Inequality in Health Care Utilization in Mexico

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Inter-American Conference on Social Security

Working Paper #2002-12
November 2002

Center of Border Economic Studies
The University of Texas-Pan American

I. Introduction

Inequality in health care utilization has become an important area of inquiry in economic development given the well-known connection between health, productivity and economic growth (Savedoff and Schultz, 2000; Strauss and Thomas, 1998). Although health is considered by most to be a fundamental human right and it is usually subsidized, access to health care services could be unequal due to, for example, interpersonal differences in the ability to pay for services (van Doorslaer and Wagstaff, 1992), the price of time (Cauley, 1987), or knowledge of the consequences of poor health (Gerdtham, 1997). Health access inequality is perhaps even more relevant in developing countries where income inequality is more pronounced than in developed countries, and where there is relatively less access to adequate health care.

In Mexico, access to adequate health care utilization has been identified as an important issue in developing public policies toward fighting poverty. For example, Mexico's National Development Plan 2000-2006 argues that good health is a necessary condition to achieve equity in economic/social opportunities. The Plan states that in order to have a "democratic health system", it is necessary to develop a quality health care arrangement that is open to all Mexicans and that is accessible to everyone regardless of socioeconomic status (PR, 2000). This is particularly relevant in a country such as Mexico, where the level of socioeconomic inequality is very high (Lustig, 1998). Inequities in the utilization of health services would then be a measurable way of assessing the performance of public policies related to health access.

This study analyzes whether there is equity in health care utilization in Mexico. Equity in health care utilization exists whenever access to health care services is the same for everyone after taking into account interpersonal differences in needs (which are measured here using morbidity indicators). The general rule is that access to health care should be about the same for everyone regardless of socioeconomic status. Note that this definition goes beyond income-related inequality because it manifests itself not only through income but also via employment status, region of residence, size of locality of residence, educational levels, etc.

Using an unusually rich individual-level data set for Mexico (the Study on Mexican Health and Attitudes towards the Recovery Process, 2000; *Estudio sobre la salud del mexicano y las actitudes hacia el proceso de recuperación, 2000*), we estimate two-part negative binomial hurdle models to evaluate health care utilization. The first part of the model evaluates whether a person decides to utilize a given service and the second part assesses the levels/quantity of health care after the initial service is rendered. Intuitively, splitting the model into two parts makes economic sense because the first decision—initial utilization—is usually made by the individual and the second decision—the level of health care after the first utilization—is determined by the health care provider. Three types of services are analyzed: Visits to doctors/physicians, visits to specialists and days hospitalized, all within the previous year to the survey.

Our empirical results show that there is evidence of inequality in health care utilization, after controlling for need (morbidity) and family structure factors. There are income-related differences in utilization for the first visit to a physician as well as

substantial differences by region, employment status, having insurance and having financial difficulties. There is evidence of income-related access inequality when it comes to the first visit to a specialist, but this is not the case for the number of days hospitalized.

The rest of the paper is organized as follows. Section II discusses conceptual issues related to the utilization of health care services in Mexico. Section III develops a two-part hurdle model of health care utilization. Section IV presents the data and the empirical findings. Section V provides a summary of the results, their policy implications and some concluding remarks.

II. Utilization of health care services in Mexico: Conceptual issues

The health care system in Mexico is characterized by a clear differentiation between public and private services. Health care entities in the public system are financed out of general taxation, through funds allocated by central and state governments and through taxation on personal labor income (paid jointly by worker and employers) in the formal sector. For these employees, institutions such as the Mexican Institute for Social Security (IMSS), the Social Security Institute for Government Workers (ISSSTE) and Petróleos Mexicanos (PEMEX) provide health-related services, while the general public (those not covered by systems linked to employment) access services primarily through the National Health Secretariat (SSA) and IMSS-Solidarity systems, paying a small fee.

In Mexico, governmental institutions provide services for almost everyone: 52.2 percent of the population are uninsured and rely on government provided health care systems, 47.7 percent use IMSS, ISSSTE and PEMEX employment-related systems, and

only 0.1 percent of the population has private insurance (IADB, 2001). Yet, the private sector controls about 30 percent of hospital beds and employs 34 percent of all doctors. The private sector also accounts for 32 percent of all consultations with physicians.

