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**Horizontal inequity in access to health care  
in four South American cities**

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## Horizontal inequity in access to health care in four South American cities<sup>\*</sup>

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### Abstract

This paper analyzes and compares socioeconomic inequalities in the use of healthcare services by the elderly in four South-American cities: Buenos Aires (Argentina), Santiago (Chile), Montevideo (Uruguay) and San Pablo (Brazil). We use data from SABE, a survey on Health, Well-being and Aging administered in several Latin American cities in 2000. After having accounted for socioeconomic inequalities in healthcare needs, we find socioeconomic inequities favoring the rich in the use of preventive services (mammograms, pap tests, breast examinations, and prostate exams) in all of the studied cities. We also find inequities in the likelihood of having a medical visit in Santiago and Montevideo, and in some measures of quality of access in Santiago, Sao Paulo, and Buenos Aires. Santiago depicts the highest inequities in medical visits and Uruguay the worse indicators in mammograms and pap scans tests. For all cities, inequities in preventive services at least double inequities in other services. We do not find evidence of a trade-off between levels of access and equity in access to healthcare services. The decomposition of healthcare inequalities suggests that inequities within each health system (public or private) are more important than between systems.

**Keywords:** inequalities, healthcare, medical visit, preventive services.

**JEL Classification:** I1, I11, I12, I18.

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## 1. INTRODUCTION

The concept of equity has been approached in the literature from two different perspectives. Horizontal equity emphasizes the principle of same treatment to those with same needs. Vertical equity, on the other hand, stresses differential treatment to those with unequal needs. Much of the empirical literature has focused on the study of horizontal equity in healthcare access and utilization (Culyer and Newhouse, 2003; Macinko and Starfield, 2002). In particular, international comparative studies have shed light on how the institutional organization of healthcare systems is associated with horizontal equity in access and use. One example has been the ECuity Project, a multiyear study funded by the European Union, national governments and other organizations, aimed at analyzing health and healthcare inequities in OECD countries. In Latin America, the EquiLAC project (a World Bank project with the support of Spanish and Danish governments) and the IHEP collaboration (a PAHO project funded by the United Nations) were similarly aimed at quantifying and comparing inequities across a number of less developed countries (Suárez-Berenguela, 2000; PAHO, 2001). The EquiLAC focused on measuring health system inequalities in Brazil, Ecuador, Jamaica, and Mexico. The IHEP collaboration studied the nature of healthcare inequalities among the poorest (the lowest 20% of the income distribution) in Brazil, Ecuador, Guatemala, Jamaica, and Peru.

Methodologically, few of the studies for Latin America have used concentration indices to analyze inequities in health care. This methodology has the advantage of quantifying the degree of existent inequality, allowing for direct comparisons between countries and across services. In this study, we use concentration indices to measure, explain and compare socioeconomic inequalities in healthcare utilization in four South American major cities: Buenos Aires, Santiago, Sao Paulo, and Montevideo. These inequalities are decomposed in a series of contributors, which include determinants associated with the need

for healthcare services (health status and morbidity), and other enabling and predisposing factors that are not associated with need (health insurance, health related behaviors, and income). We also assess whether there is a trade off between average levels of healthcare utilization and inequities in the use of services in each of these cities.

Our study uses data from the WHO Survey on Health, Wellbeing and Ageing (SABE) administered in 2000 to elderly adults living in seven major cities from Latin America and the Caribbean. This survey has rich information on the use of acute and preventive healthcare services in these cities (e.g., physician visits, hospitalizations, pap smears) and on the quality of access to care, as reflected by the waiting time to get an appointment, or the time to travel to the appointment (see Palloni and Pelaez [2004] for a detailed report on the SABE design and main findings). Because older adults are intensive users of healthcare services, inequities identified for this group of the population would shed light on the functioning of the health system overall. At the same time, this is a group of special interest given the processes of population ageing that many of these countries are currently facing. One of the limitations of SABE is that it has no good measures of household income. Other studies have used education or household assets to proxy for income. Our analysis improves upon these previous studies by imputing household income from nationally representative household surveys contemporaneous to SABE.

## 2. BACKGROUND

### **2.1 Previous literature on inequities in healthcare utilization**

The principle of horizontal equity states that people with the same needs for health care should be treated equally, regardless of differences in income, education, occupation,

health insurance, or other determinants of the demand for health care. On the basis of this principle, studies attempting to quantify inequities have compared actual healthcare use with estimations of the need of care. If there are differences between actual use and necessity, and these differences are systematically related to the level of income, researchers conclude that horizontal inequity is present. Thus, measures of inequity crucially depend on the correct estimation of the necessity of health care.

Studies for European countries, which are more likely to have universal coverage health systems, have found little inequity in visits to general practitioners, but a concentration of specialty visits favoring high-income groups (Urbanos and Meneu, 2008). In a comparative study of European countries and the US, van Doorslaer *et al.* (1992) found pro rich inequities in imputed healthcare spending in five out of seven countries (the US, Denmark, Italy, the UK, and Spain) but failed to find evidence of inequities in Netherlands and Denmark. In a subsequent study of 12 European Union countries, van Doorslaer *et al.* (2004) could not reject the hypothesis of income-related equity in the probability of a GP visit, although there was evidence of a pro-poor distribution in follow up visits to the GP. By contrast, the authors found, in all countries, substantial pro-rich inequities in the probability of contacting a medical specialist. Inequity in specialty visits was stronger in countries where either private insurance coverage or private practice options were offered to purchase quicker and/or preferential access. The authors extended the study to 21 OECD countries, using data for the years 2000 and 2001 (van Doorslaer *et al.*, 2006), and found inequity in the use of physician visits favoring the well-off in nine countries (Canada, Finland, Italy, Mexico, Holland, Norway, Portugal, Sweden and the United States), with the major inequities in the US and Mexico, followed by Finland, Portugal, and Sweden. These results were completely explained by pro-rich inequities in specialty visits, since visits to general practitioners were equitably distributed and even presented a pro-poor bias in countries with universal access

(Spain, Greece and Germany). Inequities in specialty visits became more important when private insurance was offered in the country (Finland, Portugal, Italy and Spain).

Other investigations have focused on individual countries, comparing inequities across types of services, across geographic regions, and before and after the implementation of healthcare reforms. Van Ourti (2002) analyzed the determinants of health care utilization in Belgium, and found that the distribution of general practitioner visits and hospitalizations presented a pro-poor bias. There was no evidence of horizontal inequity in the case of specialty visits. In England, Morris *et al.* (2003) found that poorer people and ethnic minorities had a lower use of secondary healthcare services but a higher use of primary ones. When analyzing the contribution of need and non-need factors to the socioeconomic concentration of healthcare services, the authors found that age, sex, and health status made the most important contributions to inequality. In a work for Switzerland spanning four years (1982, 1992, 1997 and 2002), Leu and Shellhorn (2004) found pro-rich horizontal inequity in the access to the first visit, but not in the subsequent visits indicated by the physician. Given that the act of a first visit is a patient's decision, while subsequent visits are a medical decision, this result suggests that inequity is determined by the patients' behavior and incentives and not by physicians' attitudes. Garcia Gómez and López (2004) found that the implementation of Spain's National Health System enhanced equity in the access to services (visits, hospitalizations, and emergency services), in particular when equity was considered relative to income. Nevertheless, they found that differences in access increased between those with and without private health insurance. The authors suggested that private healthcare services generated a strong access effect, allowing individuals in the new system to use private services perceived as of a higher quality. In another study for Spain, Costa and Gil (2005) found significant differences in the utilization of physician visits by county ("comunidades autónomas").

With respect to Latin America, a number of studies have found inequity in general access to healthcare with a pro-rich bias. Suárez-Berenguela (2000) showed that inequity was more pronounced in the case of preventive care than in curative care, especially in Brazil, Ecuador, and México. Jamaica and Peru appeared as the most inequitable countries. Inequalities in access were stronger in magnitude than those found for health status.

For Argentina, Bertranou (1993; 1998; 1999) and De Santis and Herrero (2006) explored the utilization of healthcare services and found inequities among people aged 18 or over. The probability of seeing a health professional depended positively on family per capita income, living in the more developed regions of the country, having health coverage, and being more educated. Non-need variables were the most important sources of inequities in the use of healthcare services.

