

Primary Health Care in Brazil and the *Mais Médicos* (More Doctors) Program: an analysis of production indicators

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Abstract *This study analyzes the number of medical appointments and referrals performed in primary health care in Brazil focusing on the Mais Médicos Program (More Doctors Program). It is a cross-sectional study on the work of physicians included, or not, to the Mais Médicos Program in 2014. Based on validation protocols, a unified database was created from two health information system databases – SIAB and ESUS. Absolute indicators were defined: the total of medical appointments per month; medical referrals and community health education activities. In addition, other indicators were considered, such as weekly rates and productivity of appointments, in line with the profile of Brazilian municipalities. The mean of all appointments was 285 per month corresponding to an average of 14.4 appointments/day. In the poorest municipalities, the figures for the Mais Médicos Program physicians were higher than national rates. The educational activities provided by primary care teams that included a Mais Médicos Program professional were higher in Brazilian capital cities. The Mais Médicos Program achieved one of its main goals, which was to increase health access for vulnerable populations and to contribute towards the consolidation of primary health care in Brazil.*

Key words *Primary health care, Mais Médicos Program, Unified Health System, Health Evaluation, Indicators*

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Introduction

Primary health care has been responsible for organizing access to health services in Brazil¹ and for government programs, such as the *Mais Médicos* Program (More Doctors Program), which were designed with the aim of expanding coverage for the population and re-directing health practices². The federal government's initiative in creating the *Mais Médicos* Program involves a policy to develop and strengthen the Unified Health System (SUS). This policy was established as a result of the need to expand primary health throughout the whole country, which faced enormous difficulties, in finding professionals, especially physicians, both to work and to settle in remote areas^{3,4}. Based on this perspective, the Federal government, by means of incentives designed to overcome the inequalities/unfairness in health care, has been directing its efforts towards ensuring that local demands are met, bearing in mind the continental dimensions of the country and the fair distributions of human and material resources, that prioritize providing emergency medical primary health care in vulnerable areas, including those municipalities located in the interior of the country, in the outskirts of great urban centers and in metropolitan regions, as well as in isolated regions such as the Amazon^{2,5}.

Many studies have registered the extended access⁶⁻¹⁰, coverage^{11,12} and performance^{13,14} of the Family Health Strategy (FHS) in Brazil as a whole, although few studies have so far been conducted into the professional-outpatient production in relation to primary care resulting from the deployment of the *Mais Médicos* Program over the last three years. This being the case, it is important to understand the contribution this Program has made to ensure Brazilians have access to health services, as regards medical-care assistance for the health needs of the population in relation to primary health care work. In addition, it is necessary to analyze in detail access to health services within the parameters of a physician's productivity in primary health care. Thus, this study aims to analyze the production of medical appointments and referrals and educational health activities carried out in primary health care in Brazil by Family Health Strategy (FHS) teams in 2014, with special emphasis on the *Mais Médicos* Program.

Method

This is a cross-sectional study about medical work production rates in Brazilian primary care, from the time when the *Mais Médicos* Program was first established until 2014, a period that saw the entry of the third wave of professionals and the consolidation of this program in the country. The case study unit of analysis was the monthly production of the family health strategy teams with and without a professional from the *Mais Médicos* Program, whose working regime was a forty-hour week.

The analyses conducted used secondary data used by the Unified Health System: Primary Health Care Information System (SIAB), considering tables for "Production"; "SSA2," "Additional," "sanitation," as well as the SUS electronic database (E-SUS), made available via the Ministry of Health's Primary Health Care Department. In order to consult this set of data, the 'PHPMyAdmin' free language web application was used, together with the *MySQL* database. An order of system provenance was established: starting with the SIAB and followed by the E-SUS. The key link that made it possible to complete this stage was the set of tables consisting of the municipal codes, health unit codes, coverage area codes and, finally, the year and month of production shown in the databases in question. A dichotomous variable was created based on the unification of the databases, so as to identify the monthly production of the team that did or did not include a professional from the *Mais Médicos* Program.

An inter-institutional scientific network was formed for the purpose of this research, which conducted meetings with the technical body at the Ministry of Health (MOH), workshops and regional meetings, in order to establish the production indicators that best express the work of a professional physician. For this, the study variables were as follows: the total number of medical consultations per month - the sum total of consultations conducted with children, adolescents, adults and the elderly, as part of the programs involving patients with hypertension and diabetes, leprosy and tuberculosis - the number of medical referrals made for specialist, emergency and hospital treatment, the number of educational health activities per FHS team, as well as the creation of rates for these variables.

