

## Coverage of the Brazilian population 18 years and older by private health plans: an analysis of data from the *World Health Survey*

Cobertura da população brasileira com 18 anos ou mais por plano de saúde privado: uma análise dos dados da *Pesquisa Mundial de Saúde*

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### Abstract

*This study analyzes data from the World Health Survey (WHS) conducted in 2003, with a sample of 5,000 individuals 18 years and older. Some 24.0% of the interviewees had private health insurance, and the main variables associated with private coverage were number of household assets, age, level of education, formal employment, living in municipalities with more than 50,000 inhabitants, and good self-rated health. The socioeconomic profiles of needs for and use of health services in the population covered by private health plans are different, confirming the findings of other studies reporting that this population segment as a whole presents better health conditions and greater use of services as compared to the population without private coverage, even after adjusting for socio-demographic variables and self-rated health. The WHS data also suggest that individuals with private health plans do not always use their insurance to pay for services, except in the case of mammograms.*

*Health Insurance; Health Services; Health Status*

### Introduction

According to the National Sample Household Survey (PNAD), in 1998 some 24.5% of the Brazilian population was covered by private health plans, and this percentage remained the same over the following five years, according to the data from 2003 <sup>1,2</sup>.

However, since regulation of the Brazilian health plan market began, a major debate has challenged the view that this market should be analyzed exclusively from the perspective of its own clientele, and especially the notion that these clients should be served by different health services providers than those organized around the Sistema Único de Saúde – SUS (Unified National Health System). In addition, it is no longer agreed that the premiums paid for health plans and health insurance come exclusively from the family budget <sup>3</sup>.

Given the diversity of plans offered by companies and the work of the Agência Nacional de Saúde Suplementar – ANS (National Supplementary Health Care Agency) to regulate this market (*Act 9,656*. Diário Oficial da União 1998; 3 jun), the analysis of the health plan/health insurance market structure is an issue which has attracted increasing attention from researchers <sup>4</sup>. The health plans originate either through the employers or direct hiring from the companies that sell them. This is an important distinction, since the population segments be-

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longing to plans through their employment tend to be younger and healthier than those covered by direct individual or family payment. In addition, health services utilization by individuals covered by so-called company plans is greater than among those who have no alternative health plans other than the coverage provided by the SUS services network<sup>5</sup>. According to insurance operators, the tendency to overuse health services has increased in both of segments covered by private health plans<sup>6</sup>.

Population-based studies have shown that health plan coverage is one of the most important factors for access to and utilization of health care services and contributes to the debate over this market's dynamics, since it allows identifying diverse population segments within this clientele, with varying degrees of capacity to access and utilize health care services<sup>7,8,9</sup>. The fact that population groups covered by health plans present healthier living habits and a health care services consumption profile characterized by more preventive procedures<sup>10</sup> is also a recurrent finding that indicates a pattern of health inequalities in Brazil, where health needs are greater in the population segments with less access to services<sup>11,12</sup>.

The exploration of alternative sampling designs, different from those used in the PNAD, can provide important backing for national population-based data policy. Thus, for example, the data from the 2003 *World Health Survey* (WHS) allow one to explore the association between health plan coverage and access to and use of services with greater accuracy, since the two types of information are provided by individuals over 18 years of age, randomly selected in the sampled households.

The aim of this study was to explore the WHS data to describe the population covered by health plans, identify factors associated with coverage, and demonstrate patterns in the use of and payment for certain procedures for which there is available information for the population segments with and without private health insurance.

## Methodology

Data from the WHS, conducted in Brazil in 2003, come from a sample of 5,000 households that answered a questionnaire originally developed by the World Health Organization under the name *World Health Survey*<sup>13</sup> and which was translated into Portuguese and adapted to the Brazilian case, especially in relation to health care services financing. The WHS sample was

selected in three stages. In the first stage, the census tracts were divided into six strata, defined according to the location (rural versus urban) and population size of the municipalities (< 50,000; 50,000-399,999; 400,000 + inhabitants) and selected with probability proportional to the respective number of households. Each sector mean income of the household was used for implicit stratification by socioeconomic level. In the second stage, the households were selected with equiprobability, according to an inverse sampling scheme in order to guarantee 20 interviews conducted per census tract. In the last stage, equiprobability was used to select one adult ( $\geq 18$  years) per household to answer the main items on the questionnaire. The sample was expanded based on selection probabilities and to allow obtaining regionalized estimates, and the expansion factors were calibrated to ensure coherency with the population totals by groups of macro-regions, income quintiles, gender, and age groups, by means of regression estimators<sup>14</sup>.