Focusing on the elderly, Noronha and Viegas (2005) studied inequities in health and in the use of healthcare services (ambulatory and in-hospital services) in six Latin American cities, using education as a proxy of income. Working with data from the SABE survey, the authors estimated ordered probit models with health indicators and use of services as dependent variables. Results suggested the existence of inequity in health status (favoring the well-off) in all six cities. They only found inequity with respect to the use of healthcare services in Santiago de Chile, Mexico DF, and Sao Paulo. Wallace and Gutierrez (2005) also used SABE to study inequities in the use of healthcare services and in the quality of access to a visit. To proxy for socioeconomic status, they used household education and a wealth index computed on the basis of the tenure of durable goods in the household. Results showed that in Montevideo, Santiago de Chile, and Mexico City, adult individuals in the poorest quintile and with the lowest educational level were less prone to consult a physician. When controlling for health insurance, the relation between wealth and physician visits became less important.

As in Noronha and Viegas (2005) and Wallace and Gutierrez (2005), our analysis compares levels of access to health care services and inequities in access across four rarely studied South American countries. The study improves upon prior literature by (i) measuring and explaining the magnitudes of inequities through the estimation and decomposition of concentration indices; (ii) comparing inequities for different dimensions of health care, namely visits and hospitalizations, quality of visits, and preventive services; and (iii) working with better and more comprehensive measures of socioeconomic status, through the imputation of income from nationally representative household surveys.

## **2.2 Institutional Background**

In what follows, we present a brief institutional description of the four countries under study at the moment the SABE survey was administered (1999-2000). As evidenced in Table 1, Uruguay and Chile stand in the most advanced stage of the demographic transition of these countries, that is, the transition to low fertility and mortality rates. Both countries present the oldest population of the continent, with 17% aged 60 or more, which determines particular epidemiological patterns and a high demand for healthcare services. Uruguay shows, in addition, the slowest annual rates of population growth. Regarding socioeconomic status, Argentina presented in 2000 the highest GDP per capita (in US dollars), followed by Uruguay. Uruguay and Argentina showed the lowest urban economic inequality, with Gini indices of 0.44 and 0.48 respectively, while Brazil appeared as the most inequitable country with a Gini coefficient of 0.59. The number of years of education by age 35 was around 9 in Uruguay, Chile, and Argentina, but only 5 in Brazil. Brazil showed also the lowest rates of population living in urban areas (81% versus 91% in Uruguay).

Per capita total expenditure in health in 2000 was of US dollars \$689 in Argentina, \$635 in Uruguay, \$302 in Chile, and \$267 in Brazil. These figures amounted respectively to

8.9% of GDP in Argentina, 10.5% in Uruguay, 6.2% in Chile, and 7.2% of GDP in Brazil.

Argentina showed the highest government expenditure on health as a percentage of total health expenditure, and Uruguay showed the lowest.

With respect to health coverage, all countries have mixed health systems, with coexisting public and private insurers and providers. The four countries differ significantly, however, in the nature of public and private coverage. In Brazil, the public system ("Sistema Único de Saude", Unique Health System) warrants universal coverage to all citizens. The system is based on a decentralized regional network regulated by the Ministry of Public Health and financed with public resources. Due to the regional economic disparities that characterize the country, and because federal support does not pursue redistribution goals, richer states present higher per capita health expenditure. The private system, on the other hand, is a fragmented conjunction of plans that include prepaid group practices, medical cooperatives, employer provided insurance, and indemnity plans. Approximately 75% of the population is exclusively covered by public health insurance. The rate is lower in the city of Sao Paulo because of its higher levels of income (62% according to SABE estimates). Although everyone has the right to use the public system, those with private coverage are unlikely to make use of it, except for high cost procedures, such as cancer treatment, which are generally not covered by private insurers.

In Chile, public coverage is provided through the National Health Fund (FONASA), while the ISAPRES ("Instituciones de Salud Previsional" or Social Security Health Institutions) are the institutions in charge of offering private insurance. Contributors to social security can choose whether to receive coverage from the ISAPRES or the FONASA, but once they opt for the private entities, they are not entitled to get coverage from the National Health Fund. In addition to covering formal employees or retirees that have chosen public insurance, the FONASA provides coverage to low-income individuals. The ISAPRES are

allowed to negotiate complementary packages with their clients that offer improved access to health services against increased premiums. Because of the higher health risks associated with aging, the ISAPRES discriminate against the elderly, either through prices or by reducing coverage. This explains why most elderly individuals in Santiago (84% according to SABE estimates) choose public coverage. Only 5% of older adults had coverage from the ISAPRES in 2000 and 10% declared no coverage at all.

The Argentinean healthcare system is divided in three subsystems: public, social security ("Obras Sociales"), and private. The public system provides free access to health services mostly to low-income groups and individuals who lack other coverage. The social security system is a compulsory scheme that covers formal dependent workers and retirees. It is financed by wage contributions that are redistributed across different "Obras Sociales" to ensure increased equality in the provision of care. Retired social security beneficiaries receive coverage from the largest entity in the "Obras Sociales" system: the "Instituto Nacional de Servicios Sociales para Jubilados y Pensionados" (Social Services Administration for Retirees and Pensioners). The private sector is integrated by unregulated private entities that offer voluntary partial or comprehensive insurance to higher income individuals and provide higher quality services. According to data from SABE, in 2000 51% of elderly individuals in Buenos Aires were beneficiaries of social security, 21% reported having public coverage, 10.4% were covered by private insurance, and 17% reported no insurance at all. Ten percent of social security beneficiaries had, in addition, complementary private insurance.

In Uruguay the public sector provides health coverage to the low-income population and individuals not covered by other insurance. The main agents in the private sector are private non-profit institutions that act both as insurers and as direct providers of care ("Instituciones de Asistencia Médica Colectiva" or Institutions of Collective Medical Assistance). These institutions provide coverage to employees contributing to the social

security system and sell voluntary insurance (at a regulated premium) to retirees, dependents, and other individuals not formally integrated to the labor market. The private sector is also integrated by for profit health insurers that sell voluntary packages in an unregulated market. Private non-profit insurance covers approximately 45% of the population, although the rate rises to 60% when considering only elderly adults. About 38% of the elderly get coverage from the public system.

There is evidence that national progressive-tax-based health systems with universal coverage achieve better levels of health in the population and reduce inequalities in health and in use of healthcare services (Lu and Hsiao, 2003). In this sense, we expect the mixed and fragmented institutional settings described above to contribute significantly to the generation of inequalities in access to health care in these countries. Due to the lower resources available at the public level, those with private coverage are likely to benefit from better access and be less subject to rationing queues. Within each health sub-system (public or private) inequities stemming from the institutional organization of health care will depend on the extent to which the mechanisms of resource allocation (copayments, rationing queues, payment incentives) favor particular socioeconomic groups. For instance, in Uruguay, copayments in the private system have deterred access among lower income beneficiaries. Socioeconomic status may also affect the ability of beneficiaries to get informed, make empowered decision about health care, and "navigate" the system (avoiding long lists and queues).

### 3. DATA

To assess and compare inequalities and inequities in access to health care in South America, we used data from the Survey on Health, Wellbeing, and Aging (Encuesta de Salud, Bienestar, y Envejecimiento, SABE) administered in 1999/2000 in seven Latin American and Caribbean cities: Bridgetown (Barbados), Buenos Aires (Argentina), La Habana (Cuba), Mexico DF (Mexico), Montevideo (Uruguay), Santiago de Chile (Chile), and Sao Paulo (Brazil). The survey was sponsored by the Pan American Health Organization and several national and academic institutions in the participating countries, and was aimed at investigating the health status and wellbeing of the elderly in the named cities. The study population included individuals aged 60 or more living in private residencies in each of these cities. The questionnaire was designed to provide comparable information across countries. The survey inquired about a variety of life dimensions, including demographic characteristics, household and housing characteristics, health status, functioning, cognition, mental health, nutrition, use of and access to health services, occupational status, sources of income, and family support. In addition, interviewers obtained anthropometric measures such as weight, height, and some measures of functional status directly from the respondents (see Palloni and Pelaez, 2004 for a full description of the survey).

Several features make of SABE a unique survey for this study. First, it has an ample variety of indicators of health status, morbidity and chronic diseases, as well as measures of access, use, and quality of health services, providing good inputs for the measurement and decomposition of inequalities in health care. Second, it is one of a few surveys that allows for direct comparisons between different Latin American and Caribbean countries. While its focus on the urban elderly may provide a partial picture of inequalities in each of the referred countries, elderly individuals are the most intensive users of healthcare services. In this respect, the analysis of access to health care by the elderly is likely to shed light on the

functioning of each system as a whole.

