1.77)	<b>-0.30600</b> (2.78)
Constant	<b>-3.82300</b> (5.77)	<b>-2.41400</b> (16.31)	<b>-3.08100</b> (8.51)	<b>-2.5120</b> (17.80)	<b>-2.20100</b> (21.02)
<b>N</b>	<b>22,211</b>	<b>23,431</b>	<b>16,283</b>	<b>24,162</b>	<b>24,162</b>
<b>Log likelihood</b>	<b>-45.47</b>	<b>-551.9</b>	<b>-88.48</b>	<b>-687.6</b>	<b>-1232.2</b>
<b>Pseudo R2</b>	<b>0.0325</b>	<b>0.0286</b>	<b>0.0309</b>	<b>0.0292</b>	<b>0.0200</b>

Source: PROESA staff calculations based on data from the DANE Living Standards Measurement Survey (LSMS, 2011).

Note: Total does not include out-of-pocket expenditure on "consumption" care.

## 8.5 CATASTROPHIC EXPENDITURE

Following the methodology proposed by the World Health Organization (Xu, 2005), a household is considered to incur catastrophic health expenditure if its DE is equal or greater than 20.0 percent of its income after deducting food expenses. Accordingly, about 7.0 percent of Colombian households incur catastrophic discretionary spending on medical care, with a two-fold higher incidence in the SR than in the CR (Table 13). The incidence of catastrophic expenditures falls somewhat with the expenditure/income quintiles. However, no income group is immune to such expenditure.

Practically all DE predictors and all care categories, consumption not included, influence the likelihood to incur catastrophic DE (Table 14). The key predictors of catastrophic expenditure are need (household size in UPC units) and holding insurance. The leading items in this regard are parallel care and copayments, and the least are supplemental and insurance. Members of the CR are likely to incur catastrophic expenditure because of insurance premiums, while holding insurance contributes to catastrophic expenditure via expenditures on parallel care.

Urbanization or relative supply of care reduces the probability of incurring catastrophic spending mainly through less spending on supplemental care and copayments.

**Table 13. Percent of households incurring catastrophic spending because of discretionary spending, by category of spending, regime, and income quintile**

Group	Spending categories				Total
	Co-payments	Insurance	Supplemental	Parallel	
<b>Regime</b>					
Contributory	0.3843%	0.4044%	0.0402%	1.2064%	2.0352%
Subsidized	2.1111%	0.0640%	0.1332%	2.4354%	4.7437%
Not affiliated	0.1182%	0.0136%	0.0445%	0.3441%	0.5204%
<b>Expenditure quintiles</b>					
Poorest=1	0.8897%	0.0532%	0.1071%	0.4629%	1.5129%
2	0.8867%	0.0045%	0.0377%	0.7065%	1.6354%
3	0.4689%	0.0147%	0.0113%	0.8742%	1.3691%
4	0.2956%	0.1121%	0.0565%	0.8991%	1.3633%
Richest=5	0.1397%	0.2786%	0.0151%	0.7005%	1.1340%
<b>All</b>	<b>2.6805%</b>	<b>0.4631%</b>	<b>0.2278%</b>	<b>3.6433%</b>	<b>7.0147%</b>

Source: PROESA staff calculations based on data from the DANE Living Standards Measurement Survey (LSMS, 2011).

Note: Total does not include out-of-pocket expenditure on "consumption" care.

