# The *Mais Médicos* (More Doctors) Program: the placement of physicians in priority municipalities in Brazil from 2013 to 2014

João Paulo Alves Oliveira <sup>1</sup> Mauro Niskier Sanchez <sup>1</sup> Leonor Maria Pacheco Santos <sup>3</sup>

> Abstract The inadequate placement and distribution of health professionals are problems that occur in various countries. The scope of the "Programa Mais Médicos" (More Doctors Program) was to reduce the shortfall of physicians and diminish regional inequalities in health. A descriptive study on the placement of physicians between 2013 and 2014 using the Ministry of Health database is presented. There was an allocation of 14,168 physicians to the 3,785 municipalities that signed up to the program: 2,377 met the priority and/or vulnerability criteria and received 77.7% of the physicians; 1,408 received 22.3% of the physicians, but did not meet the established priorities. This study reveals the reduction in the lack of physicians, mainly in the North and Northeast. These regions account for 36% of the Brazilian population and 46.3% of the physicians were allocated there. However, the introduction of an eligibility profile, which allocated 3,166 physicians in 1,408 non-priority municipalities is questionable. The conclusion drawn is that this may have hindered the ability of the Mais Médicos Program to fully achieve its objectives as a public policy aimed at reducing regional inequalities of access to primary healthcare. Further studies are necessary to evaluate the impact of the Mais Médicos Program.

**Key words** Mais Médicos Program, Human Resources in health, Health evaluation

<sup>&</sup>lt;sup>1</sup> Departamento de Saúde Coletiva, Universidade de Brasília. Campus Universitário Darcy Ribeiro, Asa Norte. 70910-900 Brasília DF Brasil. joaopaulo.aoliveira@ gmail.com

### Introduction

The inadequate supply and distribution of health professionals and services are problems that occur in various countries worldwide. When it comes to remote, poor and peripheral regions the situation is even more serious. Poor geographical distribution of health professionals, especially physicians, is a difficult situation to resolve. Countries with different economic and political systems and levels of wealth have developed different strategies to tackle the problem<sup>1,2</sup>.

Venezuela launched the *Mission Barrio Adentro* program in 2003, bringing over 20,000 physicians from Cuba to work in primary health care. In addition to this, it promoted the return of 3,328 Venezuelan students trained in general medical practice in Cuba during the course of the program<sup>3</sup>.

In Australia, for many decades past, Australian physicians trained abroad and foreign graduates trained in Australia have been sent to remote regions. They are hired for up to ten years with incremental remuneration according to the distance between the geographical area of activity and the nearest urban center.

Mexico, like other Latin American countries, instituted mandatory social service for health professionals. Before receiving their diplomas, professionals must spend a compulsory service period in healthcare facilities located in areas where access is difficult and there is low socioeconomic development<sup>4</sup>.

The inequality generated by the lack of professionals and the difficulty of access to health services enhances a situation of underdevelopment in remote and isolated regions, inhabited mostly by low-income population. Some authors point out that these situations occur in synergy with other socioeconomic character of vulnerabilities such as food insecurity and illiteracy<sup>5</sup>.

In Brazil, health is a universal right guaranteed in the Federal Constitution of 1988. Since then, the State guarantees this right with the implementation of the Unified Health System (SUS), which as in other healthcare systems, suffers from problems of scarcity and poor distribution of physicians in its territory.

In 2009, it was estimated that 42% of the population lived in municipalities with a density lower than 0.25 physicians per thousand inhabitants. In the North and Northeast regions, the situation was even more serious. The North with 8% of the total population had 4.3% of the total of physicians. The Northeast with 28% of the population had 18.2% of the total of physicians¹.

Meanwhile, the Southeast, with 42% of the population, concentrated 60% of all physicians in the country<sup>5</sup>.

The creation of the SUS and the country's urban expansion process contributed, among other things, to the increase of jobs in health. However, the strategies implemented until recently, had not been sufficient to address the constant shortage and maldistribution of physicians across the country.

In 2013, two episodes were striking: the launch of the "Where's the doctor?" campaign by the National Mayors' Alliance, which requested the hiring of physicians, including foreigners, to work in primary healthcare<sup>6</sup>. The other was the wave of protests in the country's streets, where thousands of people dissatisfied with public services in the country demanded more investments in health, education and security<sup>7</sup>. The *Mais Médicos* program (PMM) was established in this institutional political context.