Given that the WHS data were obtained from a complex sample, their analysis was done with the SUDAAN software, which incorporates information from the sampling plan, selection stratum, and sampling weight.

The data analysis initially attempted to observe the socio-demographic characterization of the population segments with and without private health plans, using the available WHS variables: gender; age group (18-34, 35-49,  $\geq 50$  years); level of education (primary education incomplete, secondary education incomplete, secondary education complete or more); number of household assets as a proxy for socioeconomic status (refrigerator, television, sound system, telephone, cell phone, clothes washer, 1 automobile, 2 or more automobiles, microwave oven, computer, and dish washer); work market situation (employed, self-employed, housewife, unemployed, student, retired, other); and size of the municipality (< 50,000 inhabitants; 50,000-399,999; and 400,000 +). The last variable was used as a proxy for the economic structure and services organization in the place of residence, which can have an important impact on health plan coverage and use of services. Differences in the proportions of health plan coverage were also examined according to the ordinal categorization of self-rated health status (very good/good; moderate; bad/very bad). Chi-square tests for homogeneity of proportions were performed for all the variables.

Multivariate analysis of the factors related to private health plan coverage was performed through logistic regression procedures, taking

the 5.0% descriptive level of significance as the critical cutoff for rejection.

To analyze the effects of private health plan coverage on use of outpatient and inpatient health care services in the 12 months prior to the interview, we described the services utilization rate per 100 persons according to the previously mentioned socio-demographic variables and self-rated health status. Chi-square tests were performed to verify homogeneity of proportions for each variable, with stratification according to the population segments covered and not covered by health plans.

Multivariate analysis of the association between private health plan coverage and utilization of health care services was performed through logistic regression models, calculating the gross odds ratio (OR) and the odds ratios adjusted by age, gender, level of education, number of household assets, population size in the municipality of residence, and self-rated health status.

Finally, we attempted to verify the type of payment made for the last treatment ("out-of-pocket to the provider", "paid through health plan", "did not pay, i.e., SUS"), for the following health care modalities: last hospitalization in the previous 12 months, last outpatient service in the previous 12 months, last mammogram in the previous three years, last prenatal visit, and last childbirth in the previous five years. The analysis was done for each of the population segments categorized according to private health plan coverage versus non-coverage at the time of the interview.

Excluded from the analysis were 111 individuals who had health plans for public employees.

## Results

Table 1 shows the differences in private health plan coverage according to demographic, social, and economic characteristics. In general, among the population 18 years of age and older (not including those covered only by health plans for public employees, or  $n = 110$ ), some 24.0% of the individuals interviewed had private health plans, with similar proportions among males and females. In relation to difference by age group, the coverage varied significantly, from 19.9% in the 18-34-year group to 28.0% for individuals 50 years or older.

For socioeconomic status, the results showed important differences in private health plan coverage, whether by level of education, number of household assets, or position in the work

market. The sharpest gradient was in the analysis by number of household assets: coverage varied from 3.8% in the lowest category (0-3 assets) to 66.8% in the highest category (8 or more assets). There was also a sharp gradient in the categories by level of education, with private health plan coverage varying from 13.0% to 47.8%. In relation to work market position, the highest coverage was in the population subgroups consisting of employees (35.8%), students (34.8%), and retirees (29.9%). Among the unemployed, coverage was only 8.3% (Table 1).

Comparison of the proportions of private health plan coverage by population size in the municipality (Table 1) showed significant differences, with an upward trend by size of municipality, that is, the larger the population in the municipality of residence, the higher the private health plan coverage rate.

Self-rated health status also showed a significant effect: coverage was greater among individuals who perceived their own health status as good or very good, probably influenced by the higher socioeconomic status in this subgroup, also showing a gradient. Private health plan coverage among individuals who rated their health status as bad or very bad was only 12.3%, that is, 50.0% less than for the overall population (Table 1).