**Table 14. Probit regressions, probability of falling into catastrophic expenditure due to health spending**

Independent variables	(t-Statistic in parentheses)				
	(1) Insurance	(2) Co-payments	(3) Supplemental	(4) Parallel	(5) Total health
(Ln of) UPC units	<b>0.0298</b> (2.10)	<b>0.06730</b> (10.29)	<b>0.02570</b> (1.46)	<b>0.07060</b> (12.40)	<b>0.07810</b> (16.18)
Gender of head of household (Male=1)	<b>-0.16000</b> (2.21)	<b>0.03030</b> (0.80)	<b>0.00437</b> (0.05)	<b>-0.02700</b> (0.84)	<b>-0.02990</b> (1.12)
(Ln of) Maximum education of household	<b>-0.06610</b> (1.31)	<b>-0.13600</b> (5.95)	<b>-0.18200</b> (3.48)	<b>0.05230</b> (2.30)	<b>-0.01120</b> (0.62)
Contributory (=1)	<b>0.37600</b> (4.64)	<b>-0.15300</b> (3.59)	<b>-0.09140</b> (0.81)	<b>-0.06510</b> (1.90)	<b>-0.06810</b> (2.36)
Insurance (=1)		<b>0.11600</b> (1.02)	<b>0.29300</b> (1.19)	<b>0.19400</b> (2.49)	<b>0.78200</b> (13.97)
Urban (=1)	<b>0.01060</b> (0.11)	<b>-0.34700</b> (9.37)	<b>-0.20300</b> (2.16)	<b>-0.01540</b> (0.44)	<b>-0.17300</b> (6.08)
Health region 2	<b>-0.14000</b> (0.92)	<b>0.03820</b> (0.51)	<b>-0.08100</b> (0.39)	<b>-0.04330</b> (0.67)	<b>-0.00582</b> (0.11)
Health region 3	<b>-0.11700</b> (1.23)	<b>0.15100</b> (3.06)	<b>0.04640</b> (0.37)	<b>0.11600</b> (2.83)	<b>0.12200</b> (3.60)
Health region 4	<b>-0.01290</b> (0.12)	<b>0.10800</b> (1.81)	<b>0.07760</b> (0.52)	<b>0.13500</b> (2.76)	<b>0.10500</b> (2.57)
Health region 5	<b>0.13200</b> (1.26)	<b>-0.01670</b> (0.25)	<b>0.14200</b> (0.95)	<b>-0.06710</b> (1.23)	<b>-0.07120</b> (1.58)
Constant	<b>-2.69100</b> (18.82)	<b>-1.78000</b> (25.68)	<b>-2.50500</b> (14.95)	<b>-2.15700</b> (33.45)	<b>-1.66600</b> (32.16)
<b>N</b>	<b>24,162</b>	<b>24,162</b>	<b>24,162</b>	<b>24,162</b>	<b>24,162</b>
<b>Log likelihood</b>	<b>-617.4</b>	<b>-3071.0</b>	<b>-409.6</b>	<b>-4066.9</b>	<b>-6339.4</b>
<b>Pseudo R2</b>	<b>0.0316</b>	<b>0.0599</b>	<b>0.0381</b>	<b>0.0240</b>	<b>0.0403</b>

Source: PROESA staff calculations based on data from the DANE Living Standards Measurement Survey (LSMS, 2011).

Note: Total does not include out-of-pocket expenditure on "consumption" care.

## 9 Discussion

Although the survey instruments were not designed for this type of pioneering analysis, the results are consistent with all plausible hypotheses—that is, with rational household behavior. The study of variations in the composition of DE on medical care provides an unparalleled insight into the functioning of the Colombian healthcare system.

Notably, controlling for all other variables, all households respond to necessity by increasing levels of expenditures on “prescribed” copayments, parallel care, and supplemental care. At least in this context, it is noteworthy that all families, and

even more those under the relatively medically generous CR, perceive parallel care—which is supposedly available under entitlement—as a need to be addressed also by out-of-pocket expenditures and discretionary insurance. Put differently, Colombians appear discontent with their public system, especially when in need. Those who can afford care that parallels entitled care either through out-of-pocket payments or insurance “exit” the publicly supported system as Hirschman (1993) suggested generally happens in cases of dissatisfaction with a product or service. This behavior is probably promoted by supplier-induced demand coupled with clients’ inability to make a clear distinction between what is covered under entitlement and what should be for pay, especially when the same plans or insurers and providers provide entitled care and care-for-pay either through insurance or out-of-pocket pay.