It is a program scheduled to last three years, with the possibility of extension, consisting of three action fronts: improving the physical structure of the primary healthcare network; educational reforms of schools of medicine and medical residency; and the supply of physicians in priority regions for the SUS<sup>8</sup>.

In section I of the first article of Law No. 12,871, of October 22, 2013 establishing the *Mais Médicos* Program<sup>8</sup>, reads "Art. 1. The *Mais Médicos* Program is hereby established, [...] with the following objectives: I - reduce the shortfall of physicians in priority regions for the SUS in order to reduce regional inequalities in health." It should be stressed that this law was the result of the conversion of Provisional Measure No. 621, of July 8, 2013.

In this respect, aiming to attain the proposed objectives based on the emergency supply of physicians, the "Projeto Mais Médicos para o Brasil" (More Doctors for Brazil Project) was established by Interministerial Ordinance No. 1369 of July 8, 2013. Among other provisions, the ordinance defined the priority regions for the SUS and the profile of physicians eligible for participation. It is important to note that the adherence of municipalities and physicians was not mandatory. Between 2013 and 2014, the Ministry of Health held five summons cycles of municipalities and physicians, through public call notices for adherence to the *Mais Médicos* program.

Bearing in mind that the *Mais Médicos* program is a public policy instituted to address the problem of shortage of physicians in priority areas in order to reduce inequalities, the efforts to

evaluate its implementation are of great importance. The modernization of public administration and the adoption of entrepreneurial public management principles foment the practice of assessment, which is already widespread in developed countries10. For Akerman and Furtado11 evaluation involves the systematization of given practices in conjunction with pre-established criteria in order to reach a consensus, a value judgment on the measures implemented, which provides input for decision-making. In this perspective of analysis, the technical aspects of policy operationalization and development are appraised12. The implementation of public policies as a field of study is linked to the possibility of in-depth understanding of the political and administrative processes and problems to be corrected13.

The scope of this study was to evaluate the implementation of the *Mais Médicos* program, based on the objectives and criteria defined in its regulatory framework, namely, reduce the shortage of physicians in remote areas to which access is difficult and reduce regional inequalities in health.

### Methods

This is a descriptive study of the deployment of the placement of physicians by the Mais Médicos Program, from 2013 to 2014, based on the normative goals of the program. Official data provided by the Secretary of Labor Management and Health Education - SGTES, the Ministry of Health (MOH), the coordination of the "Analysis of the effectiveness of the Mais Médicos Program in achieving the universal right to health and the consolidation of health Services Networks" research project, funded through Public Call MCTI/CNPq/CT-Saúde/MS/SCTIE/DECIT No. 41/2013 were used as a data source for the analysis. In the preparation of the charts the ArcGIS software (Free Trial version) was used with the municipal grid.

The data analyzed identified how many municipalities participated, had their registration cancelled, pulled out and did not sign up. The cancellation was considered as the withdrawal of registration and the withdrawal of approval to participate on the program.

For purposes of this research, the 294 physicians allocated in 34 Indigenous Health Districts – DSEIs were not considered because their geographical boundaries overlap the boundaries of municipalities, which in this case was the geo-

graphic unit of analysis. In addition to this, one of the advantages of using the municipality as the unit of analysis is the fact that these are areas with a degree of self-sufficiency in the production and use of health services. Thus, the population per se, based on its socioeconomic, demographic, epidemiological and cultural characteristics is what dictates the municipal health services<sup>14</sup>.

The analysis checked the regional distribution of the participating municipalities and was conducted on the basis of the priority and vulnerability criteria defined in the normative acts that regulated the implementation of the program, prevailing during the period under review. To achieve this, Interministerial Ordinance No. 1369 of July 8, 2013 and Call Notice No. 40 of SGTES/MS of July 18, 2013<sup>14</sup> and Call Notice No. 22 of SGTES/MS of March 31, 2014<sup>15</sup>, as described in Chart 1, were considered.

Another aspect studied was the placement of physicians based on the following characteristics of the professionals: a) Physician registered with the Regional Council of Medicine (CRM); b) Individual Exchange Physician - physicians trained abroad, entitled to exercise their profession without the CRM; and, c) Medical aid workers – physicians contracted for the program via the cooperation agreement with Cuba brokered by the Pan American Health Organization (PAHO) 9.

## Results

In the period analyzed, 3,785 municipalities in all regions of the country received 14,168 physicians contracted by the *Mais Médicos* program. A further 44 municipalities had their application rejected, 376 suspended their application and 1365 did not sign up. Thus, of the 5,570 municipalities in Brazil, 68% joined the *Mais Médicos* program.