In this investigation we selected four of the participating SABE cities, all located in the "Southern Cone" of South America: Buenos Aires (Argentina), Montevideo (Uruguay), Santiago (Chile), and Sao Paulo (Brazil). While fairly different from each other, these cities share some cultural and institutional patterns that distinguish them as a block from the other cities in the study. In addition, each of these cities had parallel household surveys that enabled us to impute household income into the SABE.

We defined three categories of measures of access to health services: (i) MD visits and hospitalizations, (ii) quality of the last visit, and (iii) use of preventive care. The first category included dichotomous indicators of any visit to a medical doctor in the past 4 and 12 months, and any hospitalization in the past 12 months. The quality of the (last) visit was assessed by a set of binary indicators that measured if the person had to wait less than a week to get an appointment, if the person spent less than 30 minutes travelling to the doctor's office, if waiting time at the office was less than 30 minutes, whether any examinations were requested at the visit, and whether any medications were prescribed. These measures were only available if the individual had reported having a medical visit. Finally, the category assessing preventive care included dichotomous indicators of any pap test in the past 2 years (women), any mammogram in the past 2 years (women), any breast examination in the past two years (women), and any prostate examination in the past two years (men).

A problem with SABE is that it shows a significant number of non-responses and non-trustworthy responses to the questions about household income. Previous studies using SABE and also interested in socioeconomic inequalities have worked with measures of the respondent's education (Noronha and Viegas, 2005) or an index of household durable goods (Wallace and Gutierrez, 2005) as approximations to the respondents' socioeconomic status.

In this study we opted to impute household income from parallel national household

surveys also representative of each city and age group in SABE. In the case of Buenos Aires, we used the "Encuesta Permanente de Hogares" (EPH) for 1999/2000, the "Pesquisa Nacional por Amostra de Domicílios (PNAD) 2001" for Sao Paulo, the "Encuesta de Caracterización Socioeconómica" (CASEN) 1999 - 2000 for Santiago, and for Montevideo the Encuesta Continua de Hogares (Instituto Nacional de Estadística) 1999/2000. As a first step, we defined, in each of these household surveys, a set of variables associated with income that could be exactly replicated with the SABE data. This set of variables included age, gender, education, occupation, household composition, housing characteristics, durable goods in the household, marital status, and sources of income. Second, we used this data to regress the logarithm of household income on the referred variables (and interactions of these variables) and produced a series of estimated coefficients. Separate regressions were run for men and women. Income was positively related to the number of people in the household, to being married, to more years of education, to being in the labor force, to being an employer, to owning the house, and to having other sources of income in addition to wage income. The above variables explained approximately half of the variance in the log of income. For Buenos Aires, the regression had an  $R^2$  of 0.45, the  $R^2$  equaled 0.58 in the case of Sao Paulo, it was 0.48 in Santiago de Chile, and 0.59 in Montevideo. Third, the estimated coefficients were imputed into SABE and a prediction for the logarithm of household income was generated on the basis of the SABE explanatory variables. Imputed income was retransformed into levels and converted into equivalent income by dividing its level by the squared root of the total number of people living in the household. While this measure of income may not capture all dimensions of socioeconomic status, it weights a sufficiently comprehensive set of variables to make it more representative of permanent income and household purchasing power than previously used measures such as education or an index of durable goods.

In addition to imputing income, we constructed a set of variables indicative of each individual's need for health care, as well as other determinants of the demand for health care not directly associated with the individual's health status or morbidity (non-need measures). We assessed the need for health care from measures of self-reported health, indicators of chronic conditions, age, gender, and other variables measuring functionality and body mass index. Self-perceived health was defined on the basis of the question: "Would you say your health is excellent, very good, good, fair or poor?" Chronic conditions were identified from the answers to the following questions: "Have you ever been told by a doctor or a health professional that you have any of the following conditions: hypertension, diabetes, cancer, heart disease, lung disease, stroke, arthritis, osteoporosis, or mental health problems?" We also considered among the need variables the respondent's Body Mass Index, the Basic Activities of Daily Living (ADL) scale (a measure of functioning), and indicators of age and gender. While these two variables are not direct measures of morbidity, they capture biologic features associated with the demand for health services that are relatively independent of individual decisions.

We also constructed other control variables that, despite being associated with health care utilization, do not justify the allocation of more health care resources to those with higher levels of these variables. Among these characteristics, we considered health insurance and behavioral health variables such as alcohol consumption, sedentary life, use of tobacco, and diet. Following the literature, we refer to these variables as *non-need* variables. While alcohol consumption and other unhealthy behaviors may result in a higher demand for health care, this higher demand cannot be justified as "need" from an equity point of view because it stems primarily from individual decisions rather than from biologic factors exogenous to the individual.

Health insurance was captured by three dichotomous variables that indicated if the respondent had public insurance, private insurance, or no insurance coverage, respectively. Risky alcohol behavior took the value of 1 if the individual reported consuming more than 2 drinks per day (more than 1 drink in the case of women) with a frequency of 4 or more days per week; or alternatively, if the individual reported consuming 5 or more drinks (4 or more for women) in average within the same episode. Respondents were considered to have a sedentary life when they did not report exercising at least three times a week in the past 12 months. Tobacco use was captured by a dummy variable equal to 1 if the individual was a current smoker (0 otherwise), and a dummy equaling one if the respondent did not currently smoke but had smoked in the past. Finally, a dichotomous variable representing poor diet was set equal to 1 if the individual reported not eating fruits and vegetables on a daily basis (and 0 otherwise).

Variables such as education, housing, marital status, or occupation were not considered as individual controls because they were captured in the imputed measure of income.

Table 2 compares means across the four South American cities for all variables considered in the analysis. Between 74% and 84% of the sample population reported visiting a medical doctor in the past 12 months, and between 54% and 77% reported having made a visit in the past 4 months. Hospitalization rates in the past 4 months ranged between 4.4% and 6.2%. Sao Paulo showed the highest prevalence of medical visits and hospitalizations, whereas Santiago showed the lowest.

Montevideo evidenced the best indicators of quality of access to the visit: more than 80% of respondents who reported having had a visit had obtained the appointment within the week and had spent less than 30 minutes travelling to the clinic or doctor's office. And 74% of these respondents had waited less than 30 minutes at the doctor's office. Sao Paulo showed

the worst indicators of time to get an appointment and transportation to the office: only 59% of those who reported a visit could get an appointment in less than a week, and 46% spent more than half an hour travelling to the clinic or doctor's office. Santiago showed the longest waiting times: above 60% of patients had waited more than 30 minutes at the office or clinic. In terms of examinations requested at the medical visit, Sao Paulo took the lead, with 65% of patients being recommended a diagnostic examination. Montevideo showed the lowest rate, with only 48% of patients being recommended an exam. Santiago, on the other hand, showed the highest rate of prescription of medications (75%) and Buenos Aires the lowest (59%).

Access to preventive care was low in general in all cities. The best rates of use of preventive care were achieved in Sao Paulo, where 40% of men reported having had a prostate exam in the past 2 years, 38% of women had had a pap smear, 35% of women reported having had a mammogram, and 45% of women reported having had a breast exam in the past 2 years. Santiago showed the worst rates in almost all indicators: only 31% of men reported a prostate exam, 21% of women reported a mammogram, and 41% reported a breast examination. The rate of pap tests was of 31% in Santiago, lower than in Buenos Aires and Sao Paulo, but higher than in Montevideo (with a rate of only 25%).

The mean age in the survey was 72 years old, and around 37% of respondents were male. Argentinean respondents showed the best levels of self perceived health (followed closely by Uruguayans), whereas Chileans evidenced the highest proportion of individuals reporting fair or poor health. Chileans and Brazilians were more likely than Argentineans and Uruguayans to report health conditions such as hypertension, diabetes, lung disease, heart disease, stroke, osteoporosis, and mental health problems. On the other hand, respondents in Buenos Aires and Montevideo showed poorer dietary habits, higher rates of sedentary life, higher likelihood of alcohol misuse, and higher smoking rates.

