

## The relationship between private health plans and use of medical and dental health services in the Brazilian health system

A relação entre planos privados de saúde e uso de serviços médicos e odontológicos no sistema de saúde brasileiro

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**Abstract** *To describe the last place of medical and dental health service used in relation to private health plans, and examine the effect of being registered in the primary healthcare system through the Family Health Strategy (FHS). This was a cross-sectional study using data from Brazil's 2008 National Household Survey. Multinomial logistic regression was performed to analyze how a private health plan and enrollment in the FHS influenced the use of health services. Results showed that individuals with a private health plan tend to use medical and dental services more than individuals without such a plan. However, many individuals with a private health plan used public services or paid out-of-pocket services, mainly for dental care. Among individuals without a private plan, being enrolled in the FHS reduced the use of out-of-pocket private services, regardless of age, income or educational level. Enrollment in the FHS increased the chances of using public services, and the effect of this enrollment is greater among those who have a private plan. Policies to strengthen public primary healthcare and to expand the FHS should be encouraged within the universal health system.*

**Key words** *Health systems, Health insurance, Family health, Primary healthcare*

**Resumo** *O objetivo deste estudo foi descrever os locais usados na última visita a serviços médicos e odontológicos no Brasil em relação à posse de plano privados de saúde, e examinar o efeito de estar cadastrado na Estratégia de Saúde da Família (ESF). Este é um estudo transversal que utiliza dados da Pesquisa Nacional de Amostra Domiciliar (PNAD) de 2008 no Brasil. Regressão logística multinomial foi realizada para analisar a influência da posse de plano privado de saúde e o cadastro na ESF no uso do serviço de saúde. Os resultados mostraram que os indivíduos com plano de saúde tendem a usar mais os serviços médico-odontológicos do que indivíduos sem plano privado. Porém, muitos indivíduos com planos usam serviços públicos ou privados com pagamento direto, principalmente para serviços odontológicos. Dentre indivíduos sem plano, estar cadastrado na ESF reduziu as chances de uso de serviços privados com pagamento direto, independente de idade, renda e nível educacional. Estar cadastrado na ESF aumentou o uso de serviços públicos e o efeito foi mais forte dentre indivíduos com planos privados. Políticas para fortalecer a atenção primária à saúde e expandir a ESF devem ser incentivadas.*

**Palavras-chave** *Sistemas de saúde, Seguro saúde, Saúde da família, Atenção primária à saúde*

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## Introduction

Universal health coverage (UHC) means that all people can have access to the health services they need, without having to risk financial hardship when paying for them<sup>1</sup>. In 2005, all WHO member states made their commitment to ensure UHC, and many advances have been achieved since then, mainly in relation to the health-related Millennium Development Goals<sup>2</sup>. Nevertheless, the coverage of health services and the protection against financial risks are still far from being universal<sup>2</sup>. In relation to oral healthcare (OHC), this topic recently entered the debate on UHC and policy formulation<sup>3</sup>. There are widespread inequalities both in the oral health system<sup>4</sup> and in the use of and access to dental services<sup>5,6</sup>. Universal OHC must overcome certain challenges before it can ensure the availability of equitable, affordable, and accessible oral health services for everyone across the globe<sup>3</sup>.

Some countries have adopted their own version of universal healthcare<sup>7,8</sup>, but few have included OHC<sup>3,9</sup>. Brazil has a universal health system that includes medical and dental services. However, the Brazilian health system comprises a mixed public-private system, in which private services complement public services and compete with one another<sup>10</sup>. The public component is called the Unified Health System (SUS)<sup>10</sup>, in which primary healthcare is organized primarily by the Family Health Strategy (FHS), which operates within the geographically registered population, and is assisted by multidisciplinary healthcare teams; its coverage in 2008 was about 50% of the population<sup>11</sup>. The private component consists of private services that receive direct payment from users; and the private health plan (PHP) component, which offers different types of plans, with different coverages, monthly rates and tax subsidies<sup>10</sup>. Individuals can use any service (public, private or plan services), depending on availability of the health service or their ability to pay. On the other hand, the public oral health system was expanded mainly after 2003<sup>12</sup>. Roughly 25% of the Brazilian population has a PHP<sup>13</sup>, but just 7.1% of this population is covered by a private dental plan<sup>14</sup>.