According to the National Health Secretariat (SSA, 2002), health care in Mexico accounts for only 5.7 percent of GDP, of which 2.8 percent comes from public sources. In comparison, other Latin American countries such as Uruguay, Colombia and Costa Rica allocate 10, 9.3 and 8.7 percent of their respective GDP into health services. Average health expenditures in Latin American countries are about 6.1 percent of GDP.

The Mexican government allocates twice the resources to the population already affiliated with the social security system than to the uncovered population. At the regional level, richer Mexican states get more resources for health. Ironically, when compared to poorer states, richer states also have a relatively larger share of their population with some type of access to health care (SSA, 2002).

Barriers preventing access to health services in Mexico include income, distance to health care providers and organizational constraints (Corbacho and Schwartz, 2002; FUNSALUD, 1997). The first derive from the fact that some services may be expensive for certain income groups, workers may lose wages if absent when seeking services, or simply some individuals may lack the minimal resources necessary to access health care services. The poorer population spends on average 4.1 percent of their income on health-related goods and services, while the richer population spends about 2.7 percent. (SSA, 2002). Distance barriers arise from the geography of the health ambulatory services, given that in some areas it is necessary to travel long distances to access health

services. Access is also more difficult as this population tends to be dispersed. Finally, organizational constraints derive from either the lack of patient confidence in the providers of health care services, or from the low quality of these services. According to the National Survey of Health Satisfaction, 40 percent of the poorest population expressed their concern about the unkind behavior and low support received from health service providers, while 60 percent reported not obtaining the needed service in a timely manner (SSA, 2002). Obviously, the quality of services offered reflects on public expenditure allocation and incidence in the health sector, being the quality of services in the private sector better than that provided in free public facilities, and these in turn being better than that available to the uninsured population. In addition, there are significant inefficiencies derived from the fragmented structure of health services, such as the use of multiple public and private providers and multiple insurance programs.

Conceptually, the factors that are likely to be related to the demand for health care services in Mexico include morbidity indicators that are related to the need for services, as well as socioeconomic and family structure factors that are related to the health care utilization. Inequality is said to exist whenever there are differences in health care utilization after accounting for variations in morbidity.

Variables related to morbidity include years of age, gender, health and disability status. Socioeconomic variables include city size (small, medium, large), geographic region (northern, central and southern states, and the Mexico City metropolitan area), years of education, employment status, income categories, government/private health

insurance and health-induced financial difficulties. The number of adults and children should also be included in the Mexican case to control for family / household structure. These variables have been previously linked theoretically and empirically to health care utilization (Gerdtham, 1997; Jiménez-Martín, Lebeaga and Martínez-Granado, 2002).

III. Two-part hurdle model of health care utilization

The demand for health care can be viewed as a derived demand in the sense that these services are required to maintain or improve a certain health status. As such, health care is essentially an input in the production of health (Jiménez-Martín, Lebeaga and Martínez-Granado, 2002). *Individuals* decide whether they should initially seek services from, for example, a physician, a specialist or to visit a hospital, by evaluating the marginal benefits and costs of improving their health. On the other hand, *physicians* primarily decide whether an individual should get additional medical attention (e.g., repeat visits / appointments).

This dual process can be modeled using a two-part hurdle model for count data in order to separately identify the variables that affect these decisions (Pohlmeier and Ulrich, 1995). Conceptually, this is a more appropriate way of modeling health care utilization than only using either Poisson or negative binomial (negbin) models. Studies have shown that two-part models provide a better fit to health care utilization data than Poisson / negbin models (Gerdtham, 1997; Pohlmeier and Ulrich, 1995).