In Santiago de Chile, 84% of respondents had public health insurance, versus 72% in Buenos Aires, 62% in Sao Paulo, and only 34% in Montevideo. Buenos Aires showed the highest rates of uninsured (17%), followed by Santiago (11%). Sao Paulo and Montevideo showed low rates of uninsurance (2.5% and 2.0% respectively). Household monthly equivalent income measured in 1999/2000 US dollars was of \$ 813 in Montevideo, \$ 736 in Sao Paulo, \$ 485 in Buenos Aires, and \$ 469 in Santiago.

#### 4. METHODOLOGY: CONCENTRATION INDICES AND HORIZONTAL INEQUITY

To assess socioeconomic inequality and inequity in health care, we followed the standard methodology in the literature (Wagstaff *et al.*, 1989; Wagstaff y van Doorslaer, 2000) and computed concentration indices. The following concentration index measures socioeconomic inequality in access to healthcare service  $m$ :

$$(1) IC_m = \frac{2}{N\bar{m}} \sum_{i=1}^N (m_i - \bar{m})(R_i - 1/2)$$

where  $m_i$  is a dichotomous indicator of access to healthcare service  $m$  by individual  $i$ ,  $N$  is the sample size,  $\bar{m}$  is the average access to healthcare service  $m$  in the sample, and  $R_i$  is the cumulative proportion of the sample up to individual  $i$  when sorted by income. The concentration index  $IC_m$  can take up values between -1 and 1. A value of -1 implies that only the poorest individual has access to healthcare service  $m$ , whereas a value of 1 implies that only the richest individual has access to service  $m$ . A value of 0 would imply that the distribution of access to healthcare service  $m$  overlaps with the distribution of income, or that inequalities in favor of the rich in certain parts of the distribution of  $m$  are compensated by inequalities in favor of the poor in other parts of the same distribution. In general terms, positive (negative) values of  $IC_m$  indicate a bias in access to care in favor of those with highest (lowest) socioeconomic status.

As mentioned before, the concept of horizontal inequity conveys that individuals with the same healthcare needs must be treated equally, despite other distinctive characteristics such as income, education, or region of residence. Two alternative methods have been proposed in the literature to compute indices of horizontal inequity (O'Donnell *et al.*, 2008). Wagstaff and van Doorslaer (2000) propose the method of indirect standardization, which estimates inequity by computing a concentration index on the residual demand for healthcare services after adjusting for healthcare needs. On the other hand, van Doorslaer *et al.* (2004) compute horizontal inequity from the decomposition of socioeconomic inequality in access to health care. Total socioeconomic inequality in care is decomposed in a series of contributors, which include determinants associated with the need for healthcare services (health status and morbidity), and other enabling and predisposing factors that are not associated with need (non-need). Once the contributions of all these factors are computed, horizontal inequity is estimated as the difference between total socioeconomic inequality in access to health care and the contribution of need variables to healthcare inequality. This latter method has the advantage of allowing for different classifications of need and non-need variables, and is more flexible when it comes to arguing which inequalities are justifiable and which are not (O'Donnell *et al.*, 2008). In addition, the decomposition method provides information on the extent to which different aggregates of non-need variables contribute to the total level of socioeconomic inequality in healthcare use.

Following Wagstaff *et al.* (1989, 1991, 2002, 2003), we specified the demand for health services as follows:

$$(2) \quad m_i = f(a_0 + a_1 y_i + \sum_k \hat{a}_k b_k h_{ik} + \sum_j \hat{a}_j g_j x_{ij})$$

where  $m_i$  is a dichotomous variable that measures access to service  $m$  by individual  $i$ ,  $f$  is a probabilistic function,  $y_i$  represents income or socioeconomic status,  $h_i = (h_{i1}, \dots, h_{iK})$

captures variables associated with the need for health care (self perceived health, weight loss, body mass index, self reported chronic diseases, and so forth), and  $x_i = (x_{i1}, \dots, x_{ij})$  includes other non-need variables that predispose and enable the demand for health care. In our analysis,  $x$  includes health insurance and health-related behaviors. We are not able to include in  $x$  other socioeconomic indicators such as education and occupation because these variables are collinear to income by construction.

When the healthcare variable of interest is linearly associated with the explanatory variables (including both need and non-need measures), the index of horizontal inequity computed on the basis of the indirect standardization is identical to the index computed under the decomposition method. When health care is not linearly related to the explanatory variables, as in our setting, we need to linearly approximate the model in order to be able to estimate horizontal inequity. In the presence of non-linearities, the index of horizontal inequity computed on the basis of the decomposition will not be identical to the index derived from indirect standardization (O'Donnell *et al.*, 2008). In this study, we estimated horizontal inequity using the decomposition method. We linearly approximated the non-linear model in (2) as follows:

$$(3) \quad m_i = a_0^m + a_1^m y_i + \sum_k \hat{a}_k b_k^m h_{ik} + \sum_j \hat{a}_j g_j^m x_{ij} + u_i$$

where  $b^m = df/dh$ ,  $g^m = df/dx$  y  $a_1^m = df/dy$  are the partial effects of  $h$ ,  $x$ , and  $y$  on  $f(\cdot)$ , treated as fixed parameters, and evaluated in the sample mean, and  $u_i$  is the error term, which includes approximation errors.

Combining (1) and (3), socioeconomic inequality in access to healthcare services ( $IC_m$ ) can be expressed as the weighted average of the (socioeconomic) inequality in the different contributors to the demand for health care, where the weight is defined as the elasticity of healthcare demand to each of these contributors (Rao, 1969; van Doorslaer *et al.*, 2004;

Wagstaff *et al.*, 2003). The following expression shows this decomposition:

$$(4) \quad IC_m = \underbrace{(a_1^m \bar{y} / \bar{m}) IC_y}_{\text{I}} + \underbrace{\hat{a}_k (b_k^m \bar{h}_k / \bar{m}) IC_{h_k}}_{\text{II}} + \underbrace{\hat{a}_j (g_j^m \bar{x}_j / \bar{m}) IC_{x_j}}_{\text{III}} + GIC_u / \bar{m}$$

where  $IC_y$ ,  $IC_{h_k}$ ,  $IC_{x_j}$  are concentration indices that measure, respectively, the concentration of income, socioeconomic inequality in *need* variables  $h_k$ , and socioeconomic inequality in *non-need* variables  $x_j$ . The terms to the left of each concentration index constitute, respectively, the elasticity of use of healthcare services with respect to income, need-variables, and non-need variables such as health insurance and health-related behaviors, captured in the vector  $x$ . The first term on the right hand side of expression (4) denotes the contribution of income inequality to the socioeconomic inequality in access to health care; the second term captures the contribution of the socioeconomic inequality in variables reflecting need for health care; and the third term reflects the contribution of the socioeconomic inequality in non-need factors (health insurance and health behaviors). The last term constitutes the unexplained portion of socioeconomic inequality in access to health care.<sup>2</sup>

Horizontal inequity in access to health care ( $IH$ ) is the part of total socioeconomic inequality in access that is not justified by socioeconomic inequalities in health care needs (Gravelle, 2003). In analytic terms, horizontal inequity can be defined as the difference between total socioeconomic inequality in access,  $IC_m$ , and the contribution to total inequality of inequality in the *need* for health care (term II in equation (4)):

$$(5) \quad IH = IC_m - \hat{a}_k (b_k^m \bar{h}_k / \bar{m}) IC_{h_k}$$

<sup>2</sup> Equation (4) helps appreciate why the analysis of inequality based on concentration indices provides further insight than the analysis based purely on regressions. While the latter focuses only on the elasticity of access to health care with respect to income, the former can explain, in addition, the incidence of the socioeconomic concentration of each explanatory variable on the socioeconomic inequality of access to care.

For each studied city, we estimated total socioeconomic inequality in access to health care, the contributions of inequality in income, need and non-need factors to total inequality, and horizontal inequity in a series of indicators of access to health care. We considered three types of indicators of access: (i) visits and hospitalizations (any medical visits in the past 4 and 12 months and any hospitalization), (ii) quality of the last visit (waiting time between booking and appointment, time travelling to the appointment, waiting time at the office, whether examinations had been requested, and whether medication was prescribed), and (iii) use of preventive care (prostate exam, pap scan test, breast examination, and mammogram). We assessed, for each city, which factors had the greatest incidence in explaining inequality in access to health care, and compared inequity across cities. In order to assess the statistical significance of the estimated values, we estimated standard errors for the concentration indices and its contributors using bootstrapping techniques.<sup>3</sup>

## 5. RESULTS

Tables 3-6 report healthcare concentration indices, contributions of needs, income, behavioral health, and health insurance to socioeconomic inequality, and measures of horizontal inequity for Buenos Aires, Sao Paulo, Santiago and Montevideo, respectively.