A public-private mix in the universal health system can facilitate access to and use of health services, but it can also lead to higher expenditures on health, greater social inequalities in accessing healthcare, and unfair competition between public and private providers. To the best of our knowledge, this interplay between access to and

use of public and private services has been little explored, both in Brazil and other countries with mixed systems. Therefore, the objective of this study was to describe the last place of medical and dental service used among individuals with PHP and to investigate the effects of being registered in primary healthcare through the FHS.

## Methods

This study was based on the 2008 National Household Survey (PNAD) conducted in Brazil. The PNAD was carried out by the Brazilian Institute for Geography and Statistics, in collaboration with the Ministry of Health, and its purpose was to produce general information for researchers addressing the socioeconomic development of the country; a specific section of the PNAD addresses health<sup>13</sup>. The PNAD use a three-stage complex probabilistic sample, and is representative of national, regional and state levels<sup>13</sup>. The sample comprised 391,868 Brazilian citizens. Details on the PNAD study population, sampling process and data collection are provided elsewhere<sup>13</sup>.

The outcome variable of this study and the places of health services used were created by combining the questions concerning the payment system (SUS, PHP or private services), as well as the time when the last medical or dental services were used (supplementary material). This combination resulted in five categories: a) public service, b) private service, c) private health plan, d) other services, and e) not used. The "other services" category included individuals who could not be classified due to some inconsistencies (e.g., paying for public services that are free), and who were excluded from the analysis. In relation to medical services, individuals who sought medical healthcare in the two weeks' time preceding the interview, and those who responded the questionnaire as having had a medical visit, chemotherapy, radiotherapy, hemodialysis or hemotherapy, outpatient surgery, plaster-cast or other immobilization, hospital admission or complementary examinations, were considered as having had an appointment. Individuals who did not answer these itemized options, or who did not consult a doctor in the previous two weeks were classified as "not used." In relation to dental services, individuals who responded as having visited the dentist in the previous year were classified according to the payment system (SUS, PHP, private services), and the individuals who did not use dental services or who used them

earlier than this period were included in the category of “not used.”

The main exposure variable, namely the place of PHP, was identified by the questions relating to holders of medical PHPs with or without dental coverage, and by having a PHP solely for dental care. The variable of the private plan type was classified as follows to evaluate the medical service: a) medical – individuals who reported having a medical PHP with or without dental coverage; b) dental – individuals who reported that they had an exclusively dental PHP; and c) no plan – individuals with no PHP. In relation to the last dental visit, the type of PHP was identified as per the questions mentioned above, combined with the question related to plans with coverage for dental treatment. The variable of the PHP type was classified as follows to evaluate the last dental visit: a) with dentistry – individuals who reported having a medical PHP with dental coverage, and individuals having an exclusively dental PHP; b) without dentistry – individuals with a PHP not entitled to dentistry; and c) no plan – individuals with no PHP.

Potential confounding variables associated with the use of health services were used as the control. They included: sex (male/female), age group (11 years and under for children, 12-17 y for teenagers, 18-24 y for young adults, 25-44 y for adults, 45-59 y for the middle-aged and 60 y and over for the aged), education level (illiterate, incomplete elementary school, completed elementary school, completed secondary school, or university or higher), equalized household income categories of minimum wage (MW) (0-½MW, ½-1MW, 1-2MW, +3MW) and being registered in the FHS (yes/no).

Bivariate analyses were performed between the place of the last dental and medical service used and covariates to test their association using Pearson's chi-squared test. All variables with  $p < 0.05$  were kept in the regression model. Multinomial logistic regression analyses were performed, including interaction between the variables of being registered in the FHS and having a private plan, thus fitting partial proportional regression according to Hosmer and Lemeshow<sup>15</sup>. To assess the overall fit, we ran three binary logistic regressions with varying cut-off points on the dependent variable. Since the Hosmer and Lemeshow goodness-of-fit test was acceptable for the binary models, it was also considered acceptable for the multiple logistic regressions. Interaction between being registered in FHS and educational level was tested. Data analyses were

performed using R version 3.1.0. This Brazilian study involved publicly available secondary data.