In accordance with Table 1, it can be seen that among the municipalities that signed up to the program, 2,377 (62.8%) complied with one of the priority or vulnerability criteria, according to Chart 1, and 1,408 (37.2%) did not comply with any criteria and were considered "other municipalities" of the program.

The South region was the one that had the participation of municipalities located in metropolitan areas (22.6%). The Northeast was the region with the largest number of municipalities with 20% or more people living in extreme poverty that signed up to the *Mais Médicos* program. It was also the region with the largest number of municipalities included in the *Mais Médicos* program (1,318).

Chart 1. Profile of municipalities eligible for the Mais Médicos Program in the chronological order of establishment of priorities and vulnerabilities. Brazil, 2013-2014.

Profile of the Municipality	Description	Norm
20% of poverty	Municipality with 20% (twenty percent) or more of the population living in extreme poverty, based on data from the Ministry of Social Development and Hunger Eradication (MDS), available at the website www.mds.gov.br/sagi.	Norm Interministerial Ordinance 1.369/2013 Listed in Bid Notice No. 40/2013/ SGTES/ MS
G-100	Areas relating to the 40% (forty percent) of census sectors with the highest percentages of population in extreme poverty of the municipalities that are among the one hundred (100) Municipalities with more than 80,000 (eighty thousand) inhabitants, with the lowest public income levels "per capita" and high social vulnerability of its inhabitants (G-100).	Interministerial Ordinance 1.369/2013 Listed in Bid Notice No. 40/2013/ SGTES/MS
Capital	Areas relating to 40% (forty percent) of census sectors with the highest percentages of population in extreme poverty in the Capitals in accordance with the Brazilian Institute of Geography and Statistics (IBGE).	Interministerial Ordinance 1.369/2013 Listed in Bid Notice No. 40/2013/ SGTES/MS
Metropolitan Region	Areas relating to 40% (forty percent) of census sectors with the highest percentages of population in extreme poverty of the municipalities located in the metropolitan region in accordance with the Brazilian Institute of Geography and Statistics (IBGE).	Interministerial Ordinance 1.369/2013 Listed in Bid Notice No. 40/2013/ SGTES/MS
Other Municipalities	Areas relating to 40% (forty percent) of census sectors with the highest percentages of population in extreme poverty of other municipalities, according to the Brazilian Institute of Geography and Statistics (IBGE).	Introduced by Bid Notice No. 40/2013/SGTES/MS
Situations of Vulnerability	Municipalities with low/very low Municipal Human Development Index - MHDI; the regions of Vales do Jequitinhonha – Minas Gerais, Mucuri – São Paulo and Ribeira – São Paulo and Paraná; the Semi-Arid in the Northeast; with residents in remaining quilombo (descendents of slaves) communities; other municipalities located in the North and Northeast Regions.	Introduced by Bid Notice No.22/2014/ SGTES/MS in Item 2.2.3

**Table 1.** Profile of the municipalities participating in the *Mais Médicos* Program, per geographic region. Brazil, 2013-2014.

Profile of the Municipality	Geographic Regions of Brazil											
1101110 01 0110 11101101p willey	Mid-West		Northeast		North		Southeast		Sout		Total	
20% of poverty	32	10.8%	978	74.2%	221	60.9%	55	5.9%	48	5.5%	1,334	35.2%
G-100	9	3.1%	36	2.7%	14	3.9%	22	2.4%	12	1.4%	93	2.5%
Capital	3	1.0%	9	0.7%	7	1.9%	4	0.4%	3	0.3%	26	0.7%
Metropolitan Region	21	7.1%	39	3.0%	5	1.4%	113	12.1%	198	22.6%	376	9.9%
Vulnerability	27	9.2%	222	16.8%	107	29.5%	147	15.8%	45	5.1%	548	14.5%
Total of priority and/or	92	31.2%	1.284	97.4%	354	97.5%	341	36.5%	306	34.9%	2,377	62.8%
vulnerable municipalities												
Other municipalities	203	688%	34	2.6%	9	2.5%	592	63.5%	570	65.1%	1,408	37.2%
Overall Total of municipalities	295	100%	1.318	100%	363	100%	933	100%	876	100%	3,785	5 100%

The Southeast and South regions were the regions with the highest number of municipalities categorized as "Other locations" that joined the program, with 592 and 570, respectively. However, non-priority municipalities in all geographic regions of the country received physicians under the program (Figure 1B).