Following Mullahy (1986) and Pohlmeier and Ulrich (1995), individuals first decide whether or not to seek medical care, which can be modeled using a logit or probit model (this is the hurdle). Second, physicians decide the number of subsequent visits to

the doctor (or the number of days hospitalized), which can be modeled using either a zero-truncated Poisson or negative binomial model. A Poisson model is traditionally used to model count data, such as the number of visits to a doctor/specialist or days hospitalized, where the observed variable can only assume non-negative integer values. In this case, some individuals have no visits to the doctor or hospital and others may have one or more visits.

Let y_i be the number of physician/specialist visits (or days hospitalized) during a given time period. Under the Poisson distribution, the probability of y_i visits/days is given by

$$(1) \qquad P(Y_i = y_i \mid l_i) = \frac{e^{-l_i} l_i^{y_i}}{y_i!} \qquad y_i = 0, 1, 2 \ldots$$

where $l_i = \exp(X_i' b_i)$, X_i represents a vector of covariates and b is the associated vector of coefficients. Although the Poisson specification has been extensively used in the health care utilization literature, the negbin model is preferred because the Poisson distribution assumes that the mean and variance are equal while the negbin model allows for overdispersion and, thus, is less restrictive. The negbin model is obtained by assuming that $l_i = \exp(X_i' b_i + e_i)$, where e_i is a random error that is uncorrelated with X_i. This error term captures unobserved heterogeneity.

The negative binomial distribution is essentially a mixture of the Poisson and Gamma distributions. If l follows a Gamma distribution, then the model can be obtained by integrating over l:

(2) $$\Pr(Y_i = y_i) = \int_0^{\infty} P(Y_i = y_i \mid l_i) f(l_i) dl_i = \frac{\Gamma(v_i + y_i)}{\Gamma(y_i + 1)\Gamma(v_i)} \left(\frac{v_i}{v_i + q_i} \right)^{v_i} \left(\frac{q_i}{v_i + q_i} \right)^{y_i}$$

where Γ is the Gamma distribution. The expected value of Y_i is given by $E(Y_i) = q_i, ?_i > 0$ and the variance by $Var(Y_i) = ?_i + \frac{1}{v_i} ?_i^2$ (Cameron and Trivedi, 1998; Jiménez-Martín, Lebeaga and Martínez-Granado, 2002).

The parameters for the two-part hurdle model can be obtained by maximizing a likelihood function that has two parts. The decision to visit a physician / hospital is modeled using a probit model and the number of visits / days is estimated using a truncated-at-zero negbin model. Following Pohlmeier and Ulrich (1995), the likelihood function is given by:

(3) $$L = \prod_{i \in \Omega_0} \Pr(y_i = 0 \mid X_i' g, s_1^2) \times \prod_{i \in \Omega_1} [1 - \Pr(y_i = 0 \mid X_i' g, s_1^2)] \frac{\Pr(y_i \mid X_i' b, s_2^2)}{\Pr(y_i \geq 1 \mid X_i' b, s_2^2)}$$

where the first part represents the hurdle and the second part models utilization (i.e., probability of a positive count conditional on visiting a physician / hospital). Ω_0 and Ω_1 represent the sets of individuals with no visits / days and at least one visit / day, respectively. g is the vector of coefficients for the hurdle part, and s_1^2 and s_2^2 are the variance for the first and second parts. The log-likelihood counterpart of equation (3) has four components: the first two components are the decision to visit a physician / hospital (probit) and the last two are the number of visits (truncated negbin). The two parts do not share any parameters and, as such, they can be estimated separately (Mullahy, 1986; Pohlmeier and Ulrich, 1995).

IV. Data and empirical results

The analysis in this paper is based on microdata from the Study on Mexican Health and Attitudes towards the Recovery Process, 2000 (*Estudio sobre la salud del mexicano y las actitudes hacia el proceso de recuperación, 2000*). The Mexican Foundation for Health (FUNSALUD) conducted the survey. A nationally representative sample of 1,040 individuals over the age of 18 was selected for interviews on questions related to the Mexican health system, access to health services and the quality of health care. In addition, a host of socioeconomic indicators were collected. The sample is stratified according to the size of the locality of residence. The survey includes data on the number of visits to doctors / physicians, number of visits to specialists and number of days hospitalized, which will be the dependent variables in the two-part hurdle models.