## Results

The final sample for dental visit included 384,073 individuals, and the analyses according to medical service totaled 389,103. Because of missing data, the final multiple regression model included a sample of 370,928 (3.4% losses) individuals for dental visits, and 384,716 (1.1% losses) participants for medical services. Among the individuals who visited the dentist in the previous year, 77.1% of the sample did not possess any type of PHP, and 11.1% had a PHP with dental coverage. Among those who had a PHP with dentistry, 44% of the individuals visited the dentist through their health plans, 13.9% of the visits were for private services, and 3.6% used public services (Table 1). In relation to the use of medical service, 75% of sample did not have a PHP, and 21.4% had a medical PHP with or without dental coverage. Among the individuals with a medical PHP, 85.6% did not use the medical services, 11.7% used the private plan, and 2.0% used public services (Table 2). Approximately 49% of the participants were male, 30% were between 25 and 44 years old, 6% had a university degree or higher, 60% had an equalized household income lower than 2MW, and 51% were registered in the FHS. Individuals registered in the FHS used public services more.

Regarding the place of dental service used in the previous year (Table 3), women used public services more than any other type of health service, compared with men. Furthermore, as age increased, the chances of using dental service in any place decreased. Individuals with higher income and education levels were more likely to use any service, but the chances were greater for using private services through the plans. The main effect among individuals not registered in the FHS, who had a PHP with dentistry, was that they were 49.43 times more likely to use the dental services through the plan than individuals without a PHP. These individuals had little chance of using public services (OR = 0.31). However, individuals registered in the FHS had a greater chance of using services in any place, than those not registered in the FHS. In addition, FHS register increased use of public services and reduced the use of these services through the FHS plan.

Table 4 presents data related to the use of medical services. Regarding sex, the use of medical

**Table 1.** Absolute and weighted relative frequency (%) of the place of dental service used in the last year, according to the independent variables, PNAD 2008.

	Place of last dental visit									
	Public		Private		Plan		Not used		Total	
	54527	(13.9)	69834	(19.3)	24871	(5.9)	234841	(61.0)	384073	(100)
Having a plan										
with dentistry	1396	(3.6)	5356	(13.9)	18923	(44.0)	15902	(38.5)	41573	(100)
without dentistry	1954	(4.4)	19358	(43.8)	1584	(3.0)	21571	(48.7)	44467	(100)
no plan	50659	(17.2)	42952	(15.4)	2546	(0.8)	192961	(66.6)	289118	(100)
Sex										
male	24028	(12.6)	31444	(17.8)	11577	(5.6)	119802	(64.0)	186851	(100)
female	30499	(15.1)	38390	(20.7)	13294	(6.0)	115039	(58.2)	197222	(100)
Age group										
child	15757	(21.7)	7733	(11.0)	3602	(4.3)	47362	(63.0)	74454	(100)
teen	10080	(23.6)	7918	(19.7)	2760	(5.8)	22012	(50.9)	42770	(100)
young adult	7691	(15.7)	11053	(24.6)	3640	(6.8)	25177	(52.8)	47561	(100)
adult	14822	(12.2)	26546	(23.8)	9983	(7.8)	66414	(56.1)	117765	(100)
middle-aged	4562	(7.1)	11631	(20.5)	3763	(5.4)	40710	(67.0)	60666	(100)
aged	1615	(3.8)	4953	(12.8)	1123	(2.3)	33166	(81.0)	40857	(100)
Education level										
illiterate	11512	(14.0)	5633	(7.1)	2137	(2.3)	63127	(76.6)	82409	(100)
incom elementary	26271	(18.0)	19566	(14.4)	5107	(3.2)	93054	(64.4)	143998	(100)
comp elementary	8315	(14.6)	11871	(23.0)	3540	(5.9)	31148	(56.5)	54874	(100)
comp secondary	7590	(9.1)	23221	(31.0)	9907	(11.1)	38510	(48.8)	79228	(100)
university/higher	599	(2.5)	9287	(43.7)	4105	(16.3)	8288	(37.5)	22279	(100)
Income categories										
up to ½MW	8200	(19.5)	2847	(7.1)	430	(0.9)	30147	(72.6)	41624	(100)
½MW to  -1MW	15400	(19.4)	7435	(9.7)	1595	(1.7)	54882	(69.2)	79312	(100)
1MW to  -2MW	17996	(15.9)	16790	(15.7)	5166	(4.1)	71578	(64.3)	111530	(100)
2MW to  -3MW	6725	(12.2)	11856	(23.0)	4373	(7.0)	31302	(57.8)	54256	(100)
more than 3MW	5909	(6.1)	30432	(33.5)	13176	(12.2)	45730	(48.2)	95247	(100)
Registered in FHS										
yes	36607	(18.4)	28878	(15.4)	8331	(3.8)	122899	(62.3)	196715	(100)
no	17769	(9.2)	40825	(23.3)	16483	(7.9)	11324	(59.6)	186401	(100)