Table 2 shows the results of logistic regression, analyzing the factors associated with private health plan coverage. The following gross and adjusted variables showed significant effects: number of household assets, level of education, age, work situation, self-rated health, and size of municipality. The number of household assets and level of education showed a sharp gradient related directly to having health plan coverage, while the gender variable did not show a significant effect. In relation to work market situation, "retired" was the only category that did not contribute significantly, while the odds of housewives and students having health plans were lower than for employees. The categories with the lowest odds of having health insurance were the self-employed and the unemployed.

As for the size of the municipality of residence, despite a sharp upward gradient (the larger the population, the higher the health insurance coverage rate), the effect remains in the smaller municipalities. The effect of self-rated health also remained, with healthier individuals showing higher odds of having health plans (Table 2).

Analyzing the health care services utilization rates in the previous year according to health plan coverage, the utilization rates per 100 per-

Table 1

Private health plan coverage according to socio-demographic characteristics and self-rated health. Brazil, 2003.

Characteristic	Sample size (n)	Private health plan coverage (%)	p-value
<b>Gender</b>			
Female	2,652	24.4	0.6798
Male	2,236	23.9	
<b>Age groups (years)</b>			
18-34	2,028	19.9	0.0000
35-49	1,447	26.5	
≥ 50	1,412	28.0	
<b>Level of education</b>			
Primary education incomplete	2,745	13.0	0.0000
Secondary education incomplete	754	21.5	
Secondary education complete or more	1,389	47.8	
<b>Number of household assets</b>			
0-3	1,425	3.8	0.0000
4-7	2,673	23.5	
≥ 8	736	66.8	
<b>Work force situation</b>			
Employed	1,402	35.8	0.0005
Self-employed	1,093	17.1	
Housewife	914	20.8	
Unemployed	532	8.3	
Student	161	34.8	
Retired	538	29.9	
Other	246	16.7	
<b>Population, municipality of residents (number of inhabitants)</b>			
< 50,000	1,684	12.7	0.0000
50,000-399,999	1,604	24.5	
400,000 +	1,600	36.0	
<b>Self-rated health</b>			
Good or very good	2,587	29.9	0.0000
Moderate	1,840	19.1	
Bad or very bad	455	12.3	
<b>Total</b>	<b>4,887</b>	<b>24.2</b>	

sons were 67.3% for those with health plans as compared to 56.9 for those without (Table 3).

Health services utilization rates for individuals with and without health plans showed important differences in terms of the associated factors. Thus, for individuals without health plans, there were statistically significant differences in favor of women, individuals with more household assets, and worse self-rated health. Among those with health plans, no statistically

significant effect was observed for any of the socioeconomic variables, municipality of residence, or self-rated health (Table 3).

According to the data in Table 4, the results of logistic regression with health care services utilization in the previous 12 months as the dependent variable, show that for the population as a whole the effects of health plan coverage on health care services utilization were significant, even after adjusting for age, number of

Table 2

Factors associated with having private health plan coverage: results of logistic regression model. Brazil, 2003.

Variables included in model	Dependent variable: private health plan coverage			
	Gross exp (b)	p-value	Adjusted exp (b)	p-value
<b>Age</b>	1.0098	0.0001	1.0273	0.0000
<b>Number of household assets</b>	1.7413	0.0000	1.5636	0.0000
<b>Gender</b>				
Male	0.9707	0.6802	0.8468	0.0957
Female	1.0000	–	1.0000	–
<b>Level of education</b>				
Primary education incomplete	0.1627	0.0000	0.3239	0.0000
Secondary education incomplete	0.2984	0.0000	0.4900	0.0000
Secondary education complete or more	1.0000	–	1.0000	–
<b>Work force situation</b>				
Employed	1.0000	–	1.0000	–
Self-employed	0.3718	0.0000	0.3826	0.0000
Housewife	0.4724	0.0000	0.6394	0.0045
Unemployed	0.1609	0.0000	0.2373	0.0000
Retired	0.6673	0.0012	0.7558	0.1136
Student/other	0.6980	0.0443	0.6378	0.0424
<b>Population, municipality of residence (number of inhabitants)</b>				
< 50,000	0.2591	0.0000	0.7306	0.0289
50,000-399,999	0.5767	0.0018	1.0460	0.7329
400,000 +	1.0000	–	1.0000	–
<b>Self-rated health</b>				
Good or very good	1.0000	–	1.0000	–
Moderate	0.5553	0.0000	0.7706	0.0124
Bad or very bad	0.3318	0.0000	0.5959	0.0090

household assets, gender, level of education, population size in the municipality of residence, and self-rated health. In other words, comparing two individuals with the same characteristics in relation to the control variables, those with private health plans had 34.0% greater probability of utilizing health care services than those not covered by private health plans.