When compared with the SR households, the higher sensitivity of the CR households to need—expressed by expenditure on co-payments and supplemental care—may suggest more awareness to need and possibly even more compliance with prescribed care, beyond what may be captured by the effect of education. This finding is consistent with the findings by Arboleda, Chernichovsky, and Esperanto (2015) that compared with their SR counterparts, members of the CR, are more inclined to report sickness and, when sick, are more inclined to seek care.

DE on care is a luxury expense: its share increases with growth in household total expenditures and income. This finding, especially if not reflecting price of care differentials, suggests that DE aggravate existing disparities in access to care within and across regimes. Matters appear worse considering the DE categories that drive this reality. Expenditure on insurance, which is typical of the more affluent households under the CR, is most sensitive to household wealth. At the same time, copayments, typical of the relatively poor SR households, are least sensitive. That is, copayments, which are more of a burden on the poor households, on the one hand, and discretionary insurance, which is typical of well-to-do households, on the other, amplify existing disparities in access to care, since availability of insurance to the better off makes healthcare even more accessible to them while copayments hinder access to care by the relatively poor.

Disparities are further aggravated, also qualitatively, by the relatively high sensitivity of expenditure on supplemental care to wealth. In this particular regard, it is important to recall that supplemental care for the SR households (at the time of the survey) represents primarily the discrepancy between the entitled packages of the two regimes. That is, expenditure on supplemental care for the SR means trying to close the gap with the CR, while the CR households “run away” with extra supplemental care, beyond the superior basic entitlement they have at the outset

The supply of care aggravates these disparities. The positive effect on DE on care of urbanization—especially on insurance even by members of the SR—and the negative impact of remoteness indicate more use of care, including insured care, where insurance and care are available. In general, SR households are more affected by remoteness than CR households. In fact, the lower expenditures of the SR households on copayments suggest that they use even less of the available public services in outlying areas. This finding can help explain the contribution of the variable supply of care to regional disparities in health in Colombia (Jaramillo et al, 2013).

These contributors to persistent disparities in access to care aggravate a challenging situation to start with: the sensitivity of DE on parallel or entitled care to wealth. Namely, even the supposedly “common base” has a wealth gradient since it is substantially procured for private pay. Indeed, perhaps the “smoking gun” against the functioning of the Colombian healthcare system is expenditure on parallel care, even considering potential caveats in the data.

Expenditures on necessary copayments and essential parallel care that is included in entitlement are the major DE contributors to falling into poverty as well as incurring catastrophic expenditures for households, especially of the SR. It is noteworthy and counterintuitive that no households are immune to catastrophic expenditure. The focus with regard to such expenditure, at least in Colombia, is on the poor, who are the natural concern of such expenditures (Amaya and Ruiz, 2011). Yet households of all socioeconomic strata can be driven into catastrophic expenditure. Specifically, the more educated in Colombia may run into catastrophic expenditure because of DE on parallel care. This again indicates that the public system does not meet clients’ expectations at all socioeconomic levels

and that it is probably afflicted by supplier-induced demand that builds on need and, mostly, ability to pay.

Living in an urban area reduces the chances of falling into poverty and incurring catastrophic expenditures primarily through lower expenditure on copayments and parallel care. This finding is consistent with the finding of Pinto (2002), using 2000–2001 data, that suggests that competition in the CR leads to better client satisfaction, and by implication a lesser need for parallel care. The effect of urbanization on copayments can suggest better compliance with regulations about copayments, especially in a relatively competitive environment. Fewer opportunities to reach out for care in the worst health region may give “fewer opportunities” to fall into poverty because of health needs that remain unaddressed.

It is somewhat surprising that insurance premiums contribute to catastrophic expenditure—contrary to the basic goal of insurance. This may signify both supplier-induced demands for DE on care and risk selection. The risk selection argument, however, appears less consistent with the data.