In order to minimize errors found in data gathering and reporting or typographical errors, consistency criteria were established, so as to guarantee the greatest possible reliability in the

data related to primary health care. Total variables and consultation rates were not considered during this stage: a) the monthly production of the team that presented a repeated production of equal value (including those with zero scores) for three consecutive months and/or during a period of four months over the course of the year 2014, accepting criteria that are more restricted than those foreseen in the resolution that advises the suspension of funding for those municipalities that do not produce data for a period of 60 days^{1,15}; b) production related to indigenous areas. Also, for the 'total number of medical consultations,' the criterion was the number of consultations from zero up to 640 consultations, acknowledging the realistic possibility that a professional can receive thirty-two patients a day or twice the normal operating capacity per month. Thus, a proportion of 50.8% of the total number of medical appointments were analyzed. With regards to the variables for 'team educational services for groups,' 'medical referrals for specialist treatment,' referrals for 'hospitals' and 'emergencies,' a number equal to zero or higher was accepted for the year 2014, since the aim of the study was to find out the proportion of some of the team mandatory reporting (categorical data), as well as the summary measures for these variables, when different from zero. Also, this being the case, a proportion of 2.2%, 1%, 2.1% and 1.9%, respectively, of all the educational referrals and consultations, was eliminated from the analysis. In order to be able to make a comparison between the two groups, rates of the same variables were constructed, these being absolute values related to the number of consultations, of referrals and educational services provided and the denominators of the total population covered by the team during that month. Variable rates were also used for each variable, in that the denominator was the number of individuals registered at the FHS multiplied by one thousand. For these rates, the criterion used was that the number of individuals registered should be between 2,000 and 6,000 per team, allowing for the extreme situations that occur in FHS designated areas, which have low and high demographic density, as is the case of Amazonas and in the major capital cities, respectively.

In addition, the 'weekly production' variable was created, which represents the total number of medical consultations in relation to the weekly working hours of the FHS teams. For this, 32 and 40 hours per week were contemplated for the teams that did or did not have a *Mais Médicos*

Program professional, respectively. In the case of the teams that included a *Mais Médicos* Program professional, the remaining 8 hours would be employed for the purpose of study by undertaking an on-line course, in accordance with present legislation⁵. The municipalities and regions of the country defined as having a deficient health care profile, in line with the principles of equity ethics, in accordance with Inter-ministerial Decree No. 1,369, of 8th July 2013, which defines priority SUS regions as those that are "of difficult access, where it is difficult to provide physicians or where the populations are considered to be in a situation of greatest vulnerability"¹⁶. The criteria adopted were therefore as follows: a) To include municipalities that had 20% or more of their population living in extreme poverty based on data issued by the Brazilian Ministry of Social Development and Campaign to Eradicate Hunger, which can be accessed via www.mds.gov.br/sagi; b) To be one of the 100 municipalities (G100) with over 80 thousand inhabitants and with the worst human development indices (HDI); c) censor sector areas of extreme poverty that afflicts metropolitan regions so badly; d) as well as the outskirts of capital cities; e) in addition, other locations, that are part of the remaining municipalities.

The following software was used: R and SPSS version 22.0 for Windows. Since there was no standard of normality or symmetry for the variables between the groups, and because this involves a large number of samples, the statistical analysis was based on a calculation of 95% confidence medians and intervals (CI 95%). Pearson's Chi-Square test was used for categorical variables and the significance level adopted was 5%. Graphs showing tendencies were constructed, bearing in mind the average productivity of the total number of consultations for both types of teams (with and without a *Mais Médicos* Program professional). This study was approved by the Research Ethics Committee at the Federal University of Rio Grande do Sul.

Findings

Based on the validation protocols described above, the databases constructed for this research consisted of the totality of the valid registrations in all the Primary Health Care teams in Brazil, in that a proportion of 2.2%, 1%, 2.1% and 1.9% of all referrals and educational group services from the database were excluded from the anal-

ysis. This represents a loss of 49.2% of the total number of medical consultations, in that there was a greater loss of information from teams in poorer areas (55.1%) and a lower loss in capital cities (40.4%). Thus, the study analyzed a total of 68,876,670 monthly productions, of which 79.5% were produced by the *Non-Mais Médicos* Program professionals and 20.5% by the *Mais Médicos* Program professionals, of the 23,321 teams belonging to the 4,231 municipalities in Brazil.

The results of the analyses conducted at a municipal level are shown on Tables 1 and 2 and in Figure 1.

The median of the total number of medical appointments produced in Brazil was 285 (CI 95%: 284-286) per month in 2014, which indicates an average of 14.4 appointments per day. These findings indicated a differentiated standard in relation to the groups of municipalities studied, based on a comparison with the national average. The median of the total number of medical consultations was lower in poorer regions and, in relation to the relative values of the registered population, municipalities with a low Human Development Index presented lower rates overall, if compared to the national median. Among the groups of teams, the *Mais Médicos* produced more in poorer regions, less HDI in other localities and less in metropolitan regions and in capital cities. It is worth mentioning that in the poorer municipalities, the *Mais Médicos* teams produced 31 more medical consultations per month and 24 fewer medical consultations per month in capital cities, when compared to the *Non-Mais Médicos* Program professionals.