The analysis also revealed that 699 eligible municipalities, i.e. 22.7% of priority municipalities, did not register or canceled their registration with the *Mais Médicos* program, namely 450 in the Northeast region, 52 in the North, 101 in the Southeast, 75 in the South and 21 in the Mid-west (Figure 1B). Also, with regard to the profile of these municipalities, it is emphasized that 374 were municipalities with 20% or more of the population living in extreme poverty, one capital (Cuiaba), five municipalities of the G-100, 133 municipalities in metropolitan regions and 186 municipalities with some of the vulnerability situations.

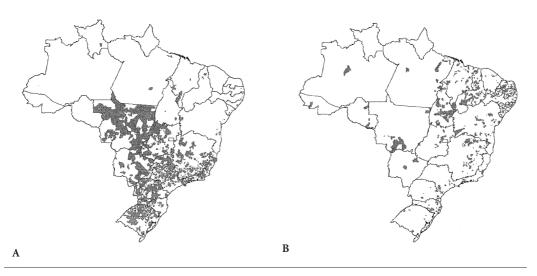
Between 2013 and 2014 the *Mais Médicos* program arranged for the supply of 14,168 physicians to the municipalities that joined the program. From the call notices for the selection of physicians an order of priority in hiring and placing in the vacancies offered was established. Thus, a physician registered with the CRM took precedence over the individual exchange student physician, who in turn had priority over the medical aid worker.

It should be stressed that the medical aid workers could not choose the municipality where they could work, since it was the MOH that defined the placement of physicians from the agreement with Cuba, unlike the others, who could state their preference as to the municipality of activity.

Another aspect regulated in the call notices was the ban on hiring exchange program physicians or conducting cooperative agreements within the scope of the *Mais Médicos* program if the rate of physicians per thousand inhabitants was less than 1.8 in the country of origin of professional practice<sup>16</sup>.

Among all the physicians hired by the *Mais Médicos* program, 11,150 were medical aid workers, resulting from the agreement signed between the Brazilian government and Cuba, which accounted for approximately 80% of the total. The Northeast region was the one that received the most medical aid workers, followed by the Southeast and South. In addition, the *Mais Médicos* program had the participation of physicians of 47 different nationalities.

However, in all regions of the country it was found that most of the physicians allocated were medical aid workers. In addition, the Northeast was the region that received the highest number of physicians registered with the CRM (965). As for the individual exchange program physicians, the South and Southeast regions were the ones that received the highest number, namely 418 and 346 respectively. It is noteworthy that the Northeast was the region that received the major-



**Figure 1. A** - Distribution of the municipalities that received physicians from the *Mais Médicos* Program without priority or vulnerability criteria. **B** - Distribution of municipalities eligible to participate in the *Mais Médicos* Program that did not sign up. (2013-2014).

ity of the physicians from the program (4,853), followed by the Southeast (4336). The data reveal a reduction in the shortfall of physicians in the North and Northeast. In these areas about 36% of the Brazilian population live and there was some positive discrimination, with the allocation of 6,565 physicians, which corresponds to 46.3% of the total (Table 2).

According to Table 3, the physicians registered with the CRM, i.e. those who chose the workplace, were allocated mainly in municipalities with 20% or more of the population living in extreme poverty (31.3%). One third of medical aid workers also went to municipalities with this profile (31.7%). Individual exchange program physicians opted mainly for metropolitan regions and capitals and, as a last option, for municipalities with some vulnerability situation.

The 2377 priority and vulnerable municipalities that signed up to the *Mais Médicos* program received 11,002 physicians (77.7%). The "other municipalities" received 3,166 physicians (22.3%), and 2,825 medical aid workers, who were allocated by the MOH itself. Physicians registered with the CRM and individual exchange program physicians were also allocated to non-priority or non-vulnerable municipalities.

## Discussion

The starting point of this study was item I of the first article of the law that created the *Mais Médicos* program, which set the objective of diminishing the shortfall of physicians in priority regions and reducing regional inequalities in health. The profiling to determine whether the municipality

**Table 2.** Distribution of the physicians participating on the *Mais Médicos* Program, per geographic region. Brazil, 2013-2014.

Profile of the Physicians	Geographic Regions of Brazil											
	Mid-West		Northeast		North		Southeast		South		Total	
Physicians registered with the Regional Council of Medicine (CRM)	134	15.1%	965	20.0%	194	11.3%	395	9.1%	146	6.1%	1,834	12.9%
Individual Exchange Physician	96	10.8%	194	4.0%	130	7.6%	346	8.0%	418	17.6%	1,184	8.4%
Medical Aid Workers Total	660 890	74.2% 100%	- ,		- 1	81.1% 100%					11,150 14,168	

**Table 3.** Physicians participating on the *Mais Médicos* Program per priority and vulnerability profile of the municipalities. Brazil, 2013-2014.