Tables 1 to 3 report the basic descriptive statistics for the variables included in the analyses. Each table reports the means conditional on whether the person did not seek a service, used the service once, and more than once. Note in Table 1 that 39 percent of those surveyed had not visited a physician in the past year. When it comes to visits to the doctor, those who are relatively older and in poorer health are more likely to have visited doctors more than once. Those residing in northern states and those with relatively high household income are also more likely to have visited a physician more than once. Moreover, those with any type of insurance—public or private—are more likely to visit a physician not only once but also multiple times.

Table 1. Visits to doctors/physicians

	No visits		One visit		More than one visit	
Variable	**Mean**	**S. D.**	**Mean**	**S. D.**	**Mean**	**S. D.**
Age	35.634	14.542	34.554	12.263	42.023	16.096
Female	0.452	0.498	0.487	0.502	0.652	0.477
Excellent health	0.119	0.324	0.094	0.293	0.085	0.280
Good health	0.842	0.365	0.828	0.378	0.705	0.456
Fair health	0.034	0.182	0.067	0.252	0.169	0.375
Bad health	0.005	0.070	0.010	0.099	0.041	0.197
Disabled	0.012	0.111	0.014	0.116	0.073	0.261
Adults	3.977	2.616	3.370	1.762	3.616	1.938
Children	2.152	1.955	2.111	1.966	1.762	1.644
Small city	0.221	0.416	0.182	0.387	0.214	0.411
Medium city	0.557	0.497	0.570	0.497	0.569	0.496
Large city	0.221	0.416	0.248	0.433	0.216	0.412
North	0.117	0.321	0.265	0.443	0.254	0.436
Central	0.257	0.437	0.184	0.389	0.204	0.403
South	0.375	0.485	0.227	0.420	0.323	0.468
Metropolitan area	0.251	0.434	0.324	0.470	0.219	0.414
Education	7.991	4.680	8.425	4.171	8.123	5.093
Employed	0.604	0.490	0.662	0.475	0.450	0.498
Income (0-1,136 pesos)	0.362	0.481	0.286	0.454	0.297	0.457
Income (1,137-3,400 pesos)	0.335	0.473	0.373	0.485	0.294	0.456
Income (3,401-5,684 pesos)	0.166	0.373	0.185	0.389	0.218	0.413
Income (5,685-7,958 pesos)	0.065	0.247	0.109	0.312	0.085	0.279
Income (7,959-11369 pesos)	0.053	0.224	0.041	0.199	0.073	0.260
Income (11,370+ pesos)	0.019	0.136	0.006	0.079	0.032	0.177
Government insurance	0.302	0.459	0.513	0.502	0.586	0.493
Private insurance	0.041	0.199	0.075	0.264	0.112	0.315
Health-induced financial difficulties	0.263	0.441	0.414	0.494	0.352	0.478
N	412		143		501	