Insurers—by and large the plans that oversee public entitlement and often supply it along with privately paid care—may induce a household that needs care to purchase insurance and then supply the care for this insurance in ways that can lead to catastrophic spending. It is noteworthy that the arrangement whereby the plan supplies everything—insurance and provision, on the one hand, and privately and publicly paid care and insurance, on the other—can lead to seemingly perverse behavior. It may be worth it for the insurer, who is also the provider, to insure an existing condition because of the potential of being paid twice, privately and publicly, plus any co-pay for the same service.

The findings, especially the relatively stronger impact of supply in the CR, lend further support to the hypothesis of supplier-induced demand. The impact of insurance on spending merits particular attention in this regard. Its positive impact on expenditure on parallel care suggests the influence of supplier-induced demand in the public system for entitled care, with a high probability of double dipping by providers. This hypothesis is corroborated by the evidence that members of the SR, in particular, pay more in copayments because of holding

insurance, while members of the CR spend more out-of pocket on supplemental care. The relatively high levels of expenditure on parallel care and their sensitivity to wealth can open the door for plans and providers to double-dip and exploit, in particular, the well-to-do, especially in cases when the boundaries between private and public entitlements are fuzzy.

Rational behavior with regard to discretionary insurance is noteworthy. Where insurance and services are available to them in urban areas, even the relatively poor of the SR behave like the better off, all things considered. In fact, the DE on insurance by members of the SR can help explain the negative effect of urbanization on co-payments in the SR. By the same logic, CR households especially, spend relatively less on discretionary insurance—a major household expense of this regime—in remote areas where the ability to take advantage of insurance is less than in central areas.

## **10 Conclusion and Policy Implications**

The patterns of discretionary expenditures (DE) on medical care by Colombian households suggest that the Colombian healthcare system has potential to advance further its primary goals, improved health and client satisfaction, through a system that is more equitable, efficient and sustainable than the current one. The study of these patterns also highlights possible avenues of reform that would be marked by a shift from privately paid care to be publicly paid.

The recent legislation stipulating a common entitlement, to be shared by the CR and SR, is a necessary but insufficient reform step. This step needs to be accompanied by a series of complementary actions the findings of this study suggest.

To curb uncalled-for demand for parallel care and possibly for some supplemental care as well as insurance for these categories, a series of interrelated and mutually reinforcing policy measures are warranted. The first measure involves



1. Minimizing, in the publicly paid system, the potential for supplier-induced demand for insurance and provision. This can be aided by:
  - Reducing the potential for vertical integration between plan-insurers and providers that are in charge of managing and supplying entitled care
  - Regulating and enforcing tightly the public-private mix

This measure can be further aided by reducing private demand for care through:

2. Prohibiting ‘double insurance’, especially private insurance of parallel or entitled care.

A complementary measure, which could stop the poor paying copayments they are exempt of, on the one hand, and avoid care because of copayments, on the other, would be:

3. Upholding clients’ rights to free care and informed choice by both state-supported consumer groups and civil society organizations.

The above measures and steps, especially the first, would simultaneously aid and be aided by:

4. Promoting managed competition, where feasible.

All the measures suggested thus far should contribute to more accountability in the publicly funded system. In addition, Colombians would benefit from manpower freed from private care, and from improved public service in part because of lesser incentives by insurers and providers, appropriately regulated and paid, to ‘push’ clients to privately paid care by lowering the quality of care and service in the public system. These measures should also contribute to cost containment and improved household welfare, reducing poverty and catastrophic expenditures induced by DE on care. These steps should also contribute to lowering disparities that can be further reduced by:

5. Subsidizing discretionary insurance for the poor
6. Augmenting the supply of care in rural and remote areas

The proposed measures are consistent with other structural reform proposals of the Colombian system that would eventually lead to better health (Chernichovsky, Martinez, and Guererro, 2012; Chernichovsky and Prada, 2014)