FHS= Family Health Unit; MW=Minimum Wage.

services is similar to the use of dental services, but is different by age. The chances of using medical services increases as age increases, except for children and teenagers. Use of public services decreases as income and educational level increases, whereas the chances of using private services (paying out-of-pocket or through the PHP) increases. The effect of FHS register regarding medical care was very similar to the effect regarding dental services. Individuals who were not registered in the FHS, and who had a medical plan, were 100.73 times more likely to use medical services through the PHP than individuals without a private plan. These individuals had little chance of using public services (OR = 0.23). Similar to

the use of dental services, those registered in the FHS had a greater chance of using public services; however, the effect of having the availability of using public health services is greater among those who had a PHP.

### Discussion

Regardless of the type of plan (i.e. dental or medical), individuals with a PHP were more likely to use health services than individuals without a PHP (covered by public services or making use of private out-of-pocket services). However, many people with a PHP used public services or paid for private services, instead of using the ser-

**Table 2.** Absolute and weighted relative frequency (%) of the place of medical service used in the two weeks preceding the interview, according to the independent variables, PNAD 2008.

	Place of last medical service									
	Public		Private		Plan		No use		Total	
	25352	(6.6)	3659	(1.0)	11692	(3.1)	348400	(89.3)	389103	(100)
Having a plan										
medical	1631	(2.0)	568	(0.7)	9760	(11.7)	71300	(85.6)	83259	(100)
dental	219	(1.6)	84	(0.6)	1700	(12.4)	11954	(85.4)	13957	(100)
no plan	23502	(8.3)	3007	(1.1)	232	(0.1)	265146	(90.6)	291887	(100)
Sex										
male	9853	(5.3)	1478	(0.8)	4429	(2.4)	173813	(91.4)	189573	(100)
female	15499	(7.9)	2181	(1.1)	7263	(3.8)	174587	(87.2)	199530	(100)
Age group										
child	5329	(7.1)	418	(0.6)	1877	(2.7)	68271	(89.6)	75895	(100)
teen	1574	(3.7)	145	(0.3)	522	(1.2)	41417	(94.7)	43658	(100)
young adult	2222	(4.6)	367	(0.7)	930	(2.0)	44807	(92.7)	48326	(100)
adult	6436	(5.5)	1154	(0.9)	3500	(3.1)	108265	(90.5)	119355	(100)
middle-aged	5279	(8.8)	738	(1.2)	2553	(4.3)	52442	(85.7)	61012	(100)
aged	4512	(11.0)	837	(2.1)	2310	(5.6)	33198	(81.3)	40857	(100)
Education level										
illiterate	7916	(9.6)	736	(0.9)	1868	(2.4)	72521	(87.0)	83041	(100)
incomp elementary	10397	(7.4)	1134	(0.8)	2313	(1.8)	131636	(90.0)	145480	(100)
comp elementary	3231	(5.9)	483	(0.9)	1396	(2.6)	50505	(90.6)	55615	(100)
comp secondary	3323	(4.2)	973	(1.2)	3795	(4.7)	72522	(89.9)	80613	(100)
university/higher	393	(1.8)	322	(1.4)	2295	(9.8)	20035	(87.0)	23045	(100)
Income categories										
up to ½MW	3695	(9.1)	177	(0.5)	219	(0.6)	37756	(89.9)	41847	(100)
½MW to  -1MW	6487	(8.4)	546	(0.7)	682	(0.9)	72195	(90.0)	79910	(100)
1MW to  -2MW	8456	(7.7)	1054	(1.0)	2131	(2.0)	101132	(89.4)	112773	(100)
2MW to  -3MW	3314	(6.2)	574	(1.1)	1915	(3.6)	49192	(89.1)	54995	(100)
more than 3MW	3282	(3.5)	1283	(1.3)	6691	(6.8)	86187	(88.4)	97443	(100)
Registered in FHS										
yes	15732	(8.1)	1717	(0.9)	3589	(1.8)	177500	(89.2)	198538	(100)
no	9539	(5.1)	1934	(1.0)	8089	(4.5)	170040	(89.4)	189602	(100)