With regards to referrals to a specialist, hospital and emergency in Brazil, it was found that there had been 97.2%, 80.7%, and 64.2%, respectively, of non-referrals in this sampling. The *Mais Médicos* teams presented a significantly higher proportion of some type of referral to a specialist, hospital and emergency in Brazil, except to specialists in the poorer regions and to emergency units in capital cities (Table 2). It may be observed in Table 1 that, assuming that the team has at least one referral for each particular variable, in general the medians and CI of referrals to a specialist, hospital and emergency involving the FHS was 2 (CI 95%: 2-2), 3 (CI 95%: 3-3) and 4 (CI 95%: 4-4), respectively. There was a significant difference in referrals made depending on the different teams involved. With regards to the *Mais Médicos* Program, real differences in the mean were found only in the case of special-

ist referrals in capital cities, with the *Non-Mais Médicos* teams presenting higher values.

With respect to FHS team services to health educational groups, the whole sample showed 33.9% from zero care cases during the months of 2014. The greatest proportion of non-treatment for a *Mais Médicos* team was found among the poorest municipalities and where there was a higher proportion of *Non-Mais Médicos* teams between municipalities in the metropolitan region, with no significant difference in the other categories (Table 2). Given that the team had registered at least one service (Table 1), the mean for serving the health educational group in the country was 4 (CI 95%: 4-4) per month - with a higher mean for capital cities (6; CI 95%: 5-6) and a lower one for poorer districts (3; CI 95%: 3-3). Despite the significant statistical differences shown in Table 1 in relation to the *Mais Médicos* Program, in the case of this variable there was only a real difference in the mean between capital cities, where the *Mais Médicos* team performed more educational activities.

Figure 1 shows that the productivity of the total number of appointments per week presents a similar pattern between the different teams during the course of the year, with lower averages for the month of December. It may also be observed that the *Mais Médicos* teams had greater weekly productivity, in comparison with the *Non-Mais Médicos* team during the course of the whole year, irrespective of the municipal category.

Discussion

These findings greatly expand the scope of studies that assess the findings on Brazilian primary health care, within the scope of medical outpatient work, such as appointments below the expected level, evidence that there were few referrals to other levels of health care, as well as a minimal interference by physicians in the variety of educational activities produced by family health teams.

The quantitative average of the total number of medical appointments seems to indicate a moderate outpatient output on the part of the FHS professionals. According to the Decree issued by the Brazilian Ministry of Health¹⁷, that deals with parameters for health care coverage, it is estimated that a physician can attain an average monthly output equal to 360 consultations. In accordance with our findings, it is possible to affirm that there was an average of 285 consultations/month in Brazil in 2014, which represent 80% of

Table 1. Monthly medical and family health team output indicators, in accordance with the Brazilian municipal profile in the year 2014.