Table 2. Visits to specialists

	No visits		One visit		More than one visit	
Variable	**Mean**	**S. D.**	**Mean**	**S. D.**	**Mean**	**S. D.**
Age	36.980	14.882	38.462	15.268	43.486	16.086
Female	0.491	0.500	0.622	0.487	0.722	0.450
Excellent health	0.112	0.316	0.062	0.242	0.079	0.270
Good health	0.807	0.395	0.788	0.411	0.664	0.474
Fair health	0.068	0.251	0.133	0.341	0.197	0.399
Bad health	0.013	0.115	0.017	0.131	0.059	0.237
Disabled	0.022	0.147	0.042	0.202	0.121	0.328
Adults	3.858	2.403	3.314	1.813	3.490	1.692
Children	2.142	1.919	1.604	1.491	1.406	1.519
Small city	0.215	0.411	0.210	0.409	0.205	0.405
Medium city	0.564	0.496	0.568	0.497	0.556	0.498
Large city	0.221	0.415	0.222	0.417	0.240	0.428
North	0.160	0.367	0.286	0.453	0.295	0.457
Central	0.238	0.426	0.232	0.424	0.145	0.353
South	0.358	0.480	0.221	0.417	0.286	0.453
Metropolitan area	0.244	0.430	0.261	0.441	0.274	0.447
Education	7.896	4.764	9.127	4.972	8.509	4.472
Employed	0.590	0.492	0.506	0.502	0.359	0.481
Income (0-1,136 pesos)	0.348	0.477	0.285	0.453	0.223	0.418
Income (1,137-3,400 pesos)	0.330	0.471	0.307	0.463	0.308	0.463
Income (3,401-5,684 pesos)	0.183	0.387	0.187	0.391	0.225	0.419
Income (5,685-7,958 pesos)	0.074	0.262	0.059	0.236	0.134	0.341
Income (7,959-11369 pesos)	0.051	0.219	0.107	0.310	0.067	0.251
Income (11,370+ pesos)	0.015	0.120	0.056	0.230	0.042	0.202
Government insurance	0.374	0.484	0.659	0.476	0.660	0.475
Private insurance	0.054	0.226	0.130	0.338	0.142	0.350
Health-induced financial difficulties	0.312	0.463	0.298	0.459	0.375	0.485
N	751		134		171	

Table 3. Days hospitalized

	None		One day		More than one day	
Variable	**Mean**	**S. D.**	**Mean**	**S. D.**	**Mean**	**S. D.**
Age	37.439	14.836	36.228	15.374	50.089	19.260
Female	0.525	0.500	0.676	0.478	0.671	0.472
Excellent health	0.106	0.308	0.000	0.000	0.042	0.202
Good health	0.813	0.390	0.457	0.509	0.202	0.404
Fair health	0.069	0.253	0.522	0.511	0.554	0.499
Bad health	0.012	0.110	0.021	0.146	0.201	0.403
Disabled	0.021	0.142	0.160	0.375	0.409	0.494
Adults	3.769	2.296	3.529	1.729	3.482	1.980
Children	2.001	1.847	1.752	1.441	2.036	2.114
Small city	0.213	0.409	0.250	0.443	0.225	0.419
Medium city	0.565	0.496	0.664	0.483	0.488	0.502
Large city	0.222	0.416	0.087	0.288	0.287	0.454
North	0.190	0.392	0.057	0.236	0.190	0.394
Central	0.226	0.419	0.295	0.466	0.224	0.419
South	0.335	0.472	0.256	0.446	0.338	0.475
Metropolitan area	0.248	0.432	0.393	0.499	0.248	0.434
Education	8.151	4.779	8.739	4.678	6.586	4.324
Employed	0.566	0.496	0.488	0.511	0.267	0.444
Income (0-1,136 pesos)	0.324	0.468	0.447	0.508	0.392	0.490
Income (1,137-3,400 pesos)	0.324	0.468	0.311	0.473	0.358	0.481
Income (3,401-5,684 pesos)	0.190	0.392	0.155	0.370	0.145	0.353
Income (5,685-7,958 pesos)	0.080	0.271	0.000	0.000	0.068	0.252
Income (7,959-11369 pesos)	0.060	0.238	0.048	0.219	0.025	0.157
Income (11,370+ pesos)	0.022	0.148	0.039	0.198	0.013	0.113
Government insurance	0.431	0.496	0.624	0.495	0.575	0.496
Private insurance	0.071	0.256	0.039	0.198	0.124	0.331
Health-induced financial difficulties	0.311	0.463	0.453	0.509	0.460	0.501
Hospital waiting			0.361	0.491	0.264	0.443
Hospital quality index			8.016	1.165	8.466	1.304
	917		23		116	

When it comes to visits to specialists, individuals who have multiple visits to specialists are older and in poorer health, as expected. Again, there appear to be regional differences in seeking medical care from specialists in that individuals residing in the north are more likely to have visited a specialist at least once, if not more, while those in both the central and southern areas of Mexico are less likely to have done so. We also observe similar income-related patterns for those visiting specialists as for those visiting physicians with the higher relative income individuals being more likely to visit specialists more than once.