Analyzing the form of payment in the last health treatment according to private plan coverage versus non-coverage (Table 5), for all hospitalizations, 72.0% either involved no payment or payment was provided by the SUS. However, this figure was 19.0 and 91.0% among those with and without health plans, respectively. In relation to last outpatient treatment, the percentage of free treatments or those paid for by the SUS was lower, some 60.0%. Interest-

ingly, among individuals who had received outpatient treatment in the previous 12 months and who did not have private health coverage, the proportion of out-of-pocket payment without reimbursement was 20.0%.

The lowest percentage of care covered by the SUS was for mammograms, and the highest was for childbirth. Some 78.0% of hospitalization for childbirth were covered by the SUS, and one-fourth of women who reported having private health insurance at the time of the interview had not paid for the hospitalization in their last delivery, or had their childbirth covered by the SUS. Inversely, the proportion of mammograms covered by the SUS was only 48.0%, and 41.0% of women who had done this exam in the previous three years had paid for it through their health plans (Table 5).

Table 3

Health services utilization (outpatient or inpatient) in previous year, according to socio-demographic characteristics, self-rated health, and private health plan coverage. Brazil, 2003.

Characteristic	Sample size (n)	Health services utilization (%)		
		Private health plan coverage No	Yes	Total
<b>Gender</b>				
Female	2,652	59.2	68.5	61.5
Male	2,236	54.2	65.8	57.0
p-value		0.0102	0.4224	0.0075
<b>Age bracket (years)</b>				
18-34	2,028	56.1	67.2	58.3
35-49	1,447	56.8	70.0	60.3
≥ 50	1,412	58.3	64.6	60.1
p-value		0.6330	0.3666	0.5351
<b>Level of education</b>				
Primary education incomplete	2,745	55.4	63.8	56.5
Secondary education incomplete	754	59.3	67.3	61.1
Secondary education complete or more	1,389	59.7	69.0	64.2
p-value		0.1500	0.3304	0.0004
<b>Number of household assets</b>				
0-3	1,425	52.3	66.7	52.8
4-7	2,673	59.5	65.9	61.0
≥ 8	736	63.1	69.0	66.9
p-value		0.0003	0.6126	0.0000
<b>Population, municipality of residence (number of inhabitants)</b>				
< 50,000	1,684	55.8	62.1	56.6
50,000-399,999	1,604	60.4	67.2	62.0
400,000 +	1,600	54.3	69.3	59.7
p-value		0.0592	0.2749	0.0531
<b>Self-rated health</b>				
Good or very good	2,587	53.1	69.0	57.9
Moderate	1,840	59.7	62.8	60.3
Bad or very bad	455	63.9	70.2	64.6
p-value		0.0001	0.1896	0.0413
<b>Total</b>	<b>4,887</b>	<b>56.9</b>	<b>67.3</b>	<b>59.4</b>

## Discussion

We should begin by highlighting that despite the small sample size in the WHS, the estimated coverage rate for private health plans among individuals 18 years or older (24.2%) was very close to the rates obtained in the health supplements of the 1998 and 2003 National Sample Household Surveys<sup>1,2</sup>, which were 24.5 and 24.6%, respectively. These data suggest the need to review some forecasts on trends towards in-

creased adherence to private health coverage, based on estimated increases in family spending on this item in the household budget<sup>4</sup>.

From the socioeconomic perspective, private health plan coverage was higher among individuals with more household assets, increased with age and level of education, and was higher among residents of medium-sized (50,000-399,999 inhabitants) and large municipalities (400,000 + inhabitants) and those with better self-rated health.

Table 4

Effects (gross and adjusted) of having private health plan coverage on utilization of health services in the previous year. Brazil, 2003.