As seen in Table 3, Buenos Aires (Argentina) did not show any inequality or inequity in access to medical visits or hospitalizations. There was evidence of an unequal distribution of needs for visits and hospitalizations concentrated among those with lower socioeconomic status, although this inequality in health status did not translate into statistically significant inequities in actual visits or hospital stays. There was also little evidence of inequalities and inequities in the quality of the last visit. Only waiting time in the office showed inequity favoring the rich (those with higher socioeconomic status waited less in the doctor's office),

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<sup>3</sup> Standard errors were constructed based on 400 replications (StataCorp, 2006).

with an index of 0.088. On the other hand, results revealed strong inequality and inequity favoring the better off in the measures of use of preventive care. Indices of inequality in prostate exams, pap tests, and breast exams were between 0.11 and 0.12, and the concentration index for mammograms equaled 0.19. Inequality in preventive care was explained mainly by pro rich inequalities in income (which accounted for more than 60% of overall concentration) and by pro rich inequalities in health insurance (which explained about 30% of inequalities in preventive care). Horizontal inequity was of 0.12 in the case of prostate exams, 0.11 in the case of pap tests, 0.17 for mammograms, and 0.10 for breast exams. All residuals showed negative signs, suggesting a failure to capture unobserved needs for care (usually pro poor) and potentially higher inequity in preventive care.

Table 4 shows concentration indices, contributions to inequality, and measures of horizontal inequity for Sao Paulo (Brazil). In this city, needs for medical visits and hospitalizations were unequally distributed in favor of the poorest and health insurance contributed positively to inequalities in access to MD visits. However, there was no statistically significant evidence (at  $p < 0.05$ ) of horizontal inequity in these measures of utilization. At  $p < 0.10$ , there was evidence of pro rich horizontal inequities in hospitalizations (with an index equaling 0.14). Unlike Buenos Aires, Sao Paulo showed pro rich inequalities and inequities in most indicators of the quality of a visit. Horizontal inequity in the time to get an appointment attained a value of 0.047, mostly due to the contribution of income inequality. Requests of examinations showed an index of horizontal inequity of 0.059, and waiting time in the office evidenced the highest pro rich inequity, with an index of 0.10. The pro rich inequities in these two cases were mostly due to the unequal socioeconomic distribution of health insurance and to the concentration of income. The strongest magnitudes of horizontal inequity were found for measures of preventive care. The inequity index for prostate exams equaled 0.13; it attained a value of 0.08 for pap tests; it was 0.13 in the case of

mammograms; and 0.10 for breast exams. The pro rich distribution of health insurance was the main contributor to the observed inequities.

Santiago de Chile (Table 5) showed horizontal inequity favoring the rich in access to medical visits in the past 4 months (the inequity index equaled 0.05) and horizontal inequity favoring the poor (at  $p < 0.10$ ) in the case of hospitalizations. Income inequality was the main contributor to these values. In the case of medical visits, those with higher income were more likely to have a visit, and income inequality contributed positively to horizontal inequity in MD visits. Regarding hospitalizations, those with lower income were more likely to be hospitalized, and income inequality contributed negatively to total inequality in hospitalizations (with a pro poor concentration). Again, a failure to adequately control for morbidity or healthcare needs could be explaining the negative sign on hospitalizations. The big magnitude and sign of the residual in the analysis of hospitalizations is suggestive of underlying unobserved need factors associated both with income and hospitalizations. Informal evidence for these countries suggests that poor patients are, all else equal, more likely to be hospitalized because they are less likely to have adequate conditions for care and recovery at home. If such is the case, and this need is not captured in the observed indicators, the income contribution will reflect part of the effect. In terms of the quality of visits, Santiago showed pro rich horizontal inequity in the likelihood of getting an appointment in less than a week (0.06), and in the likelihood of waiting in the office for less than 30 minutes (0.09). In both cases, the concentration of income was the main contributor to these inequities. Regarding preventive care, Santiago showed pro rich horizontal inequities in access to prostate exams (0.12) and in access to mammograms. Income inequalities explained most of the concentration in the former service, whereas inequity in mammograms was due to the pro rich contribution of income and health insurance, and to the unequal concentration of needs for the exam among the poor.

Table 6 presents findings for Montevideo (Uruguay). MD visits were unequally distributed in favor of the rich in this city, with a horizontal inequity index of 0.041 for visits in the past 12 months and 0.036 for visits in the past 4 months. In both cases, inequity was explained by a higher concentration of health needs among the poor and a higher concentration of income among the rich. Interestingly, two measures of the quality of visits showed horizontal inequities in favor of the poor. After adjusting for needs, those with lower socioeconomic status were more likely to get appointments in less than a week (horizontal inequity equaled -0.038) and more likely to be prescribed medication (the level of inequity was of -0.034). In the first case, most of the observed inequity stemmed from a negative contribution of income inequality, whereas in the second, it was mostly explained by the negative contribution of health insurance. It is quite possible that these negative indices reflect, again, unobserved determinants related to need for health care. Low income individuals with a poor healthcare coverage are more likely to delay care and to make a consultation at the emergency. Some of the reported "visits" may have occurred at the emergency room explaining why it took less time for poor people to see a medical doctor. Furthermore, if lower income individuals are more likely to delay care, they may be more severe once they show up at the clinic. This would explain why poor individuals are more likely to be prescribed medication at the medical visit. As in the other cities, the highest pro rich horizontal inequities in Montevideo were observed for preventive services. The index of horizontal inequity for prostate exams attained a value of 0.21; it was 0.17 for pap tests; 0.13 for mammograms; and 0.05 for breast exams. The main determinant of these inequities was the concentration of income.

Table 7 summarizes, for ease of comparison, horizontal inequities in all measures of access for the four cities analyzed. Only Santiago and Montevideo presented inequities in medical visits favoring those with higher status. Findings for Sao Paulo showed some

evidence (statistically significant at  $p < 0.10$ ) of pro rich inequities in hospitalizations, whereas in Santiago there was evidence of pro poor inequities in hospital stays. In terms of quality indicators, results for Sao Paulo and Santiago revealed pro rich inequities in the time required to get an appointment; and all cities but Montevideo presented pro rich inequities in the time waiting at the office (horizontal inequities ranging between 0.09 and 0.10 in all three cities). Sao Paulo also showed inequities in favor of the better off in examinations requested, whereas Montevideo presented pro poor inequities in the time to get an appointment and medication prescribed. The strongest commonality across the cities was in access to preventive care. All cities showed strong and statistically significant pro rich inequities in access to prostate exams and mammograms, and almost all locations except Santiago evidenced, in addition, inequities in pap smears and breast exams. The highest level of inequity was observed in Montevideo for prostate exams, with a horizontal inequity index of 0.21, versus approximately 0.12 in the other cities. Montevideo depicted also the highest inequities in pap smears (0.17 versus 0.11 in Buenos Aires and 0.08 in Sao Paulo). Inequities in breast examinations, on the other hand, were higher in Buenos Aires and San Pablo with an index of 0.10.

A question of interest is whether policy makers in these countries are trading off increases in inequality against improvements in the mean of the distribution. We did not find evidence of a trade off between the levels of access to services and the income concentration of these services. On the contrary, those cities scoring low in terms of levels of access or quality, presented in many cases the strongest inequities in those measures. Santiago depicted the lowest levels of access to MD visits and also the highest inequity. Similarly, Sao Paulo showed the highest rate of patients having to wait more than a week to get an appointment, and one of the highest concentrations in this measure (after Santiago). The likelihood of waiting more than 30 minutes at the doctor's office or clinic was also higher in both Santiago

and Sao Paulo (compared to Buenos Aires and Montevideo), and both cities showed strong horizontal inequities in this indicator of quality. Montevideo, on the other hand, scored well both on the level and equity dimensions of the quality of visit indicators (time between booking and appointment, transportation time, and waiting time at the clinic or office). On the other hand, Montevideo showed the lowest levels of access to pap tests, a low level of access to prostate exams, and the highest inequities in these measures. Only for Santiago, there was some evidence of a trade off between levels of access to preventive services and inequality in these services. Santiago showed the lowest rates of access to most preventive services but the lowest levels of inequities in access to these services when compared to the other cities.