FHS= Family Health Unit; MW=Minimum Wage.

vices offered by the private plan. Lastly, an important and new finding was that FHS register increased the use of public services and reduced the use of private services among individuals without a PHP, and FHS register increased the use of any service, including public services among individuals with a PHP, despite the fact they could have used their PHP.

Other studies have also found that holding a PHP favors the use of health services<sup>16,17</sup>, including dental health services<sup>18-21</sup>. In Brazil, individuals with a PHP have a dual mode of access to health services, i.e., by both the public system and private plans. This public-private mix in the Brazilian health system creates inequality in ac-

cessing health services<sup>5,22</sup>, pointing out that the existence of PHPs has contributed the most to promoting overall inequity, by favoring the rich in healthcare use<sup>16</sup>. Nonetheless, the coverage by PHP is greater among Brazilians with greater educational and income levels<sup>13</sup>. Others authors have also shown that PHP coverage increased among the self-employed and decreased among those in financial difficulty<sup>23</sup>. In this study, about a quarter of the sample had a PHP, and could access services by the dual mode, pointing out that the individuals with a higher educational level had the largest coverage by PHP (results not shown), thus promoting inequalities in accessing healthcare services. Nevertheless, many individu-

**Table 3.** Odds Ratio (OR) and Confidence Interval (CI) of the multinomial regression models, according to the type of dental service used in the last year (No use, Public, Private, Plan), according to the independent variables, PNAD 2008.

	Place of last dental visit		
	OR (99%CI)		
	Public	Private	Plan
Sex			
male	1.00	1.00	1.00
female	1.41(1.37,1.45)	1.28(1.25,1.31)	1.20(1.15,1.26)
Age group			
child	1.00	1.00	1.00
teen	0.88(0.84,0.93)	1.08(1.02,1.15)	0.84(0.75,0.94)
young adult	0.62(0.59,0.65)	0.82(0.78,0.87)	0.53(0.47,0.59)
adult	0.47(0.45,0.49)	0.79(0.75,0.83)	0.53(0.48,0.59)
middle-aged	0.26(0.24,0.27)	0.58(0.55,0.61)	0.31(0.28,0.34)
aged	0.12(0.12,0.13)	0.38(0.35,0.40)	0.14(0.13,0.16)
Income categories			
up to ½MW	1.00	1.00	1.00
1/2MW to  -1MW	1.09(1.05,1.14)	1.35(1.27,1.43)	1.27(1.06,1.51)
1MW to  -2MW	1.07(1.03,1.12)	2.05(1.94,2.18)	1.79(1.52,2.11)
2MW to  -3MW	1.01(0.96,1.06)	2.86(2.69,3.04)	2.19(1.86,2.59)
more than 3MW	0.76(0.72,0.80)	3.94(3.71,4.18)	2.66(2.26,3.13)
Educational level			
Illiterate	1.00	1.00	1.00
incomp elementary	1.97(1.9,2.05)	2.48(2.36,2.61)	2.40(2.17,2.66)
comp elementary	2.00(1.89,2.10)	3.84(3.62,4.07)	3.88(3.42,4.39)
comp secondary	1.88(1.78,1.99)	5.18(4.89,5.48)	6.00(5.32,6.77)
university/higher	1.26(1.11,1.42)	6.84(6.39,7.32)	6.39(5.61,7.28)
Main effects (among those not enrolled in FHS)			
Having a plan			
no plan	1.00	1.00	1.00
with dentistry	0.31(0.27,0.35)	0.78(0.74,0.83)	49.43(45.63,53.54)
without dentistry	0.40(0.36,0.44)	2.11(2.03,2.20)	2.83(2.53,3.15)
Main effects (among those not having a health plan)			
Registered in the FHS			
no	1.00	1.00	1.00
yes	1.65(1.60,1.69)	0.90(0.87,0.92)	0.62(0.56,0.69)
Additional effects of having a plan (among those enrolled in FHS)			
Having a plan * Enrolled in FHS			
with dentistry * FHS(yes)	1.63(1.39,1.90)	1.15(1.05,1.26)	1.33(1.18,1.51)
without dentistry * FHS(yes)	1.45(1.28,1.65)	1.03(0.96,1.10)	1.66(1.39,1.99)