Variables included in model	Dependent variable: health services utilization in previous year			
	Gross exp (b)	p-value	Adjusted exp (b)	p-value
<b>Private health plan coverage (yes)</b>	1.5563	0.0000	1.3421	0.0010
<b>Age</b>	1.0013	0.5581	0.9999	0.9617
<b>Number of household goods</b>	1.0770	0.0000	1.0515	0.0052
<b>Gender</b>				
Male	0.8308	0.0073	0.8575	0.0288
Female	1.0000	–	1.0000	–
<b>Level of education</b>				
Primary education incomplete	0.7239	0.0001	0.8057	0.0392
Secondary education incomplete	0.8758	0.2078	0.9723	0.8028
Secondary education complete or more	1.0000	–	1.0000	–
<b>Population, municipality of residence (number of inhabitants)</b>				
< 50,000	0.8813	0.1802	1.0934	0.3715
50,000-399,999	1.1008	0.3269	1.2437	0.0282
400,000 +	1.0000	–	1.0000	–
<b>Self-rated health</b>				
Good or very good	1.0000	–	1.0000	–
Moderate	1.1052	0.1493	1.2119	0.0119
Bad or very bad	1.3333	0.0197	1.6601	0.0001

The association between higher health plan coverage rates and better socioeconomic status is well-known, especially considering that most private health coverage is through employment plans. The private health plan coverage rate among employed individuals was significantly higher than among the other work situation categories (with the exception of retirees), even after adjusting for the other variables. The largest differences were related to the unemployed and the self-employed, confirming the importance of formal employment for acquiring health insurance. The differences were smaller for housewives and students, but were still significant, probably because these individuals may be covered as dependents of their parents or husbands.

As for the lower probability of coverage for residents of municipalities with fewer than 50,000 inhabitants, although we found nothing in the literature in this regard, the finding may be attributed to the more limited supply of jobs that include health plans in these small com-

munities, as well as the lower supply of private health care services contracted by health plan operators. The lack of references on this subject in the literature is due in part to the fact that in the PNADs it is not possible to analyze data down to the municipal level, which was not the case in the WHS design. We consider this an important discussion for future research, since the size of municipalities is associated not only with coverage, but also with the odds of using health care services, given the different levels of supply and management complexity.

The WHS data also corroborate the results of similar analyses, based on the PNADs, which also leads to the conclusion that the population segment with health plan coverage is healthier than the segment without private coverage<sup>5,9</sup>.

In general we observed that after adjusting for the effects of socioeconomic variables, place of residence, and self-rated health, persons with private health plans show higher odds of utilizing health care services, thus corroborat-

Table 5

Form of payment for selected health care procedures, according to private health plan coverage at time of interview. Brazil, 2003.

Coverage at time of interview	Form of payment for last procedure			Total
	Out-of-pocket, without reimbursement	Through health plan	Did not pay (SUS)	
<b>Hospitalization in previous year</b>				
Without private plan	27 6.6	10 2.4	374 91.0	411 100.0
With private plan	6 4.1	111 76.6	28 19.3	145 100.0
Total	33 5.9	121 21.8	402 72.3	556 100.0
<b>Outpatient treatment in previous year</b>				
Without private plan	338 20.0	58 3.4	1295 76.6	1,691 100.0
With private plan	104 16.2	422 65.7	116 18.1	642 100.0
Total	442 18.9	480 20.6	1411 60.5	2,333 100.0
<b>Childbirth in previous five years</b>				
Without private plan	22 5.2	17 4.0	385 90.8	424 100.0
With private plan	9 9.5	62 65.3	24 25.3	95 100.0
Total	31 6.0	79 15.2	409 78.8	519 100.0
<b>Prenatal care in previous five years</b>				
Without private plan	31 7.6	22 5.4	354 87.0	407 100.0
With private plan	11 11.7	64 68.1	19 20.2	94 100.0
Total	42 8.4	86 17.2	373 74.5	501 100.0
<b>Mammogram in previous three years</b>				
Without private plan	44 15.3	30 10.4	214 74.3	288 100.0
With private plan	8 3.8	176 83.4	27 12.8	211 100.0
Total	52 10.4	206 41.3	241 48.3	499 100.0

SUS = Sistema Único de Saúde (Unified National Health System)



ing several points already discussed by other authors, such as the low capacity of the SUS outpatient network to meet the demand<sup>15</sup>.