Indicators	Total		
	Non MM	MM	Total
Medical appointment output (n)	179444	46128	225572
Total Mean (95% CI)	285 (284-286)	286 (285-288)	285 (285-286)
Rate Mean (95% CI)	88.8 (88.5-89.0)	88.8 (88.3-89.2)	88.8 (88.5-89.0)
Medical referrals to specialists (n)	7222	1757	8979
Total Mean (95% CI)	2 (2-2)	2 (2-2)	2 (2-2)
Rate Mean (95% CI)	0.70 (0.68-0.72)	0.69 (0.63-0.74)	0.70 (0.68-0.72)
Medical referrals to hospital (n)	41443	13238	54681
Total Mean (95% CI)	2 (2-2)	2 (2-2)	2 (2-2)
Rate Mean (95% CI)	0.62 (0.61-0.63)	0.63 (0.62-0.65)	0.62 (0.61-0.63)
Medical referrals to emergency (n)	81204	23740	104944
Total Mean (95% CI)	3 (3-3)	3 (3-3)	3 (3-3)
Rate Mean (95% CI)	0.90 (0.89-0.91)	0.92 (0.91-0.94)	0.91 (0.90-0.91)
Consultations of the team to health education groups (n)	149464	37153	186617
Total Mean (95% CI)	4 (4-4)	4 (4-4)	4 (4-4)
Rate Mean (95% CI)	1.24 (1.23-1.25)	1.14 (1.12-1.16)	1.22 (1.21-1.23)
Indicators	20% poverty		
	NonMM	MM	Total
Medical appointment output (n)	35085	17305	52390
Total Mean (95% CI)	240 (238-241)*	271 (269-273)*	251 (250-252)
Rate Mean (95% CI)	81.2 (80.6-81.7)*	90.2 (89.3-91.1)*	84.4 (83.8-84.8)
Medical referrals to specialists (n)	901	399	1300
Total Mean (95% CI)	3 (2-3)	3 (2-3)	3 (3-3)
Rate Mean (95% CI)	0.98 (0.87-1.08)	0.97 (0.86-1.32)	0.97 (0.89-1.05)
Medical referrals to hospital (n)	10110	5939	16049
Total Mean (95% CI)	2 (2-2)	2 (2-2)	2 (2-2)
Rate Mean (95% CI)	0.73 (0.71-0.75)	0.71 (0.69-0.73)	0.72 (0.71-0.73)
Medical referrals to emergency (n)	14534	8784	23318
Total Mean (95% CI)	3 (3-3)	3 (3-3)	3 (3-3)
Rate Mean (95% CI)	1.06 (1.03-1.08)	1.04 (1.00-1.08)	1.05 (1.03-1.07)
Consultations of the team to health education groups (n)	27057	12602	39659
Total Mean (95% CI)	3 (3-3)	3 (3-3)	3 (3-3)
Rate Mean (95% CI)	1.00 (0.99-1.02)	0.98 (0.96-0.99)	0.99 (0.98-1.00)
Indicators	G100		
	Non MM	MM	Total
Medical appointment output (n)	13386	4037	17423
Total Mean (95% CI)	264 (261-266)*	288 (283-293)*	270 (268-272)
Rate Mean (95% CI)	74.2 (73.3-75.0)*	81.1 (79.8-82.7)*	75.8 (75.2-76.6)
Medical referrals to specialists (n)	380	149	529
Total Mean (95% CI)	5 (4-5)	1 (1-2)	3 (2-4)
Rate Mean (95% CI)	1.26 (1.24-1.34)	0.36 (0.30-0.44)	0.94 (0.73-1.22)
Medical referrals to hospital (n)	2399	869	3268
Total Mean (95% CI)	2 (2-2)	2 (2-2)	2 (2-2)
Rate Mean (95% CI)	0.45 (0.43-0.47)	0.47 (0.44-0.51)	0.45 (0.44-0.47)
Medical referrals to emergency (n)	6412	2201	8613
Total Mean (95% CI)	3 (3-3)	3 (3-3)	3 (3-3)
Rate Mean (95% CI)	0.84 (0.82-0.86)	0.84 (0.80-0.87)	0.84 (0.82-0.86)
Consultations of the team to health education groups (n)	11525	3129	14654
Total Mean (95% CI)	4 (4-4)	4 (3-4)	4 (4-4)
Rate Mean (95% CI)	1.12 (1.09-1.15)*	0.97 (0.94-1.02)*	1.09 (1.07-1.12)

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Table 1. continuation

Indicators	Metropolitan region		
	Non MM	MM	Total
Medical appointment output (n)	24178	6402	30580
Total Mean (95% CI)	300 (298-302)*	293 (290-297)*	299 (297-301)
Rate Mean (95% CI)	89.4 (88.9-90.1)*	84.6 (83.4-85.8)*	88.4 (87.8-89.0)
Medical referrals to specialists (n)	769	281	1050
Total Mean (95% CI)	2 (2-2)	2 (2-2)	2 (2-2)
Rate Mean (95% CI)	0.69 (0.61-0.74)	0.63 (0.56-0.74)	0.67 (0.60-0.73)
Medical referrals to hospital (n)	4346	1387	5733
Total Mean (95% CI)	2 (2-2)	2 (2-2)	2 (2-2)
Rate Mean (95% CI)	0.49 (0.48-0.51)	0.47 (0.46-0.52)	0.49 (0.47-0.50)
Medical referrals to emergency (n)	11732	3459	15191
Total Mean (95% CI)	3 (3-3)	3 (3-3)	3 (3-3)
Rate Mean (95% CI)	0.87 (0.85-0.89)	0.85 (0.81-0.88)	0.86 (0.85-0.88)
Consultations of the team to health education groups (n)	20294	5550	25844
Total Mean (95% CI)	4 (4-4)	4 (4-4)	4 (4-4)
Rate Mean (95% CI)	1.16 (1.13-1.18)	1.15 (1.12-1.19)	1.16 (1.14-1.18)
Indicators	Capitals		
	Non MM	MM	Total
Medical appointment output (n)	33518	5591	39109
Total Mean (95% CI)	289 (287-291)*	265 (261-269)*	285 (284-287)
Rate Mean (95% CI)	84.1 (83.6-84.7)*	73.8 (72.8-75.0)*	82.4 (81.9-83.0)
Medical referrals to specialists (n)	1985	230	2215
Total Mean (95% CI)	2 (2-2)	1 (1-2)	2 (2-2)
Rate Mean (95% CI)	0.54 (0.49-0.59)	0.44 (0.38-0.52)	0.52 (0.47-0.56)
Medical referrals to hospital (n)	3476	599	4075
Total Mean (95% CI)	1 (1-1)	1 (1-1)	1 (1-1)
Rate Mean (95% CI)	0.35 (0.34-0.36)	0.33 (0.32-0.35)	0.35 (0.34-0.35)
Medical referrals to emergency (n)	13289	2052	15341
Total Mean (95% CI)	2 (2-2)	2 (2-2)	2 (2-2)
Rate Mean (95% CI)	0.73 (0.71-0.74)*	0.65 (0.61-0.69)*	0.72 (0.70-0.73)
Consultations of the team to health education groups (n)	27639	4663	32302
Total Mean (95% CI)	5 (5-6)	6 (6-6)	6 (5-6)
Rate Mean (95% CI)	1.62 (1.59-1.64)*	1.72 (1.65-1.79)*	1.63 (1.61-1.66)
Indicators	Other locations		
	Não MM	MM	Total
Medical appointment output (n)	73277	12793	86070
Total Mean (95% CI)	304 (303-305)*	312 (310-314)*	305 (304-306)
Rate Mean (95% CI)	97.3 (96.8-97.7)*	99.8 (99.0-100.7)*	97.7 (97.3-98.0)
Medical referrals to specialists (n)	3187	698	3885
Total Mean (95% CI)	2 (2-2)	2 (2-2)	2 (2-2)
Rate Mean (95% CI)	0.70 (0.67-0.72)	0.78 (0.72-0.84)	0.71 (0.69-0.73)
Medical referrals to hospital (n)	21112	4444	25556
Total Mean (95% CI)	2 (2-2)	2 (2-2)	2 (2-2)
Rate Mean (95% CI)	0.69 (0.68-0.70)	0.69 (0.67-0.72)	0.69 (0.68-0.70)
Medical referrals to emergency (n)	35237	7244	42481
Total Mean (95% CI)	3 (3-3)	3 (3-3)	3 (3-3)
Rate Mean (95% CI)	0.94 (0.92-0.95)	0.97 (0.94-0.99)	0.94 (0.93-0.95)
Consultations of the team to health education groups (n)	62949	11209	74158
Total Mean (95% CI)	4 (4-4)	4 (4-4)	4 (4-4)
Rate Mean (95% CI)	1.24 (1.23-1.26)*	1.17 (1.14-1.21)*	1.23 (1.22-1.25)