When it comes to the number of days hospitalized within the last year, women accounted for about two-thirds of those hospitalized both for one day and for more than one day. Unlike what was observed for physician/specialists visits, those with relatively high household income were less likely to have been hospitalized for more than one day. Furthermore, individuals hospitalized for more than one day had lower educational levels than those not hospitalized or hospitalized for only one day.

Tables 4-6 report the results of the two-part hurdle models (visits to doctors/physicians, visits to specialists and days hospitalized). Note that the models have a reasonable fit, as measured by the pseudo-R^2s, which range from .158 to .326 for the probit (hurdle) part and from .035 to .111 for the truncated negbin part. The pseudo-R^2s are somewhat higher for the model on hospitalization days than for doctor or specialist visits.

Table 4. Negbin hurdle model for visits to doctors/physicians

	Visited doctor (probit)	Number of visits (truncated negbin)
Variable	**Coeff.**	**Coeff.**
Age	0.008**	0.013**
	(0.004)	(0.005)
Female	0.489***	0.080
	(0.121)	(0.126)
Good health	0.169	0.104
	(0.174)	(0.165)
Fair health	0.969***	0.747**
	(0.208)	(0.319)
Bad health	1.246***	0.830**
	(0.332)	(0.394)
Disabled	0.054	0.213
	(0.205)	(0.342)
Adults	-0.055**	-0.005
	(0.026)	(0.035)
Children	0.003	-0.001
	(0.026)	(0.049)
Medium city	0.018	0.131
	(0.133)	(0.169)
Large city	-0.082	-0.058
	(0.144)	(0.231)
North	0.424**	0.331*
	(0.168)	(0.205)
Central	-0.137	0.520**
	(0.152)	(0.231)
South	-0.040	0.307*
	(0.153)	(0.174)
Education	0.006	-0.003
	(0.015)	(0.020)
Employed	0.021	-0.403***
	(0.128)	(0.150)
Income (1,137-3,400 pesos)	0.138	-0.130
	(0.136)	(0.186)
Income (3,401-5,684 pesos)	0.406**	0.175
	(0.166)	(0.195)
Income (5,685-7,958 pesos)	0.471**	0.397
	(0.232)	(0.284)
Income (7,959-11,369 pesos)	0.411	0.139

	(0.266)	(0.271)
Income (11,370+ pesos)	0.036	0.203
	(0.358)	(0.404)
Government insurance	0.607***	0.353**
	(0.116)	(0.139)
Private insurance	0.200	-0.094
	(0.223)	(0.206)
Health-induced financial difficulties	0.522***	-0.050
	(0.120)	(0.133)
Constant	-1.268***	-0.197
	(0.384)	(0.690)
N	1,056	644
Log-likelihood	-616.127	-1,377.120
Pseudo-R^2	0.158	0.047

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5. Negbin hurdle model for visits to specialists

	Visited specialist (probit)	**Number of visits (truncated negbin)**
Variable	**Coeff.**	**Coeff.**
Age	0.003	0.006
	(0.004)	(0.036)
Female	0.413***	0.479
	(0.125)	(1.304)
Good health	0.409**	-1.153
	(0.193)	(5.306)
Fair health	0.877***	-0.434
	(0.222)	(3.929)
Bad health	0.864***	0.367
	(0.305)	(2.459)
Disabled	0.317*	0.024
	(0.176)	(0.975)
Adults	-0.045	0.035
	(0.029)	(0.224)
Children	-0.090***	0.062
	(0.033)	(0.283)
Medium city	-0.150	0.227