	Profile of the Physicians											
Profile of the Municipalities	Physicians with the Region of Medicin	onal Council	Indiv Exchange Phys	Program		cal Aid rker	Total					
20% of poverty	574	31.3%	149	12.6%	3,538	31.7%	4,261	30.1%				
G-100	264	14.4%	149	12.6%	780	7.0%	1,193	8.4%				
Capital	324	17.7%	301	25.4%	858	7.7%	1,483	10.5%				
Metropolitan Region	351	19.1%	326	27.5%	1,603	14.4%	2,280	16.1%				
Vulnerability	152	8.3%	87	7.3%	1,546	13.9%	1,785	12.6%				
Total of physicians allocated to priority and/or vulnerable municipalities	1,665	85.5%	1,012	85.5%	8,325	74.7%	11,002	77.7%				
Physicians allocated in other municipalities	169	9.2%	172	14.5%	2,825	25.3%	3,166	22.3%				
Overall Total of Physicians	1,834	100%	1,184	100%	11,150	100%	14,168	100%				

was eligible or not to participate in the program was an arrangement to guide the implementation of the emergency supply of physicians.

Following the line of thinking of Menicucci<sup>17</sup>, the contention is that the implementation promotes retro-feedback effects on the formulation process. Furthermore, it is acknowledged that the formation of policy occurs when there is integration between the processes of formulation, implementation and evaluation of policy<sup>18</sup>. Greater adherence of priority municipalities in the North and Northeast regions, where the shortfall of physicians reflects the serious socio-economic conditions experienced, is emphasized6. There is evidence that the *Mais Médicos* program promoted the reduction of the shortfall of physicians in priority and vulnerable regions, with the allocation of 11,002 physicians, and this was only possible due to the fact that the Mais Médicos program innovated by making international calls for the recruitment of physicians and the cooperation agreement with Cuba mediated by PAHO: an innovation on other strategies implemented prior to that time in Brazil.

The acknowledgement of municipalities in vulnerable situations contributed to specify other areas that should be prioritized due to the shortfall of physicians and the difficulty of retaining them, especially those who are members of the Family Health Strategy (ESF) teams.

Nevertheless, the results draw attention to possible shortcomings in the implementation of the *Mais Médicos* program. The first deals with the subsequent creation of a profile that enabled the inclusion of 1,408 non-priority municipalities when the program corresponding to "Other municipalities" was formulated.

The National Council of Health Secretaries (CONASS), by means of Technical Note No. 23/2013, confirms the decision that only the Capitals, Metropolitan Regions, G-100s, municipalities with 20% or more of the population living in extreme poverty and those with any of the vulnerabilities described were priorities for the purposes of the *Mais Médicos* program<sup>19</sup>.

O'Brien and Lianjiang<sup>20</sup>, considers that a degree of discretion on the part of those in charge of the implementation may be desirable as they have more local knowledge and can innovate and adapt the plan. However, it is important to keep the focus regarding the objectives of the policy, which was formulated to act on a previously defined situation. The creation of the "other municipalities" profile leads to prejudice in the prioritization of vulnerable regions.

At the time of the formulation of the *Mais Médicos* program, it was common knowledge that regional inequalities in health in Brazil are enormous. For example, the Southeast with 2.6 physicians per thousand inhabitants has a concentration of 2.6 times more physicians compared to the North (0.98)<sup>21</sup>. Paim<sup>22</sup>, considers that some evidence indicates that over the years there has been a reduction in inequalities in the distribution of SUS resources in Brazil. However, the North and Northeast regions still need a better redistribution of resources in their favor.

The second shortcoming of the implementation was that 22.7% of priority municipalities for the SUS were left out of the initiative, due to the fact that inclusion of the municipalities is not mandatory. Among these municipalities, 72% are located in the North and Northeast regions. The needs of 100% of the municipalities that joined were met, however, it must be recognized that in practice the demand was greater.

The results of this study clearly reveal the contrast in the distribution of non-priority municipalities and those that were eligible but did not sign up to the *Mais Médicos* program, as shown in Figure 1. Furthermore, regarding the required number of physicians, a recent study indicated that, in practice, the need for physicians was greater. The municipalities that joined between August 2013 and July 2014 requested 15,460 physicians and the program attended 93.5% of this demand<sup>23</sup>.

