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Articles

Brazilian More Doctors Program: assessing the implementation of the Education Axis from 2013 to 2015

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The More Doctors Program (PMM) was created in 2013. Guided by social needs, it set a new regulatory framework for medical education and residency in Brazil. This study is based on public policies and their actions aimed at implementing changes in medical education in PMM, as well as their results until 2015, by analyzing documents from official sources and the literature. The following results were identified: decrease in regional inequalities in the distribution of undergraduate course seats; education internalization; increase in medical residency seats specialized in Family and Community Medicine; expansion of preceptorship qualification; and creation of the National Registration of Specialists. The challenges faced by PMM to effectively achieve its goals, the need for State commitment and the current threats to this vital dimension of the program (ensure the right to health) are pointed out.

Keywords: Primary healthcare. Medical education. More Doctors Program. Public policies.

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Introduction

The More Doctors Program (PMM) was created in 2013 with the objective of addressing the challenges faced by the expansion and development of primary healthcare and the Brazilian National Health System (SUS)[1]. PMM is structured in three axes: emergency provision, infrastructure and medical education[2]. Emergency provision is based on calls for doctors to join Family Health Strategy teams in territories that lack specific professionals. Infrastructure is characterized by the contribution of resources to reform, expand and build new Primary Care Units. Lastly, the medical education axis is aimed at expanding and qualifying the education of doctors in Brazil, according to SUS needs[3].

The attempt to bring university education and health systems closer to each other is not a new goal, neither is it specific to Brazil. The World Health Organization (WHO) considers this attempt a challenge to all countries and its object of technical collaboration[4,5].

In Brazil, several initiatives were proposed since the 1970s, aimed at adapting medical education to the population's health needs. The Pan American Health Organization (PAHO) was part of several of these processes, supporting and fostering changes in medical education. Initiatives as the Teaching-Healthcare Integration project, in the 1970s, and the "UNI: a new initiative in health professionals' education" project, in the 1990s, are considered some of the grounds for a better teaching-service-community integration[6]. Another important movement of assessment and proposition of changes in education was the National Interinstitutional Commission for Evaluation of Medical Education (CINAEM) project, comprised of several entities[7].

Prior to PMM, there were some recent initiatives aimed at expanding medical education[8,9]. The first movement of internalization and expansion of Federal Higher Education Institutions and of undergraduate medical courses offered by these institutions started in 2003. The Brazilian Ministry of Education (MEC) called it Phase 1 Expansion. The Reuni Program, created in 2007, guided the restructuring of Federal Higher Education Institutions as a second movement that stimulated the internalization and increase in seats.

The third movement was the Qualification Program for Primary Care Professionals (PROVAB)[10], created in 2011 by the Brazilian Ministry of Health, to provide areas that are hard to reach or with vulnerable population with doctors. The program developed distance education strategies, such as specialization in Family Health and Telessaúde, in-person and distance supervision activities, as well as a 10% additional score in examinations for Medical Residency Programs[3]. In its essence, PROVAB follows international experiences that aim at creating strategies to address the need for a medical education that is committed to internalization and encouragement to retain doctors in rural areas in an attempt to address social demands[11].

When PMM was launched, although there was a significant number[7] of medical schools in Brazil, the proportion of graduate medical students per inhabitant was lower than the average of the Organization for Economic Co-operation and Development (OECD) member countries. While in Brazil there were 14,634 graduate students in 2011, an average of 0.74 per 10,000 population[12], the United Kingdom and Australia had, respectively, averages of 1.1 and 0.9, and the OECD countries, 1.06[13]. Besides

lacking seats, the Brazilian distribution was unequal, with a greater concentration in the largest and wealthiest cities, capitals and the Southeast and South regions[3].

Regarding the education of specialists, lack and poor distribution of residency programs were observed in the same period. This education stage was considered inadequate to SUS and the population's health needs[14,15]. In late 2012, there were only 11,468 direct-access residency seats for 2013 to 15,804 graduate doctors, i.e., there was an imbalance between the number of graduate students and residency seats.

Historically, the Brazilian medical residency has been basically provided with public funding. However, until now, there were no defined mechanisms to regulate the need and distribution of specialists, as there are in other countries with successful experiences in education in universal health systems[3,4,6]. In this national scenario, great disparities are observed in the education process. In 2014, family doctors represented less than 2% of the country's doctors and only 5% of the doctors who worked in family health teams. These numbers show a significant imbalance between need and offer[16,17].

PMM's education axis tried to reorganize the process to offer new medical courses and residency seats. It prioritized health regions with a lower proportion between seats and doctors per inhabitant and a health service structure that enabled to offer an adequate field of practice to education. The law established new National Curricular Guidelines that conditioned the opening and operation of courses to their effective implementation.