## 6. CONCLUSIONS

In this paper we computed, decomposed, and compared concentration indices in access to health care by the elderly in four South American major cities: Buenos Aires, Santiago, Sao Paulo, and Montevideo. We found horizontal inequities in MD visits in Montevideo and Santiago, but not in Sao Paulo or Buenos Aires. Results also showed that rationing mechanisms (such as waiting days for an appointment, or waiting time at the office) affected primarily those with lower socioeconomic status in all cities but Montevideo. Finally, access to preventive services was distributed inequitably in all cities and achieved the highest inequity magnitudes.

Counter to our expectations, we did not find evidence of a trade off between levels of access to services and horizontal inequities. On the contrary, in most cases, the cities with the highest inequities presented also the lowest levels of access.

The decomposition of inequalities in access to health care suggests that inequities in these South American cities are not always related to the fragmentation of health insurance. While inequities in Sao Paulo stemmed primarily from differences in access between the

privately and publicly insured, in the other cities income inequality was the main contributor to inequity in access, after adjusting for the type of health insurance. This lack of significance of health insurance when it came to explaining inequities was expected in the case of Chile, where most of the elderly are covered by public insurance. But the finding was quite surprising in the case of Uruguay, with a heavily fragmented system and important resource differences between the private and public sectors. In Argentina, health insurance contributed to explain inequities in waiting times and preventive services, but its contribution was much smaller than that of income inequality.

In sum, we found, for all cities but Sao Paulo, that inequities within each health system (public or private) were more important than between systems. Within the private insurance system, disparities in use and quality of access may be explained by the existence of differential premiums, out of pocket charges, or copayments that operate as barriers to care. For example, in Uruguay, copayments in the private system have operated as a strong barrier to care among elderly adults, explaining part of the inequities in access to healthcare (Balsa *et al.*, 2009). Among beneficiaries of public systems, on the other hand, where financial charges are less of an issue, higher socioeconomic status may be associated with a better ability to "navigate" the system (finding ways to avoid queues and delays in access) or with better information on how to use services. In this sense, we believe that the strong inequities detected in access to preventive services for all cities are less likely to be the result of out of pocket costs or copayments (which operate mainly at the private level), than of information and educational gaps between individuals of different socioeconomic status.

Beyond health insurance and income inequality, the unequal distribution of need for health care was another reason for the observed inequities in medical visits in Montevideo and Santiago. Brazil and Argentina also evidenced pro-poor distributions in the need for hospital stays.

There are some limitations to the analysis. The decomposition of inequality did not consider the potential endogeneity between access to health care, and explanatory variables such as need for health care, health insurance, and income. First, access to health care and need for health care may be endogenously determined because they were measured simultaneously in the survey. Because using health services improves health, reported health status may depend on the use of health services. Moreover, some conditions are more likely to be detected when the respondent has been in contact with the healthcare system. Second, failure to include all relevant measures of need could also result in biases if these unobserved measures were correlated with other explanatory variables such as income or health insurance. In fact, we suspect that some of the negative concentration indices identified could well reflect the omission of need variables in the regression. Third, health insurance is usually not exogenous to (observed and unobserved) measures of health status: individuals with more severe health conditions are likely to select into more comprehensive insurances and are likely to use services differently. Finally, the simultaneity between income and health introduces another source of endogeneity. It is unclear whether health (and health care) are determined by income or if good health (due in part to access to health care) is the cause for a satisfactory socioeconomic status. Unfortunately, we cannot address these issues with the data available. Some studies for Europe and the US have been able to overcome some of these problems by using longitudinal data, but this type of data is not easily available in less developed countries, and less so when the aim is to compare measures across countries. We tried to raise attention to potential problems of omitted variables when describing results. However, no causality should be interpreted from our findings.

Another limitation of the study is the lack of reliable information about household income in SABE. By imputing income from parallel household surveys we captured several dimensions of socioeconomic status in a single unit (education, occupation, household

durable goods, sources of income). But because the imputed income measure was linearly dependent to these variables, we were not able to distinguish which elements associated with socioeconomic status (such as education or occupation) were more important when it came to explaining the observed inequities.

An additional limiting aspect has to do with the difference between access and utilization. While equity in access is the ultimate goal, most studies analyze equity in the use of services, which is easier to assess. Equal access to health care, however, does not necessarily imply equal use of services. Different physicians' prescription practices and differences in cultural habits or preferences may lead to different levels of utilization (Urbano and Meneu, 2008). These differences may justify some of the differences in use not accounted by differential health needs.

Finally, in the past years some of the countries under analysis underwent important changes in their health systems. In Chile, the plan AUGE was introduced to guarantee minimum levels of care to beneficiaries of public and private insurance. Since 2005, health authorities began to explicitly list the package of preventive and curative health services that beneficiaries of all health insurances were entitled to. In addition, the new regulation established maximum time frames for the provision of services, required providers to get accreditation in order to ensure standards of quality, and limited copayments in the ISAPRES and FONASA C and D to 20% of a nominal value of the service. In Uruguay, the government took in 2008 the first steps towards the conformation of a universal social health insurance system (the "Sistema Nacional Integrado de Salud" or National Health Insurance System), aimed at providing equal access to and quality of health care to all the population. The government is gradually incorporating new groups to the scheme. The first groups to be entitled to the new coverage (in addition to formal workers already contributing to social security) were dependents of formal workers under the age of 18 and low-income retirees. In

Argentina, the 2004–2007 Federal Health Plan was designed to strengthen primary care and started by allocating more funds toward promotion and prevention activities. The Plan considers the gradual, systematic, and organized decentralization of these activities and plans for local governments to take on the implementation of this strategy by developing healthy policies, providing information, and modeling conduct. Brazil, on its part, has continued consolidating its unique universal and decentralized public health system, based on the conception of health as a right of all citizens. Because many of these reforms pursued equity objectives, it is quite possible that the inequities identified in this paper were smoothed in the recent years.

Despite these limitations, this paper is one of a few studies to use concentration indices and decomposition methods to quantify and explain socioeconomic inequalities and inequities in South America. Our findings provide insights into how South American health systems and income inequalities interact in the determination of healthcare inequities. Because most of the reform processes are still ongoing, our findings can shed light on the types of services and sources of inequities that need more serious attention.

While finding comparable data across Latin American countries is a hard task, explicit efforts should be made to collect health data that allows for comparisons across countries in this region. Future studies using a similar methodology with post-reform data would shed light on the impact of the current reforms in terms of inequity, quality of access, and use of healthcare services.

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Table 1: Socioeconomic and demographic indicators by country

	<i>Argentina</i>	<i>Brazil</i>	<i>Chile</i>	<i>Uruguay</i>
<b>Demographic and Socioeconomic Indicators, year 2000</b>				
Population 60 years or older (%)	13	9	17	17
Population growth (annual %)	1.1	1.5	1.2	0.4
Population in urban areas (%)	89	81	86	91
Average years of education (population 35 years old)	9.5	5	9	8.7
GDP per capita (current dollars)	7701.9	3701.8	4880.6	6263.6
Economic urban inequality (Gini index)	0.48	0.59	0.56	0.44
<b>Health and Health Expenditures, year 2000</b>				
Life expectancy at birth, total (years)	74	70	77	75
Per capita total expenditure on health	689	267	302	635
Gov't expend on health as % total expend on health	55.4	40	48.7	33.4
Total expenditure on health as % GDP	8.9	7.2	6.2	10.5

Source: World Development Indicators, World Bank; WHOSIS, World Health Organization