Thus, as verified in other studies, analysis of the 2003 WHS data demonstrate the overall pattern of inequalities in Brazilian society, as reflected by the higher probability of healthier individuals utilizing health care services.

As defined here, health care services utilization rates included any outpatient or inpatient care, and as described in the literature, the greatest inequalities occur in outpatient services<sup>8</sup>. However, we opted for this compound utilization indicator (outpatient plus inpatient), since in the WHS the analysis according to type of use would have been limited to few individuals in the case of hospitalization occurring in the previous 12 months.

Another important discussion relates to the fact that the public system and private services contracted by the SUS are often used by people covered by private health plans, which has lead the ANS to conduct an exhaustive study to compare the hospitalizations paid for by the SUS with the registry of health plan beneficiaries in order to calculate the amount the health plans should reimburse to the SUS<sup>6</sup>. Data in Table 5 suggest that this may be happening in nearly all the situations analyzed and for which there was information on the source of payment for the service used. The exception was mammograms, which were paid for mostly by health plans when the persons had this type of coverage. The WHS data indicate that some 20.0% of care was financed by the SUS in situations already covered by private health plans. We should also recall that in many cases, especially where the interviewees were not the nominal policy-holders, the response “*did not pay*” may have been due to lack of knowledge by the services user concerning the actual health plan coverage. In addition, we observed that a small percentage of individuals reported having paid

for services through private plans, even though at the time of the interview they did not report having health plan coverage, which may be due to the fact that some people were treated under the SUS at a time prior to the initial coverage by a private plan. The opposite situation may also have occurred, namely a certain proportion of individuals treated under the SUS despite having reported health plan coverage, either because the plan failed to cover the given procedure or because they preferred the public health service, a common situation with emergency services.

Data analyses on health care services utilization and payment from population-based surveys tend to show problems due to the time elapsed between the use of a given service and the interview, when the questions about health plan coverage are generally addressed. Since the situation with health plan coverage at the time of use is unknown, there may be a bias in the estimated utilization rates. In the case of the WHS, this bias may be more pronounced for hospitalization, prenatal, and childbirth rates, since the observation time was up to five years. At any rate it is important to recall that even the data from the 1998 PNAD Health Supplement, in which this reference period was 12 months, do not allow obtaining this information with the desired precision. Thus, questionnaires from household surveys on health services access and utilization should incorporate the information on health plan coverage at the time of services utilization.

Analysis of the WHS data did not allow a clear distinction between the health plans' contracting modalities, which would be an important contribution to the services utilization profile among the various population segments covered by private health insurance. The questionnaire approaches this question in a very summary way, and the results disagree with those in the literature.

## Resumo

*Esse estudo analisa os dados da Pesquisa Mundial de Saúde (PMS), realizada em 2003, em uma amostra de 5 mil indivíduos com 18 anos ou mais. Cerca de 24,0% dos indivíduos entrevistados têm seguro privado de saúde, sendo que os fatores associados à posse do plano são o número de bens, idade, escolaridade, ter emprego formal, residir em municípios com menos de 50 mil habitantes e referir boa auto-avaliação do estado de saúde. Os perfis sócio-demográficos de necessidades e uso de serviços de saúde da população coberta por plano de saúde são distintos, confirmando os achados*

*de outros trabalhos que referem que esse segmento populacional como um todo apresenta melhores condições de saúde e um maior uso de serviços em relação à população não coberta por seguro de saúde, mesmo após o controle por variáveis sócio-demográficas e a auto-avaliação do estado de saúde. Os dados da PMS também sugerem que pessoas cobertas por plano de saúde nem sempre utilizam o plano para pagamento de serviços, excetuando-se o caso da mamografia.*

*Seguro Saúde; Serviços de Saúde; Nível de Saúde*

## Contributors

F. Viacava collaborated in all the stages of the study and drafting of the paper. P. R. B. Souza-Júnior collaborated in the elaboration of the study, statistical analysis, and discussion of the results. C. L. Szwarcwald collaborated in the methodological design, drafting of the methodology, and presentation of the results.

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