FHS=Family Health Unit; MW=Minimum Wage.

als with a higher educational level used the public service instead of using a private plan. Use of public health services by individuals who had a higher education and who had a PHP was also higher in 2003 than 2008, in Brazil<sup>24</sup>.

Moreover, many individuals with a PHP used public services or paid out-of-pocket services, instead using their health plan. In relation to dental visits, most of the people with dental plan

coverage paid to receive private services. Unlike the use of medical services, most PHP holders used the public service. This is an important concern, because it means that citizens are spending twice as much for the same service. This may lead to excessive health spending<sup>25</sup>, while not necessarily resulting in improved health, but actually encouraging health plan operators to swell their profits. The limited number of procedures cove-

**Table 4.** Odds Ratio (OR) and Confidence Interval (CI) of the multinomial regression models, according to the type of medical service used in the two weeks preceding the interview (No use, Public, Private, Plan), according to the independent variables, PNAD 2008.

	Place of last medical service		
	OR (99%CI)		
	Public	Private	Plan
Sex			
male	1.00	1.00	1.00
female	1.56(1.51,1.62)	1.41(1.29,1.53)	1.47(1.40,1.55)
Age group			
child	1.00	1.00	1.00
teen	0.55(0.50,0.60)	0.55(0.43,0.71)	0.60(0.52,0.70)
young adult	0.86(0.80,0.93)	1.07(0.87,1.31)	0.71(0.62,0.82)
adult	1.05(0.99,1.11)	1.18(1.00,1.40)	0.98(0.87,1.10)
middle-aged	1.71(1.61,1.81)	1.86(1.57,2.20)	1.39(1.24,1.56)
aged	2.03(1.92,2.15)	3.21(2.75,3.74)	2.04(1.83,2.27)
Income categories			
up to ½MW	1.00	1.00	1.00
1/2MW to -1MW	0.96(0.91,1.01)	1.70(1.37,2.12)	0.91(0.73,1.14)
1MW to -2MW	0.97(0.92,1.03)	2.31(1.88,2.85)	1.08(0.88,1.32)
2MW to -3MW	0.90(0.85,0.97)	2.53(2.02,3.16)	1.17(0.96,1.44)
more than 3MW	0.69(0.65,0.74)	3.40(2.75,4.22)	1.23(1.01,1.50)
Educational level			
illiterate	1.00	1.00	1.00
incomp elementary	0.81(0.77,0.85)	0.76(0.67,0.87)	0.62(0.56,0.69)
comp elementary	0.80(0.75,0.86)	0.86(0.72,1.03)	0.78(0.68,0.89)
comp secondary	0.62(0.58,0.67)	1.23(1.05,1.44)	0.76(0.68,0.86)
university/higher	0.53(0.47,0.61)	1.30(1.05,1.6)	0.77(0.68,0.87)
Main effects (among those not enrolled in FHS)			
Having a plan			
no plan	1.00	1.00	1.00
medical	0.23(0.20,0.25)	0.37(0.31,0.43)	100.73(80.62,125.86)
dental	0.17(0.13,0.23)	0.33(0.23,0.47)	119.53(94.59,151.05)
Main effects (among those not having a health plan)			
Registered in FHS			
no	1.00	1.00	1.00
yes	1.25(1.21,1.30)	0.84(0.76,0.92)	0.39(0.26,0.56)
Additional effects of having a plan (among those enrolled in FHS)			
Having a plan * Enrolled in FHS	1.00	1.00	1.00
medical * FHS[yes]	2.19(1.91,2.51)	1.38(1.08,1.77)	2.33(1.59,3.42)
dental * FHS[yes]	3.50(2.45,5.01)	0.03(0.00,0.95)	2.11(1.40,3.18)