PMM proposed the universalization of medical residency seats, defining the Family and Community Medicine specialization as a path for the education of specialists in Brazil. The program also instituted the Education-Health Public Action Organizational Contract (COAPES) as a contracting tool of teaching-service integration[18,19].

This study describes and reflects upon how the education axis was proposed and developed, analyzes data related to its implementation and assesses the results obtained from 2013 to 2015. The educational scope is PMM's main strategy to increase the number of doctors in Brazil from 1.8 per 1,000 population (in 2013, when the program was created) to the goal of 2.7 per 1,000 population in 2026[3].

Therefore, this study aims at describing, systematizing, analyzing and assessing the results obtained from 2013 to 2015 in PMM's education axis in order to identify the impacts and developments in health and education. This process was oriented by the following guiding questions: Did PMM effectively increase the number of medical schools and residency programs in higher proportion than in previous periods? Which were the characteristics of this expansion when compared to previous periods? Did the program change the legal framework and public policy tools related to the education's guidance and quality and the expansion's regulation? Are these changes sustainable? Or do they enable to resume this strategy in the future?

Methodology

This is a documentation study that reviews the literature related to PMM in a non-systematic way using SciELO and PubMed's online databases. The following descriptors were used in the search bar (including all indices): *Programa Mais Médicos* (More Doctors Program), *Mais Médicos* (More Doctors), *educação superior* (higher education), *faculdades de medicina* (schools of Medicine) and *educação médica* (medical

education). The English, Portuguese and Spanish languages were taken into consideration, from 2002 until the present moment.

A retrospective documentation analysis was conducted in order to identify rules (laws, regulations, decrees, directives, technical notes with determinative power) provided by the federal government on websites related to the program. Documents and publications were also analyzed. It was possible to identify, describe and systematize the program's objectives, justifications and expected results. These results were then correlated with changes in regulated public policy tools or with the creation of new tools in order to build a general action framework that structured meanings[20].

The resulting model was used to structure the analyzed policy (instead of other potential models). After creating this model and identifying previous policies applied in other countries for similar social problems and issues[21] and taking into consideration the research questions, we searched for evidence of policy implementation both in reports and literature, and in the analyzed databases. This search was structured based on typical implementation assessment study designs[21,22] considering the degree of accomplishment of the suggested objectives and the regulatory impacts in the sector.

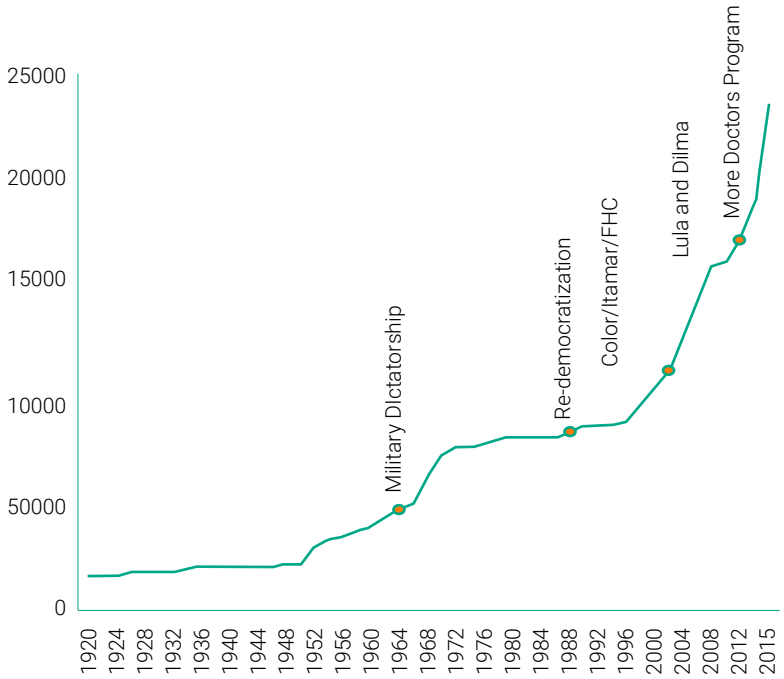
In order to analyze the process of expansion of undergraduate medical course seats, secondary data of public databases of the Directorate of Health Education Development (DDES), Division of Health Education Management (DEGES) and Planning and Regulation Division for the Supply of Health Professionals (DEPREPS) was used. Since there was no variable "number of seats upon creation of the course" in the available databases, the number of seats upon authorization of the course was considered instead. Population data was obtained from the Brazilian Institute of Geography and Statistics (IBGE).