	(0.149)	(1.176)
Large city	-0.268*	0.320
	(0.159)	(0.435)
North	0.172	0.217
	(0.166)	(0.704)
Central	-0.164	0.025
	(0.170)	(0.741)
South	-0.256	0.173
	(0.164)	(0.616)
Education	0.019	-0.028
	(0.015)	(0.110)
Employed	-0.232*	-0.021
	(0.130)	(0.232)
Income (1,137-3,400 pesos)	0.150	-0.237
	(0.146)	(0.943)
Income (3,401-5,684 pesos)	0.319*	-0.214
	(0.190)	(2.097)
Income (5,685-7,958 pesos)	0.364	0.361
	(0.249)	(1.084)
Income (7,959-11,369 pesos)	0.492*	0.018
	(0.274)	(1.221)
Income (11,370+ pesos)	0.724**	-0.683
	(0.337)	(3.438)
Government insurance	0.536***	0.322
	(0.123)	(0.289)
Private insurance	0.308	0.043
	(0.203)	(1.235)
Health-induced financial difficulties	0.209*	0.225
	(0.121)	(0.541)
Constant	-1.622***	-0.474
	(0.393)	(14.650)
N	1,056	305
Log-likelihood	-471.356	-495.964
Pseudo-R^2	0.158	0.035

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6. Negbin hurdle model for days hospitalized

	Hospitalized (probit)	Number of days hospitalized (truncated negbin)
Variable	**Coeff.**	**Coeff.**
Age	0.005	0.023***
	(0.004)	(0.008)
Female	0.191	-0.410*
	(0.121)	(0.229)
Good health	-0.054	-0.059
	(0.216)	(0.468)
Fair health	1.377***	-0.310
	(0.247)	(0.473)
Bad health	1.291***	0.661
	(0.312)	(0.581)
Disabled	0.870***	-0.049
	(0.167)	(0.280)
Adults	-0.030	0.062
	(0.030)	(0.064)
Children	0.053*	0.012
	(0.032)	(0.051)
Medium city	0.160	-1.096***
	(0.142)	(0.373)
Large city	0.186	-0.131
	(0.144)	(0.355)
North	-0.106	1.041**
	(0.174)	(0.447)
Central	0.051	-0.646**
	(0.159)	(0.320)
South	0.011	-0.224
	(0.162)	(0.277)
Education	0.053***	0.048
	(0.015)	(0.031)
Employed	-0.066	-0.323
	(0.124)	(0.249)
Income (1,137-3,400 pesos)	-0.082	0.380
	(0.147)	(0.294)
Income (3,401-5,684 pesos)	-0.073	0.374
	(0.168)	(0.318)
Income (5,685-7,958 pesos)	-0.269	0.223
	(0.202)	(0.468)

Income (7,959-11,369 pesos)	-0.335	-1.735**
	(0.252)	(0.730)
Income (11,370+ pesos)	-0.307	-0.704
	(0.392)	(0.991)
Government insurance	0.155	-0.001
	(0.123)	(0.244)
Private insurance	-0.042	0.308
	(0.182)	(0.338)
Health-induced financial difficulties	0.322***	0.094
	(0.114)	(0.209)
Hospital waiting		0.392
		(0.239)
Hospital quality index		0.131
		(0.081)
Constant	-3.118***	-0.621
	(0.427)	(1.146)
N	1,056	138
Log-likelihood	-127.221	-331.687
Pseudo-R^2	0.326	0.111

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

The first six variables reported capture need (morbidity) factors (i.e., Age, Female, Good health, Fair health, Bad health and Disabled). For the model on visits to the doctors / physicians reported in Table 4, the individual decision to seek health services and the physician decision regarding additional medical attention are both responsive to age and lower health status. As shown in Table 4, the coefficients for age, fair health and bad health are each positive and statistically significant for both the probit model of the decision to visit a doctor and the truncated negbin model of the subsequent number of visits, with the impact being the greatest for bad health. The square of age was also included to capture nonlinearities but its coefficient was statistically insignificant in all

the models. Women are also more likely to initially visit a physician than men, but there are no gender differences in the number of visits after the initial contact.

The rest of the variables capture socioeconomic and family structure factors related to health care utilization. Apparently, individuals living in the northern region are more likely to choose to visit a doctor; yet, this regional difference does not arise when we evaluate the number of visits to the doctor. Health care coverage with governmental insurance also increases both the likelihood of an individual visiting a doctor and the number of visits. Interestingly, coverage with private insurance does not appear to have an effect. Moreover, while the decision to visit a doctor is not responsive to whether an individual is employed, being employed lowers the number of subsequent visits (see the negative and statistically significant coefficient for employed in the negbin model). This is likely to be related to the fact that there is penalty—in terms of lost earnings / wages—to visiting physicians more than once (Cauley, 1987).