Table 2: Mean Comparisons

	<i>Buenos Aires, Argentina</i>	<i>Sao Paulo, Brazil</i>	<i>Santiago, Chile</i>	<i>Monte- video Uruguay</i>
<b><i>Indicators of Access to Health Care</i></b>				
<b><i>MD Visits and Hospitalizations</i></b>				
MD visit past 12 months	0.825	0.843	0.738	0.760
MD visit past 4 months	0.699	0.774	0.536	0.713
Hospitalized past 4 months	0.055	0.062	0.044	0.061
<b><i>Quality of Care (last appointment)</i></b>				
Time to get appointment < 7 days	0.673	0.590	0.664	0.827
Time travelling to appointment < 30 min	0.678	0.536	0.577	0.803
Waiting time in office <30 min	0.504	0.413	0.394	0.740
Examinations requested	0.569	0.648	0.500	0.474
Medications prescribed	0.592	0.632	0.747	0.637
<b><i>Use of Preventive Care (past 2 years)</i></b>				
Prostate exam	0.376	0.399	0.306	0.334
Pap test	0.344	0.381	0.308	0.249
Mammogram	0.295	0.347	0.209	0.286
Breast exam	0.446	0.453	0.411	0.459
<b><i>Need variables (Measures of Health Status)</i></b>				
Age	70.766	73.276	71.573	70.956
Male	0.369	0.411	0.343	0.366
Self perceived health: excellent or very good	0.218	0.106	0.062	0.178
Self perceived health: good	0.444	0.342	0.293	0.454
Self perceived health: fair or poor	0.339	0.552	0.645	0.368
Body Mass Index	N/A	26.342	27.861	28.156
Lost weight past 12 mths	0.201	0.279	0.337	0.204
Hypertension	0.493	0.542	0.528	0.450
Diabetes	0.126	0.179	0.135	0.131
Lung disease	0.085	0.126	0.128	0.092
Heart disease	0.202	0.214	0.339	0.232
Stroke	0.047	0.080	0.069	0.040
Arthritis	0.530	0.334	0.319	0.469
Osteoporosis	0.296	0.318	0.354	0.289
Mental health problems	0.121	0.144	0.256	0.161
Basic activities of daily life	0.833	0.785	0.765	0.857
<b><i>Non-need variables</i></b>				
Does not consume fruit and vegetables daily	0.124	0.157	0.128	0.162
Risky alcohol use	0.087	0.035	0.062	0.079
Sedentary life	0.867	0.773	0.791	0.836
Smokes	0.135	0.136	0.122	0.148
Former smoker	0.288	0.326	0.326	0.283
Public health insurance	0.212	0.623	0.840	0.335
Social security health insurance	0.512	n/a	n/a	n/a
Private health insurance	0.104	0.351	0.049	0.667
No health insurance	0.172	0.025	0.112	0.020
<b><i>Income</i></b>				
Imputed household income (in 2000 US\$)	765	1203	1022	1310
# persons in household	2.6	3.0	3.8	2.9
Imputed equivalent income (in 2000 US\$)	485	736	469	813
<i>N</i>	1039	2143	1301	1444

Table 3: Decomposition of Socioeconomic Inequality in Access to Health Care, Buenos Aires (Argentina)

	<i>Inequality in Access to Health Care</i>	<i>Contribution to Inequality in Access to Health Care...</i>					<i>Horizontal Inequity (1)-(2)</i>
		<i>Contribution health needs</i>	<i>Contribution behavioral health</i>	<i>Contribution health insurance</i>	<i>Contribution income</i>	<i>Residual</i>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>MD Visits and Hospitalizations</i>							
MD visit past 12 months	0.000 (0.008)	-0.008** (0.003)	-0.001 (0.002)	0.015** (0.006)	0.001 (0.006)	-0.008	0.007 (0.008)
MD visit past 4 months	0.021 (0.014)	-0.008 (0.007)	-0.002 (0.004)	0.007 (0.007)	0.030 (0.015)	-0.007	0.028 (0.015)
Hospitalized past 4 months	-0.005 (0.083)	-0.098** (0.037)	-0.006 (0.013)	-0.001 (0.197)	0.019 (0.037)	0.081	0.093 (0.096)
<i>Quality of Care (last visit)</i>							
Time to get appointment <7 days	0.012 (0.017)	0.001 (0.008)	-0.002 (0.005)	0.014 (0.01)	0.002 (0.016)	-0.004	0.011 (0.019)
Time travelling to appointment <30 min	-0.027 (0.017)	0.002 (0.008)	0.005 (0.005)	-0.008 (0.009)	-0.008 (0.018)	-0.018	-0.029 (0.018)
Waiting time in office <30 min	0.086** (0.024)	-0.002 (0.014)	-0.002 (0.008)	0.051** (0.012)	0.039 (0.027)	0.000	0.088** (0.026)
Examinations requested	-0.019 (0.02)	-0.009 (0.011)	-0.006 (0.007)	-0.016 (0.011)	0.008 (0.023)	0.004	-0.01 (0.022)
Medication prescribed	-0.004 (0.021)	-0.007 (0.01)	-0.005 (0.007)	0.001 (0.012)	-0.013 (0.023)	0.021	0.003 (0.023)
<i>Use of Preventive Care (past 2 yrs)</i>							
Prostate exam	0.113** (0.035)	-0.009 (0.021)	0.009 (0.011)	0.043** (0.017)	0.082* (0.038)	-0.013	0.122** (0.038)
Pap test	0.119** (0.029)	0.011 (0.017)	0.01 (0.011)	0.039** (0.014)	0.068 (0.037)	-0.010	0.108** (0.029)
Mammogram	0.188** (0.032)	0.015 (0.018)	0.007 (0.012)	0.045** (0.014)	0.157** (0.048)	-0.035	0.174** (0.033)
Breast exam	0.108** (0.023)	0.011 (0.014)	0.006 (0.009)	0.035** (0.012)	0.092** (0.036)	-0.036	0.097** (0.024)

Bootstrapped standard errors in parentheses. \* Statistically significant at  $p < 0.05$ ; \*\* statistically significant at  $p < 0.01$ . Data: SABE 1999/2000, Buenos Aires.

Table 4: Decomposition of Socioeconomic Inequality in Access to Health Care, Sao Paulo (Brazil)

	<i>Inequality in Access to Health Care</i>	<i>Contribution to Inequality in Access to Health Care...</i>					<i>Residual</i>	<i>Horizontal inequality (1)-(2)</i>
		<i>Contribution health needs</i>	<i>Contribution behavioral health</i>	<i>Contribution health insurance</i>	<i>Contribution income</i>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
<i>MD Visits and Hospitalizations</i>								
MD visit past 12 months	0.003 (0.007)	-0.008** (0.003)	-0.001 (0.001)	0.011** (0.003)	-0.004 (0.004)	0.005	0.011 (0.007)	
MD visit past 4 months	-0.008 (0.009)	-0.007* (0.003)	0.002 (0.003)	0.010* (0.005)	-0.005 (0.007)	-0.008	0.000 (0.009)	
Hospitalized past 4 months	0.077 (0.071)	-0.061** (0.022)	0.002 (0.01)	0.001 (0.007)	0.045 (0.035)	0.090	0.138 (0.071)	
<i>Quality of Care (last visit)</i>								
Time to get appointment <7 days	0.056** (0.017)	0.009 (0.007)	-0.007 (0.005)	0.013 (0.009)	0.049** (0.015)	-0.008	0.047** (0.016)	
Time travelling to appointment <30 min	-0.009 (0.018)	0.004 (0.007)	-0.003 (0.005)	-0.025* (0.011)	0.006 (0.015)	0.008	-0.014 (0.018)	
Waiting time in office <30 min	0.111** (0.024)	0.009 (0.01)	0.001 (0.006)	0.066** (0.014)	0.045* (0.021)	-0.008	0.103** (0.025)	
Examinations requested	0.058** (0.013)	-0.001 (0.005)	0.003 (0.004)	0.024** (0.008)	0.033* (0.016)	0.000	0.059** (0.013)	
Medication prescribed	-0.012 (0.015)	-0.01 (0.005)	-0.004 (0.004)	-0.002 (0.008)	0.003 (0.013)	0.000	-0.002 (0.015)	
<i>Use of Preventive care (past 2 yrs)</i>								
Prostate exam	0.142** (0.029)	0.012 (0.014)	0.018 (0.01)	0.058** (0.016)	0.013 (0.026)	0.041	0.130** (0.028)	
Pap test	0.088** (0.021)	0.006 (0.009)	0.011 (0.006)	0.043** (0.013)	0.005 (0.02)	0.023	0.082** (0.02)	
Mammogram	0.127** (0.025)	-0.001 (0.009)	0.011 (0.007)	0.062** (0.016)	0.033 (0.032)	0.021	0.128** (0.024)	
Breast exam	0.100** (0.019)	0.004 (0.008)	0.009 (0.006)	0.053** (0.012)	0.019 (0.025)	0.015	0.095** (0.019)	

Bootstrapped standard errors in parentheses. \* Statistically significant at p<0.05; \*\* statistically significant at p<0.01. Data: SABE 1999/2000, Sao Paulo.