* Statistically significant differences (CI do not tally). NOTE: MM: Team with medical professional of the Mais Médicos Program. Non MM: Team without medical professional belonging to the Mais Médicos Program. 95% CI: 95% Confidence Interval. NOTE: Rates per 1,000 inhabitants; the denominator being the total number of people registered per health team.

Table 2. Medical referral and health education group indicators from primary care in Brazil in the year 2014.

Indicators	Total						p*
	Non MM		MM		Total		
	N	%	N	%	N	%	
Medical referrals to:							
Specialists							<0.001
none	809570	(97.2)	59299	(97.0)	868869	(97.2)	
1 or more	23137	(2.8)	1845	(3.0)	24982	(2.8)	
Hospital							<0.001
none	664250	(81.0)	46696	(77.0)	710946	(80.7)	
1 or more	156154	(19.0)	13962	(23.0)	170116	(19.3)	
Emergency							<0.001
none	531826	(64.6)	35469	(58.5)	567295	(64.2)	
1 or more	290854	(35.4)	25144	(41.5)	315998	(35.8)	
Consultations to health education groups							<0.001
none	76144	(33.8)	19762	(34.7)	95906	(33.9)	
1 or more	149464	(66.2)	37153	(65.3)	186617	(66.1)	
Indicators	20% poverty						p*
	Non MM		MM		Total		
	N	%	N	%	N	%	
Medical referrals to:							
Specialists							0.097
none	177331	(97.9)	22170	(98.0)	199501	(97.9)	
1 or more	3854	(2.1)	443	(2.0)	4297	(2.1)	
Hospital							<0.001
none	136982	(77.0)	16108	(71.5)	153090	(76.4)	
1 or more	40879	(23.0)	6405	(28.5)	47284	(23.6)	
Emergency							<0.001
none	120900	(67.6)	12983	(57.8)	133883	(66.5)	
1 or more	58026	(32.4)	9491	(42.2)	67517	(33.5)	
Consultations to health education groups							<0.001
none	15756	(36.8)	27057	(38.7)	23702	(37.4)	
1 or more	27057	(63.2)	12602	(61.3)	39659	(62.6)	
Indicators	G100						p*
	Non MM		MM		Total		
	N	%	N	%	N	%	
Medical referrals to:							
Specialists							0.004
none	67881	(97.6)	5238	(97.0)	73119	(97.6)	
1 or more	1642	(2.4)	161	(3.0)	1803	(2.4)	
Hospital							<0.001
none	59830	(86.1)	4480	(82.5)	64310	(85.8)	
1 or more	9659	(13.9)	951	(17.5)	10610	(14.2)	
Emergency							<0.001
none	43706	(63.3)	2897	(54.1)	46603	(62.7)	
1 or more	25329	(36.7)	2454	(45.9)	27783	(37.3)	
Consultations to health education groups							0.457
none	5772	(33.4)	1608	(33.9)	7380	(33.5)	
1 or more	11525	(66.6)	11525	(66.6)	3129	(66.1)	