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## Annexes

### ANNEX A - CLASSIFICATION OF HOUSEHOLD DISCRETIONARY EXPENDITURES ON MEDICAL CARE – LAST 30 DAYS, EITHER RECORDED OR ADJUSTED, UNLESS SPECIFIED OTHERWISE

#### **Consumption**

Household Payment for Personal Hygiene

Household Payment for First-Aid Kit

#### **Supplemental for Subsidized Regime/Parallel for Contributory Regime**

Consultation or Dental Treatment Payment

Clinical Laboratory or Prescription Payment

Rehabilitation or Therapy Payment

Last 12 months - Surgery or Outpatient Procedure Payment

Last 12 months- Hospitalization Payment

#### **Supplemental for Contributory Regime**

Vaccine Payment

Last 12 months - Glasses, Hearing aid or Orthotics Payment

#### **Parallel**

Payment for Medical Prescriptions or Medicine Consumed Regularly

Payment for Most Recent Care

Medical Consultation

Alternative Therapy

Last 30 days – Medication Payment

#### **Co-payments. Deductibles and Related Pay**

Deductibles (for SR)

Copayments and Deductibles

Payment for Transportation to Health Care Center

#### **Voluntary Medical Insurance**

Insurance for Hospitalization

Prepaid Medicine Contract

Insurance for Supplemental Health Plan Contract

Insurance for Other Service Contracts (Student, Ambulance, Etc)

#### **No Category**

How much is paid or how much is discounted for being covered?

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**ANNEX B –UPC/CAPITATION COEFFICIENTS BY AGE AND GENDER GROUPS**

<b>Age (years)</b>	<b>Factor group</b>
Under 1	4.3524
1-4	0.9633
5-14	0.3368
15-18 Male	0.3207
15-18 Female	0.5068
19-44 Male	0.5707
19-44 Female	1.0588
45-49	1.0473
50-54	1.3358
55-59	1.6329
60-64	2.1015
65-69	2.6141
70-74	3.1369
Over 75	3.9419

## ANNEX C – TOBIT AND OLS REGRESSION COEFFICIENTS OF SPENDING EQUATIONS

Table C1. Tobit and OLS regression coefficients of spending equations, entire population  
(t-Statistic in parentheses)

Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
	Ln(Insurance)	Ln(Co-payments)	Ln(Supplemental)	Ln(Parallel)	Ln(Consumption)	Ln(Total health)*
(Ln of) UPC units	<b>6.3694</b> (6.09)	<b>5.0876</b> (26.54)	<b>8.0764</b> (12.62)	<b>7.1716</b> (19.66)	<b>-0.5707</b> (-14.80)	<b>0.5293</b> (17.77)
Gender of head of household (Male=1)	<b>1.6336</b> (1.60)	<b>-0.8333</b> (-3.54)	<b>0.8275</b> (1.11)	<b>0.2563</b> (0.58)	<b>0.3281</b> (6.55)	<b>0.1574</b> (4.06)
(Ln of) Maximum education of household	<b>20.5737</b> (14.28)	<b>1.8807</b> (10.75)	<b>6.5704</b> (9.55)	<b>4.2050</b> (11.89)	<b>0.7732</b> (22.10)	<b>0.9576</b> (35.52)
(Ln of) Size of household (in persons)	<b>-8.0555</b> (-6.62)					
Contributory (=1)	<b>14.3147</b> (11.58)	<b>6.3074</b> (25.41)	<b>11.4817</b> (14.19)	<b>7.3363</b> (16.02)	<b>0.5902</b> (11.04)	<b>2.4033</b> (58.09)
Insurance (=1)		<b>2.1818</b> (3.77)	<b>7.2249</b> (5.09)	<b>7.1735</b> (7.58)	<b>0.0368</b> (0.27)	<b>0.7654</b> (7.25)
Urban (=1)	<b>9.8522</b> (5.59)	<b>-0.3369</b> (-1.25)	<b>5.3782</b> (5.43)	<b>2.7597</b> (5.25)	<b>0.0283</b> (0.51)	<b>0.3399</b> (7.88)
Health region 2	<b>-2.5742</b> (-1.42)	<b>0.8974</b> (2.11)	<b>-1.1077</b> (-0.89)	<b>-2.0150</b> (-2.59)	<b>0.3946</b> (4.17)	<b>0.2112</b> (2.89)
Health region 3	<b>-2.4018</b> (-2.04)	<b>-1.4117</b> (-4.86)	<b>-4.7976</b> (-5.49)	<b>-4.2769</b> (-8.09)	<b>0.2702</b> (4.28)	<b>-0.0550</b> (-1.13)
Health region 4	<b>-3.5117</b> (-2.35)	<b>0.7036</b> (2.02)	<b>-4.4342</b> (-4.08)	<b>-1.9622</b> (-3.09)	<b>0.7481</b> (9.73)	<b>0.1910</b> (3.21)
Health region 5	<b>-7.2835</b> (-4.40)	<b>-5.5475</b> (-14.10)	<b>-10.3875</b> (-8.02)	<b>-7.9300</b> (-10.88)	<b>-0.1503</b> (-1.90)	<b>-0.7617</b> (-12.49)
Constant	<b>-110.3989</b> (-21.77)	<b>-16.6263</b> (-31.13)	<b>-71.7151</b> (-27.45)	<b>-41.9443</b> (-35.47)	<b>7.3086</b> (71.66)	<b>7.9324</b> (100.86)
<b>N</b>	<b>24,162</b>	<b>24,853</b>	<b>24,853</b>	<b>24,853</b>	<b>24,853</b>	<b>24,853</b>
<b>Log likelihood</b>	<b>-5248.3443</b>	<b>-3.912e+04</b>	<b>-9034.2164</b>	<b>-2.116e+04</b>	<b>-6.373e+04</b>	<b>-6.080e+04</b>
<b>(Pseudo) R2</b>	<b>0.1045</b>	<b>0.0297</b>	<b>0.0595</b>	<b>0.0386</b>	<b>0.0104</b>	<b>0.2766</b>

Source: PROESA staff calculations based on data from the DANE Living Standards Measurement Survey (LSMS, 2011).

\*Dependent variable "Total health expenditure" is estimated with ordinary least squares.

**Table C2. Tobit and OLS regression coefficients of spending equations, contributory regime.**

(! Statistic in parentheses)

Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
	ln(Insurance)	ln(Copayments)	ln(Supplemental )	ln(Parallel)	ln(Consumption)	ln(Total health)*
(Ln of) UPC units	6.6282 (5.72)	4.8329 (19.39)	8.2837 (10.57)	6.8539 (14.77)	.04017 (-6.70)	0.5852 (18.59)
Gender of head of household (Male=1)	1.5164 (1.33)	.04625 (-1.51)	0.9591 (1.05)	0.7729 (1.38)	0.2720 (.352)	0.2160 (5.32)
(ln of) Maximum education of household	24.5255 (13.77)	0.3262 (1.20)	5.3688 (5.86)	2.4800 (4.80)	0.6635 (9.74)	0.7318 (20.48)
(Ln of) Size of household (in persons)	-8.2313 (-6.03)					
Insurance (=1)		1.8508 (3.42)	7.6442 (5.47)	6.9349 (7.64)	0.1011 (0.72)	0.7318 (9.94)
Urban (=1)	-101.0353 (-17.36)	-6.3759 (-7.92)	-55.5485 (-17.59)	-27.4051 (-17.05)	7.7564 (39.29)	10.5392 (101.80)
Health region 2	7.8235 (3.54)	0.6551 (1.49)	4.7896 (3.28)	1.9417 (2.34)	0.2124 (1.92)	0.5277 (9.11)
Health region 3	-1.5171 (-0.81)	0.8835 (1.73)	-0.3221 (-0.22)	-1.2112 (-1.32)	0.4240 (3.22)	0.1379 (1.99)
Health region 4	-5.8790 (-4.50)	1.7384 (4.93)	-4.1418 (4.00)	-4.8153 (-7.48)	0.4506 (5.05)	.00371 (-0.79)
Health region 5	-2.7170 (-1.72)	0.1120 (0.26)	-2.4336 (-1.91)	-1.5088 (-1.95)	0.5849 (5.28)	.00666 (-1.14)
Constant	-8.7746 (-4.76)	-3.0200 (-6.26)	-8.4303 (-5.46)	-7.1173 (-7.77)	0.2186 (1.85)	0.0028 (0.05)
N	8743	8,930	8,930	8,930	8,930	8,930
Log likelihood	-4173.7972	-1.852e+04	-5880.2536	-1.132e+04	-2.261e+04	-1.766e+04
(Pseudo) R2	0.0473	0.0132	0.0236	0.0199	0.0047	0.1196