The study was divided into five periods: from 1808 (creation of the first school of Medicine) to 1963 (immediately before the military dictatorship), from 1964 (military dictatorship) to 1987 (immediately before the constitution in effect), from 1988 (federal constitution) and 2002 (Collor and FHC presidencies), from 2003 (Lula's government expansion) and 2012 (Dilma's government before PMM), and 2013 to 2015 (Dilma's government during PMM)[23]. All graphs with the results take these periods into consideration. The undergraduate seats shown in the graphs are authorized by MEC. The municipal and state ones, in turn, are authorized by the State Education Councils.

Results and discussion

Graduation expansion

The creation of undergraduate medical course seats in Brazil is a late process when compared to other countries and with periods of slow expansion that resulted in deficit in the number of doctors in the country. Graph 1 shows an accented growth starting in 2003, particularly from 2013 on, with PMM. The average annual expansion after the program is 3.5 times greater than in the period of 2003 to 2012.



Graph 1. Undergraduate medical course seats per year of creation.

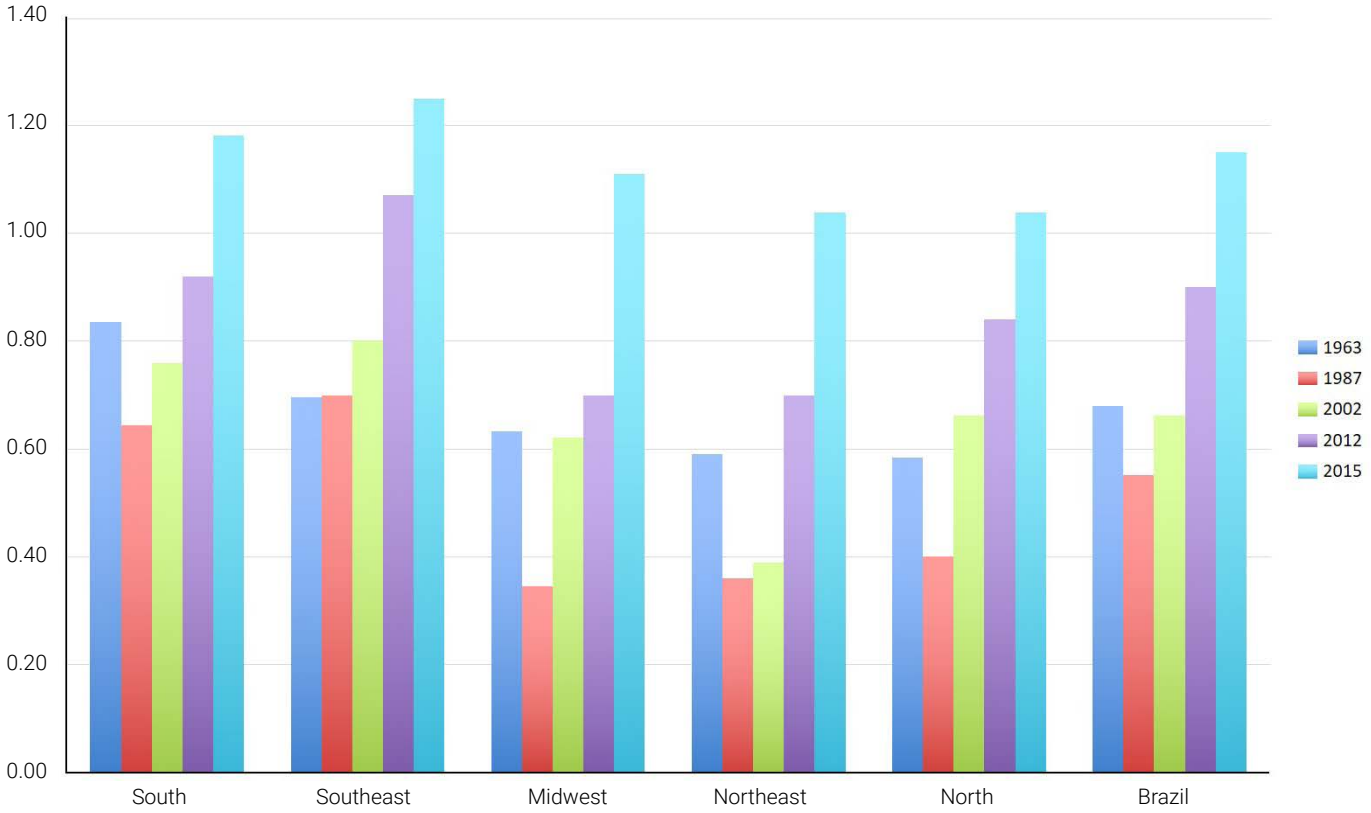
Source: DEGES and DDES data, 2015.