it continues

Table 2. continuation

Indicators	Metropolitan region						p*
	Non MM		MM		Total		
	N	%	N	%	N	%	
Medical referrals to:							
Specialists							<0.001
none	112757	(97.2)	8484	(96.5)	121241	(97.2)	
1 or more	3221	(2.8)	304	(3.5)	3525	(2.8)	
Hospital							<0.001
none	98801	(85.3)	7301	(82.9)	106102	(85.1)	
1 or more	17032	(14.7)	1511	(17.1)	18543	(14.9)	
Emergency							<0.001
none	70427	(62.0)	4963	(57.0)	75390	(61.6)	
1 or more	43169	(38.0)	3738	(43.0)	46907	(38.4)	
Consultations to health education groups							<0.002
none	10124	(33.3)	2549	(31.5)	12673	(32.9)	
1 or more	20294	(66.7)	5550	(68.5)	25844	(67.1)	
Indicators	Capitals						p*
	Non MM		MM		Total		
	N	%	N	%	N	%	
Medical referrals to:							
Specialists							<0.001
none	127472	(97.9)	7193	(96.9)	134665	(97.9)	
1 or more	2716	(2.1)	233	(3.1)	2949	(2.1)	
Hospital							0.011
none	120371	(92.4)	6800	(91.6)	127171	(92.4)	
1 or more	9886	(7.6)	623	(8.4)	10509	(7.6)	
Emergency							0.626
none	91538	(70.5)	5246	(70.8)	96784	(70.6)	
1 or more	38229	(29.5)	2163	(29.2)	40392	(29.4)	
Consultations to health education groups							0.61
none	14430	(34.3)	2401	(34.0)	16831	(34.3)	
1 or more	27639	(65.7)	4663	(66.0)	32302	(65.7)	
Indicators	Other locations						p*
	Non MM		MM		Total		
	N	%	N	%	N	%	
Medical referrals to:							
Specialists							<0.001
none	324129	(96.5)	16214	(95.8)	340343	(96.5)	
1 or more	11704	(3.5)	704	(4.2)	12408	(3.5)	
Hospital							<0.001
none	248266	(75.9)	12007	(72.9)	260273	(75.8)	
1 or more	78698	(24.1)	4472	(27.1)	83170	(24.2)	
Emergency							<0.001
none	205255	(61.9)	9380	(56.2)	214635	(61.7)	
1 or more	126101	(38.1)	7298	(43.8)	133399	(38.3)	
Consultations to health education groups							0.323
none	30062	(32.3)	5258	(31.9)	35320	(32.3)	
1 or more	62949	(67.7)	11209	(68.1)	74158	(67.7)	

* Statistical test used: Pearson's chi-square test.