Table 5: Decomposition of Socioeconomic Inequality in Access to Health Care, Santiago (Chile)

	<i>Inequality in Access to Health Care</i>	<i>Contribution to Inequality in Access to Health Care...</i>					<i>Residual</i>	<i>Horizontal inequity (1)-(2)</i>
		<i>Contribution health needs</i>	<i>Contribution behavioral health</i>	<i>Contribution health insurance</i>	<i>Contribution income</i>			
□	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
<i>MD Visits and Hospitalizations</i>								
MD visit past 12 months	0.003 (0.009)	-0.014** (0.005)	0.002 (0.002)	0.003 (0.003)	0.019* (0.009)	-0.007	0.017 (0.01)	
MD visit past 4 months	0.043** (0.015)	-0.004 (0.006)	0.001 (0.003)	-0.004 (0.005)	0.036* (0.015)	0.014	0.047** (0.016)	
Hospitalized past 4 months	-0.164* (0.069)	0.126 (0.128)	0.001 (0.004)	0.009 (0.068)	-0.055* (0.025)	-0.246	-0.290 (0.161)	
<i>Quality of Care (last visit)</i>								
Time to get appointment <7 days	0.060** (0.018)	0.001 (0.008)	-0.001 (0.003)	0.003 (0.007)	0.056** (0.021)	0.002	0.059** (0.019)	
Time travelling to appointment <30 min	-0.026 (0.019)	0.011 (0.008)	0.000 (0.003)	-0.003 (0.006)	-0.027 (0.019)	-0.007	-0.036 (0.019)	
Waiting time in office <30 min	0.098** (0.028)	0.012 (0.014)	-0.001 (0.005)	0.005 (0.010)	0.089** (0.028)	-0.007	0.086** (0.029)	
Examinations requested	-0.020 (0.022)	0.002 (0.009)	-0.005 (0.003)	0.000 (0.006)	-0.002 (0.022)	-0.016	-0.022 (0.022)	
Medication prescribed	0.021 (0.012)	-0.001 (0.005)	0.001 (0.002)	-0.007 (0.005)	0.030* (0.013)	-0.001	0.022 (0.012)	
<i>Use of Preventive Care (past 2 yrs)</i>								
Prostate exam	0.108** (0.037)	-0.009 (0.025)	0.003 (0.009)	0.013 (0.012)	0.118** (0.046)	-0.018	0.117** (0.041)	
Pap test	0.018 (0.028)	-0.021 (0.014)	0.004 (0.007)	0.001 (0.009)	0.053 (0.031)	-0.018	0.039 (0.028)	
Mammogram	0.053 (0.036)	-0.044** (0.016)	0.003 (0.006)	0.029** (0.011)	0.089** (0.031)	-0.024	0.097** (0.035)	
Breast exam	-0.001 (0.021)	-0.014 (0.009)	0.006 (0.006)	0.021** (0.008)	-0.002 (0.024)	-0.012	0.013 (0.022)	

Bootstrapped standard errors in parentheses. \* Statistically significant at  $p < 0.05$ ; \*\* statistically significant at  $p < 0.01$ . Data: SABE 1999/2000, Santiago.

Table 6: Decomposition of Socioeconomic Inequality in Access to Health Care, Montevideo (Uruguay)

	<i>Inequality in Access to Health Care</i>	<i>Contribution to Inequality in Access to Health Care...</i>					<i>Residual</i>	<i>Horizontal inequality (1)-(2)</i>
		<i>Contribution health needs</i>	<i>Contribution behavioral health</i>	<i>Contribution health insurance</i>	<i>Contribution income</i>			
□	(1)	(2)	(3)	(1)	(2)	(3)	(1)	
<i>MD Visits and Hospitalizations</i>								
MD visit past 12 months	0.025** (0.009)	-0.016** (0.004)	0.006* (0.003)	0.005 (0.006)	0.029** (0.009)	0.001	0.041** (0.009)	
MD visit past 4 months	0.016 (0.013)	-0.020** (0.006)	0.005 (0.004)	0.004 (0.007)	0.020 (0.012)	0.007	0.036** (0.013)	
Hospitalized past 4 months	-0.024 (0.073)	-0.021 (0.025)	-0.015 (0.015)	0.051 (0.032)	-0.094 (0.055)	0.054	-0.003 (0.074)	
<i>Quality of Care (last visit)</i>								
Time to get appointment <7 days	-0.028** (0.007)	0.01** (0.003)	-0.002 (0.002)	0.003 (0.004)	-0.017** (0.005)	-0.021	-0.038** (0.007)	
Time travelling to appointment <30 min	0.006 (0.008)	0.013** (0.004)	-0.003 (0.002)	0.000 (0.005)	0.003 (0.007)	-0.007	-0.007 (0.008)	
Waiting time in office <30 min	0.024** (0.009)	0.012** (0.005)	-0.007** (0.003)	0.007 (0.006)	0.01 (0.009)	0.002	0.013 (0.009)	
Examinations requested	-0.032 (0.023)	-0.033** (0.013)	0.01 (0.007)	0.018 (0.014)	-0.004 (0.022)	-0.022	0.002 (0.025)	
Medication prescribed	-0.044** (0.015)	-0.01 (0.009)	-0.002 (0.005)	-0.025** (0.010)	-0.002 (0.013)	-0.005	-0.034* (0.016)	
<i>Use of Preventive Services (past 2 yrs)</i>								
Prostate exam	0.186** (0.035)	-0.021 (0.018)	0.003 (0.016)	0.066** (0.022)	0.099** (0.034)	0.040	0.207** (0.035)	
Pap test	0.138** (0.039)	-0.028 (0.017)	0.011 (0.01)	0.021 (0.023)	0.149** (0.035)	-0.014	0.166** (0.04)	
Mammogram	0.091** (0.037)	-0.036* (0.017)	0.013 (0.01)	-0.003 (0.024)	0.122** (0.032)	-0.005	0.127** (0.034)	
Breast exam	0.038 (0.024)	-0.009 (0.012)	0.008 (0.006)	-0.007 (0.015)	0.045* (0.021)	0.000	0.047* (0.023)	

Bootstrapped standard errors in parentheses. \* Statistically significant at p<0.05; \*\* statistically significant at p<0.01. Data: SABE 1999/2000, Montevideo.

Table 7: International Comparison of Socioeconomic Inequities in Access to Health Care

	<i>Buenos Aires, Argentina</i> (1)	<i>Sao Paulo, Brazil</i> (2)	<i>Santiago, Chile</i> (3)	<i>Montevideo, Uruguay</i> (4)
<u>MD Visits and Hospitalizations</u>				
MD visit past 12 months	0.007 (0.008)	0.011 (0.007)	0.017 (0.010)	0.041** (0.009)
MD visit past 4 months	0.028 (0.015)	0.000 (0.009)	0.047** (0.016)	0.036** (0.013)
Hospitalized past 4 months	0.093 (0.096)	0.138 (0.071)	-0.290 (0.161)	-0.003 (0.074)
<u>Quality of Care (last visit)</u>				
Time to get appointment <7 days	0.011 (0.019)	0.047** (0.016)	0.059** (0.019)	-0.038** (0.007)
Time travelling to appointment <30 min	-0.029 (0.018)	-0.014 (0.018)	-0.036 (0.019)	-0.007 (0.008)
Waiting time in office <30 min	0.088** (0.026)	0.103** (0.025)	0.086** (0.029)	0.013 (0.009)
Examinations requested	-0.010 (0.022)	0.059** (0.013)	-0.022 (0.022)	0.002 (0.025)
Medication prescribed	0.003 (0.023)	-0.002 (0.015)	0.022 (0.012)	-0.034* (0.016)
<u>Use of Preventive Services (past 2 yrs)</u>				
Prostate exam	0.122** (0.038)	0.130** (0.028)	0.117** (0.041)	0.207** (0.035)
Pap test	0.108** (0.029)	0.082** (0.020)	0.039 (0.028)	0.166** (0.040)
Mammogram	0.174** (0.033)	0.128** (0.024)	0.097** (0.035)	0.127** (0.034)
Breast exam	0.097** (0.024)	0.095** (0.019)	0.013 (0.022)	0.047* (0.023)

Bootstrapped standard errors in parentheses. Data: SABE 1999/2000.

\* Statistically significant at  $p < 0.05$ ; \*\* statistically significant at  $p < 0.01$ .