Source: PROESA staff calculations based on data from the DANE Living Standards Measurement Survey (LSMS, 2011).

\*Dependent variable "Total health expenditure" is estimated with OLS.



**Table C3. Tobit and OLS regression coefficients of spending equations, subsidized regime**

Independent variables	(t-Statistic in parentheses)					
	(1) Ln(Insurance)	(2) Ln(Copayments)	(3) Ln(Supplemental)	(4) Ln(Parallel)	(5) Ln(Consumption)	(6) Ln(Total health)*
(Ln of) UPC units	5.7315 (2.01)	5.1162 (15.99)	8.2012 (6.42)	7.9358 (11.93)	-.6323 (-11.39)	0.4849 (10.17)
Gender of head of household (Male;1)	0.0492 (0.02)	-1.3132 (-3.41)	-.01461 (-0.10)	-0.5749 (-0.74)	0.3393 (4.83)	0.0984 (1.63)
(Ln of) Maximum education of household	14.5498 (4.85)	2.5768 (9.79)	7.8911 (6.46)	5.6096 (9.65)	0.8210 (18.20)	0.9948 (25.74)
(Ln of) Size of household (in persons)	-4.5529 (-1.42)					
Insurance (;1)		6.9854 (3.86)	1.8528 (0.29)	9.4150 (2.90)	0.2923 (0.77)	1.3737 (4.23)
Urban (;1)	12.89525 (-8.81)	19.0686 (-22.02)	-80.1771 (-15.20)	-50.5620 (-23.50)	7.4090 (52.33)	7.9884 (65.80)
Health region 2	17.0732 (4.40)	0.7826 (-1.98)	5.3698 (3.37)	3.0852 (3.79)	0.0043 (0.06)	0.3007 (4.91)
Health region 3	10.3181 (-1.20)	11.252 (1.47)	-3.0821 (-1.15)	-3.3840 (-1.19)	0.3822 (2.63)	0.3044 (2.43)
<b>Health region 4</b>	12.6887 (3.02)	-1.2236 (-2.36)	-5.4913 (-3.06)	-3.7884 (-3.76)	0.144 (1.47)	-0.0550 (-0.66)
Health region 5	3.886 (-0.71)	12.907 (2.07)	-10.1072 (-4.10)	-2.7759 (-2.24)	0.724 (6.54)	0.3197 (3.15)
Constant	0.1693 (0.03)	-8.1913 (-11.74)	-13.8213 (-5.23)	-9.2791 (-6.90)	-0.3984 (-3.44)	-1.1469 (-11.53)
<b>N</b>	13,190	13,604	13,604	13,604	13,604	13,604
Log likelihood	8370359	1771e+04	2657.7680	8100.2925	3505e+04	3.530e+04
(Pseudo) R2	0.0633	0.0190	0.0332	0.0249	0.0081	0.0857

Source: PROESA staff calculations based on data from the DANE living Standards Measurement Survey (LSMS, 2011).

\*Dependent variable "Total health expenditure" is estimated with OLS.