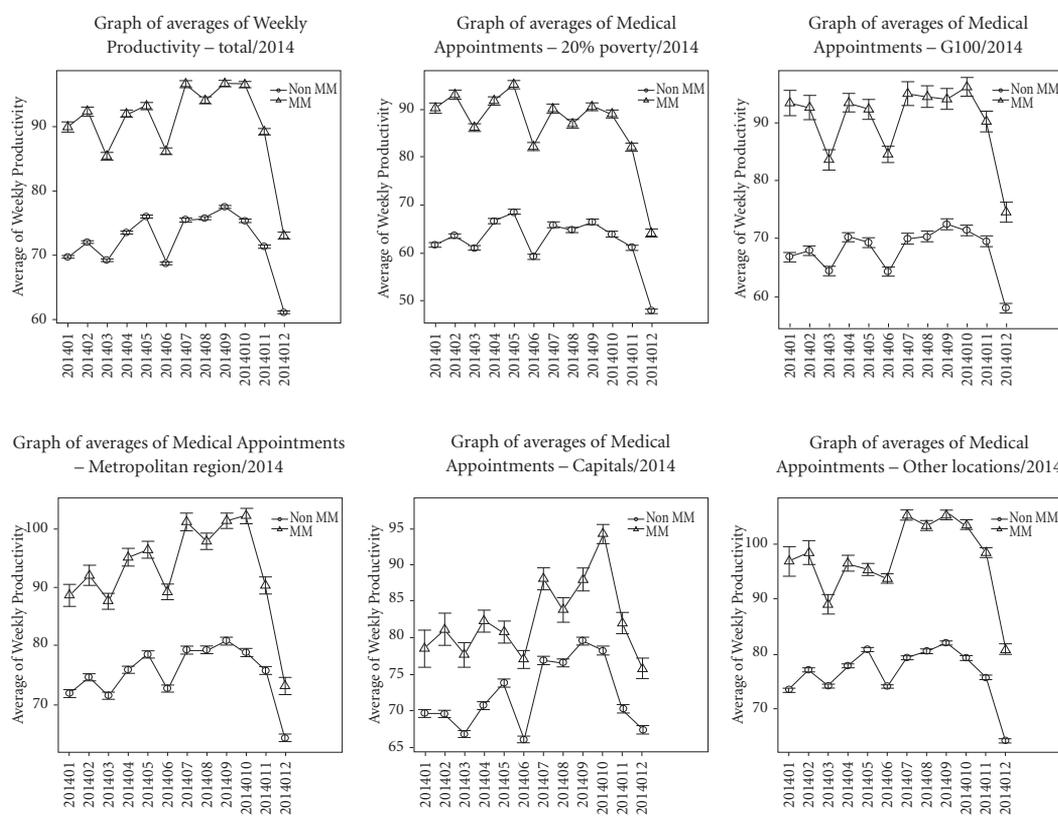


Figure 1. Comparison of weekly productivity of the total of medical appointments in accordance with the profile of Brazilian municipalities – 2014.

the expected number of primary care consultations, which implies that an FHS physician's output is below the expected average recommended by the Ministry of Health. The performance of a physician varies between 251 and 305 consultations per month in the poorer districts and in other areas of the country, respectively. According to Silva, Barbosa and Rocha, these findings show that the performance of a physician is influenced by the family health team, rather than by existing infrastructure, the time a physician has worked in an area or his qualifications as a doctor¹⁸. It is possible that, generally, it is difficult to attain the number of monthly consultations expected through primary health care work, which requires home visits, activities involving health education and consultations by demand, which are either pre-scheduled or spontaneous, which may possibly influence the total number of consultations given in the course of a month. It should also be remembered that this analysis included all the months of the year, including December, which is a period of low productivity.

In Brazil, the expansion of Primary Health care has been made possible by means of the Family Health Strategy (FHS) and the deployment of the *Mais Médicos* Program has represented an effective reduction in the inequalities of access to these services. According to our findings, there was a higher productivity of medical consultation in the *Mais Médicos* teams in municipalities classified as being socially more vulnerable, which suggests that the aim of the program has been achieved, being a wide-ranging measure to combat inequalities of access to effective primary care^{5,7,8,11,19,20}. This relationship is inverted in the case of municipalities located within metropolitan regions or in capital cities, which would indicate that in these places there are other care outlets, thereby acknowledging the complimentary value that the *Mais Médicos* Program represents within the ambit that offers primary health care services. It was possible to observe greater weekly output from the *Mais Médicos* teams in all areas of the study, especially in the poorer municipalities and those which

had the worst HDI. This is due to the total hours worked per week (32 hours) that dedicate nearly one day a week to activities related to study, which suggests that it would be possible to include periods of time for continued educational studies as part of the daily working routing of a Non-*Mais Médicos* team, in order to train in FHS work processes^{3,21,22}. According to Ceccim and Merhy, ongoing education therefore becomes a strategy used to change the working process and for investment in care practices that aim to articulate learning in the workplace and, based on this work and what this produces, commitments in support of the health care needs of the population²³. The weekly output of a *Mais Médicos* team reveals the possibility of implementing regular study periods or activities that reflect the working world to enhance the quality of the Non-*Mais Médicos* teams without loss of performance.

Few medical referrals were registered for specialist care with peculiarities inherent to the system of regulation and the constitution of the care system network for each type of municipal profile. We found 2.8% of some type of referral to a specialist, 19.3% for hospital referrals and 35.8% for emergency referrals in the sampling of the Brazilian municipalities analyzed. Health regulations are understood to be “a set of mediate actions, which are interposed between the demands of users and their access to health services, translated into workflows, care protocols, examination and consulting centers, as well as related work procedures”²⁴, by means of central regulations, that involve the logic health care areas and issues. Primary health care referrals to specialized services still represent a considerable challenge for the SUS in municipalities that have a lower intermediate technological density. There is evidence of logistical difficulties given the physical distances that limit the access of users to health services, with non-existent ambulance services, as well as problems with accessing the regulatory services (SISREG) in the case of medical referrals. These two factors make it difficult for the population living in smaller municipalities to have access to more complex health services, which generates a significant number of absenteeisms²⁵. However, a high number of non-referrals can indicate problems related to filling in the required forms online, a fact that was not clarified by the analyses conducted in this study.