In areas of the country and the outskirts of large cities where access is difficult, the population cannot avail itself of health services. In order to change this reality what was needed was for physicians to work together with the other professionals of the ESF teams. Without the presence of physicians, catering to the health needs of the population is prejudiced and comprehensive actions in healthcare are limited due to the shortfall in the team.

In its Audit Report No. 005391/2014-8, the Federal Audit Court (TCU) also pointed out that the process of supply of physicians for the PMM featured some problems. In the document, the TCU pointed out that as of May 2014 the Ministry of Health had left 592 priority municipalities for SUS out of the *Mais Médicos* program<sup>24</sup>. The TCU infers that one of the causes for the poor distribution may be related to the system of selection of the participating municipalities, since it was the municipality itself that expressed interest and indicated the number of physicians required. Thus, although there is respect for

the autonomy of the federal entities, those municipalities with more aptitude in planning and management benefitted to the detriment of less well-structured municipalities<sup>24</sup>.

Lima and Luciano<sup>13</sup>, argues that many factors influence the results of the implementation process. Among these he highlights the variables related to regulations and the clarity with which the plan explains the implementation process. Others are variables of political and economic context and derive support, resistance to or boycott of the policy, on the part of the social actors that influence the availability of resources essential for successful implementation.

In fact, to legitimize a policy it is necessary to consider that the information is never perfect, as a consensus is reached progressively and resources are limited. Since its announcement, the creation of the *Mais Médicos* program generated intense dispute in the country. There was fierce confrontation between the different social actors, especially government officials, medical corporations, political parties and the National Congress. Some medical organizations even filed two lawsuits alleging unconstitutionality in the Supreme Court in an attempt to prove that the program contravened constitutional provisions<sup>25</sup>.

For its part, the media promoted a stir around the *Mais Médicos* program, expounding theses and discussions, which were not always accurately portrayed. Nevertheless, it contributed to the staging of surveys and polls that gradually garnered favorable results for the *Mais Médicos* program.

In August 2013, a Datafolha survey reported that 54% of the people interviewed approved of the *Mais Médicos* Program<sup>26</sup>. Research of the National Transport Confederation (CNT) showed 49.7% approval in July 2013, followed by 73.9% in September and 84.3% in November of the same year<sup>27</sup>.

Although several initiatives implemented in recent decades sought to reduce health inequities, sometimes combining technical criteria for resource allocation, at other times promoting the staging of analyses that could assist in health policy formulation oriented towards equity, evidence shows that the quality of life, leisure, the distance to the central areas of large cities and the average income are more significant to explain the presence of the physician in municipalities<sup>28</sup>.

Therefore, it would seem that when the priority municipalities were defined, they were the ones that offered the least conditions to the population to exercise the right to health in terms of the lack of physicians. In this sense, it is important that all priority municipalities for the SUS should be attended by the *Mais Médicos* program in order to reduce the shortfall of physicians and guarantee access to health services for the population. Among other aspects, the lack of physicians is a characteristic that impedes the ability of the population to use health services.

### Final considerations

The primary objectives behind the creation of the *Mais Médicos* program were to guarantee access to and reduce inequalities in health. Rectifying the unequal distribution of physicians is not an easy task, nor even feasible in the short term. The solutions are not simple, though the development in tandem of different strategies may achieve promising results.

For the operation of public policies as a tool of social inclusion, it is necessary to ensure the implementation of mechanisms to increase their effectiveness, efficacy and efficiency, including: the formation of social capital; the effective evaluation of public policies, with the ensuing use of the results thereof.

The *Mais Médicos* program has enabled increased access to primary care services in thousands of Brazilian municipalities. However, the introduction of the "other municipalities" profile that enabled the participation of so many non-priority municipalities may have had repercussions on results of the program other than those expected in terms of reducing regional inequalities in health, when one takes the increased number of physicians into consideration.

It is also important to stress that even in non-priority municipalities there are vulnerable population groups with limited access to physicians and medical services. However, the conclusion drawn is that the allocation of physicians in non-priority or vulnerable municipalities impacted the ability of the *Mais Médicos* program to reduce regional inequalities in access to health care even more significantly, which calls for studies to check the possible effects in the medium term.

## Collaborations

JPA Oliveira worked on the initial draft, research, methodology and final draft. MN Sanchez worked on the research, the final draft and critical review. LMP Santos worked on the initial draft, methodology and critical review.

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