FHS=Family Health Unit; MW=Minimum Wage.

red by the dental plans<sup>14</sup>, and coverages that are difficult to obtain or that are denied by the insurance providers<sup>26</sup> for some procedures may be related to this fact. This can lead the government to spend more funds than could otherwise be used toward proving other services.

Another important finding was that individuals register in the FHS were more likely to use

public medical and dental services, even those individuals with a PHP. In areas covered by the FHS, the population receives regular visits from community health workers, and also from doctors and dentists when needed<sup>27</sup>. The importance of the activities performed by community health workers, such as making home visits, has been widely demonstrated<sup>28,29</sup>; other duties include he-

alth promotion and educational activities<sup>27</sup> that may increase people's willingness to use public services. The expansion of the FHS teams<sup>10,27</sup> and the improvement in dental health service coverage after 2003<sup>12</sup> characterized the expansion of the UHC in oral health in Brazil, and may explain why individuals registered in the FHS used more public health services. In Chile, the health system reforms included universal coverage for some oral health procedures, and resulted in greater use of dental services<sup>21</sup>. In Europe, few countries have universal OHC, but among those offering public coverage, the inequalities in dental services use were lower<sup>6</sup>. Some studies showed that living in areas covered by primary healthcare with FHS presented favorable results for use of health services<sup>30,31</sup>. Other countries with effective primary healthcare also achieved positive results for use of health services and for achieving UHC<sup>7,32,33</sup>. Primary healthcare is essential for bridging the gap to UHC<sup>34</sup>.

A limitation of this study was its cross-sectional nature; hence, we cannot be sure of the temporal order of use of services, or the purchase of healthcare plans. Another limitation is that methodological adjustments were needed to define the type of PHP in the sample. This was necessary because only the primary-holders of a PHP answered questions about plan characteristics. The plan typology was then extended to dependents living in the household. The lack of information on the presence of a dentist in the

FHS is a limitation of this study. However, in many healthcare units, even though there may be no FHS oral health team, there may be a dentist. Strengths of this study include its large and representative sample of the Brazilian population, making it possible to generalize the results, to infer some short-term trends, and to test interactions to evaluate effective modifications. Our findings may be useful for other developing countries with similar characteristics.

In conclusion, individuals covered by any type of PHP had a greater chance of using the health services provided by their private plan, as compared with those without a private plan, but were less likely to use a public health service. However, many individuals with private health plans used the public service or paid out-of-pocket services. Individuals with a private dental plan used more out-of-pocket services, whereas those who had a medical PHP tended to use more public services. Importantly, individuals with a PHP were more likely to use public services if they were registered in the FHS, regardless of their educational level, income or gender. More comprehensive studies are necessary, possibly both quantitatively and qualitatively, to understand why people pay to have a PHP, but use public services when they need to use a health service, even though their private plan offers the same type of service available in public service. The findings of this study are relevant for addressing issues of health regulation, planning and management.

## Collaborations

LM Pilotto and RK Celeste worked in the study conception and design, LM Pilotto carried out analyses and wrote a first draft, RK Celeste critically revised and participated in interpretations of results. Both authors approved the final version.



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