The coefficients in two middle-income categories are statistically significant in the probit model but are insignificant in the negbin model. Recall that the income categories capture ability to pay. Consequently, these results suggest that there is income-related inequality in health care utilization in Mexico, with those with relatively low (and high) income levels being less likely to initially visit a doctor than those with middle income levels. This finding is consistent with those of Gertham (1997) who finds that in Sweden, income is an important predictor in the initial physician visit, but it is statistically insignificant in the frequency decision.

We should point out that there is no statistical evidence of inequality in health care utilization—as measured by physician visits—when one looks at city size, education and private insurance. However, besides income-related differences in utilization, there are also slight differences by region (north), being employed, having government provided insurance and having health-induced financial difficulties.

Table 5 reports the results for the visits to specialists. This model is particularly interesting given the unequal distribution of specialists across both city size and region that characterizes Mexico. When it comes to morbidity factors, the results suggest that women, those in relatively poor health and the disabled are more likely to visit a specialist. Some socioeconomic and family structure factors are also statistically significant; namely, the number of children, residence in a large city, being employed and having government insurance. There is also some evidence of health care access inequality in terms of income and having visited a specialist. That is, those with relatively high income are more likely to have visited a specialist.

Note that none of the coefficients for the truncated negbin model are statistically significant. This result suggests that inequality in the health care utilization of specialists takes many forms, but it is only related to the initial visit and not to subsequent visits.

Table 6 reports the results for the number of days hospitalized. Besides the variables included in the previous two models, we also include the hospital waiting time and a hospital quality index to capture supply effects. Although these variables turn out to be

statistically insignificant, they are included in order to control for potential unobserved heterogeneity in the second part (negbin) portion of the model.

The morbidity indicators suggest that those in fair health and the disabled are more likely to be hospitalized. However, only two need/morbidity indicators—years of age and being female—are statistically significant in the truncated negbin portion of the number of days hospitalized. When it comes to socioeconomic and family structure factors, the number of children, education and having health-induced financial difficulties are all positively related to being hospitalized at least once. Those residing in a medium-sized city, in the northern or central regions, and those with high income levels, are relatively less likely to be hospitalized. Thus, there is no income-related inequality when it comes to being hospitalized, although there is some evidence of inequality when it comes to educational levels and having health-induced financial difficulties.

V. Concluding remarks

Adequate access to health care is as an important goal of policies seeking to combat poverty and reduce inequality. In Mexico's case, the National Development Plan 2000-2006 posits that good health is a necessary condition to achieve equity in economic/social opportunities. Equity implies that there should be quality health care that is accessible to all Mexicans regardless of interpersonal differences in socioeconomic status.

Using microdata from the Study on Mexican Health and Attitudes towards the Recovery Process, 2000, we estimate two-part negative binomial hurdle models to

analyze equity in health care utilization in Mexico. After controlling for need (morbidity) and family structure factors, we find evidence of inequality in health care utilization. When it comes to visits to doctors/physicians, we find that there are income-related differences in utilization for the first visit. There are also some differences by region, employment status, having insurance and having financial difficulties.

Those with relatively high income are also more likely to have visited specialists, but this finding only applies to the first visit. There is no income-related inequality when it comes to being hospitalized; nonetheless, there is inequality via education and having health-induced financial difficulties.

These results have important public policy implications. First, there is evidence of inequality in health care utilization in Mexico and most of it occurs in the form of initial visits to doctors/physicians and specialists. Inequality for initial visits to the doctor is mostly connected to income and insurance; as such, policies that target increases in real income or increasing insurance coverage could prove to be effective in reducing inequality in health care utilization. Improving initial access is the main policy concern here. Lastly, utilization in northern Mexico seems to be higher than in all other regions; thus, it is important that policies be structured to benefit the most disadvantaged areas if equality across regions is desired.

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