The fact that few emergency referrals are registered may indicate a more effective primary health system. In areas that are more dependent on primary health, the reduced number of refer-

als shows that primary health care is incorporating emergency care and widening the scope of practices that are conducted on a regular basis. In our findings, there is a lower number of non-referrals to specialists and hospitals in 20% of the poorer municipalities (97.9%) and G100 (97.6%), when compared to the total sampling of Brazilian municipalities (97.2%). These findings lead us to conclude that the physicians in these locations tend to choose a more local response, which may suggest a more effective health care service. Regulations cannot be thought of from the point of view of the rationalization of resources, which is contrary to the guiding principles of the SUS²⁴. Primary care has an inherent technological complexity and density that is exercised on a daily basis through work organization and management, which implies that the effectiveness of primary care, with its system of referral and counter-referral and the continued and comprehensiveness of care provided, gains consistency with the presence of health care teams in the districts. Problems with regulations become more complicated when, in regions where prior access was more restricted, the number of physicians increases with the *Mais Médicos* Program, producing a greater number of referrals, making the shortage of specialists even more acute. We have to consider the existence of repressed demand, restricted access, the lack of agility to access referral services, a lack of definition related to the flow of referrals and counter-referrals and the failure to implement lines of care, as limitations of a network service, which jeopardizes its operation²⁵. The *Mais Médicos* Program illustrates the problems that exist between the different levels of health care, without dealing with issues related to a low level of effectiveness in health care. On the contrary, we understand that the regulatory problems indicate an important aspect of effectiveness for managers and professionals as something that needs to be faced in the services on a daily basis. It was also observed that the physicians belonging to the Non-*Mais Médicos* teams made more referrals to specialist and emergency care in the capital cities. In more vulnerable municipalities, Non-*Mais Médicos* Program professional teams make more referrals to hospitals, leading to the hypothesis that worse health conditions are caused by obstacles found in accessing these services. Physicians who are part of the family health strategy, irrespective of their group, make an equal number of hospital referrals. The flow of a care network can be jeopardized, if key points of health care are in some way restricted,

which thereby prejudices the management of the system. This can be seen in poorer municipalities where access to emergency services and specialist care are not advantageous, especially as patients depend on ambulance transportation for long distances^{7,26}. The fact is that in all cases efforts are made to promote equity in access to health services so as to ensure comprehensive health care that adjusts its offer of available care services according to the needs of the users.

We found that the number of educational activities conducted by the health teams is similar for both groups. In relation to the services that the teams provide for health education groups, the *Non-Mais Médicos* Program teams showed a higher monthly output, while the *Mais Médicos* teams carried out more educational activities in the capital cities and municipalities in general. These findings can be partly explained by the fact that physicians are more actively involved in outpatient care, in most cases, through scheduled or spontaneous consultations, even in primary care. Although educational activities are seen as a powerful health promotion instrument, there are still certain barriers that make it difficult to implement fully, since these activities have to compete with the time a physician still has available, after dealing with his outpatients, home visits and emergency work. We noted that the variable in question is the sum total of the actions promoted by the health team, which indicates that the community health agent has assumed, to a large extent, the responsibilities for educational activities and, on the other hand, that the physician, independent from the group, does not interfere in the way a team carries out health educational activities for the benefit of the population.

Among the limitations of this study, we would highlight the inconsistencies of the database made available by the Ministry of Health. According to the report issued by the Federal Court of Auditors, duplication of production data was detected (number of medical consultations, requests for tests and home visits), which showed several municipalities with identical production numbers in consecutive months in 2013, as well as the presence of monthly production data (for example, the number of medical consultations) that did not tally with the trends seen in the municipalities that were assessed. Bearing in mind the relevance of these findings, this study identified the same problems and developed a protocol to validate information that exists in the two main national primary care systems, so as to construct an integrated database using

production indicators for primary health care in Brazil. In this respect, the method used in the study also represented a significant finding, since they assess solutions found by control organs and return concise information to the health sector to help them prepare their planning schedule, as well as to help control, monitor, assess and audit health services. Nonetheless, the findings of this study point to the need for new studies about the working procedures of the medical professional together with his team, medical production by team and by municipality in the area of maternal-infant health care and for chronic non-communicable diseases, studies to analyze health practices from the perspective of networks, it being up to social and political studies, based on problems detected in the course of the realities experienced, to attain, for the purpose of a critical reflection, more effective actions in primary health care^{19,20}.

This study concludes that the primary care medical output for 2014, in addition to the *Mais Médicos* Program, contributed towards ensuring that Brazilians had access to health services, measured by the number of consultations, weekly productivity, medical referrals and educational services provided by FHS teams, which are seen as being indispensable to ensure the effectiveness and comprehensiveness of health care. In addition, the *Mais Médicos* Program showed that it was a complementary primary health care program and that it seeks to meet its objective in allocating medical professional to different regions of Brazil, highlighting in particular those areas that have the greatest needs and are considered to be the most socially vulnerable, so as to reduce the inequalities of access to health care services^{3,5,20}.

Collaborations

FS Costa, AS Balieiro worked on the text, on the construction of the figures and tables. RTS Lima, TG Fernandes, JC Schweickardt, JMA Schramm, AA Ferla worked on the concept, on the text and final draft of this article.

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