After 2013, the expansion was regulated by PMM's law and prioritized the opening of courses in regions with the lowest doctor-per-inhabitant ratio, strengthening internalization and reducing regional inequalities. Planned goals were based on projections, aimed at reaching 2.7 doctors per 1,000 population in 2026 and improving the country's distribution[3].

The expansion also presented a noticeable equality component, as shown in Graph 2. The North and Northeast regions, which have the greatest social needs and less ability to attract and retain professionals[24], had a per-population seat ratio historically lower than the South and Southeast regions. Until 2002, the number of seats per population in the Northeast (0.39/10,000) was half the ratio from the Southeast (0.8/10,000). From 2013 to 2015, 6,391 medical course seats were created, i.e., 55% of PMM's goal, which planned for 11,500 seats until 2017.

The National Expansion Policy of Medical Schools in Federal Higher Education Institutions, instituted under PMM's scope, was guided towards reducing regional inequalities, internalizing and adopting strategies to improve the quality of courses. Thereby, the selection of places to implement new courses and offer seats in existing courses was conducted according to the Federal Higher Education Institutions. The process was based on criteria such as priority to implement new courses in internalized campi and in regions with a lower ratio of doctors per population, particular the North and Northeast.

The distribution of seats enabled all the Brazilian regions to surpass the mark of 1 seat per 10,000 population. Additionally, the difference among them was significantly reduced, with a greater proportional growth in the regions that had the lowest ratios.



Graph 2. Evolution of medical course seats per 10,000 population, per region and period: Brazil, 1963 to 2015.

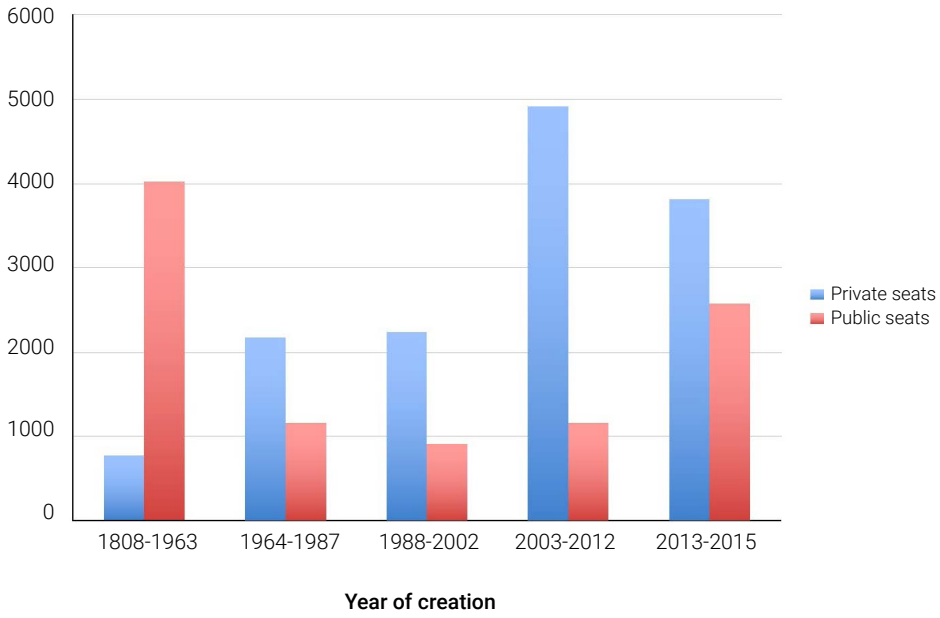
Source: DEGES and DDES data, 2015.

The Midwest and Northeast regions had a greater growth (58% and 48%, respectively) than the South, North and Southeast regions (28%, 24% and 17%, respectively). This proportional growth partially reduced regional inequalities, which might consequently result in a reduction in inequities in the provision of healthcare. The expansion advances are evident, though they did not reach the established goal. The legal and factual change in the way private schools expand was also evident, as further explained below.

Increase in seats in public and private institutions

PMM planned the expansion of medical course seats in public universities, particularly in Federal Higher Education Institution campi in provinces, created in the process of expansion of higher education that started in 2003[9]. However, after negotiations involving MEC, provosts, course coordinators and government coordinators of the economic area, the expected numbers for this expansion were lower than the goal set by PMM. Thereby, the difference between the final goal and new seats offered by Federal Higher Education Institutions would be transferred to the private sector[3].

From 2013 to 2015, there was an important public expansion with strong internalization due to the federal expansion program, which hired teachers and invested in infrastructure[25].



Graph 3. Evolution in the absolute number of open medical course seats, per nature (public or private) and period (1808 to 2015).

Source: DEGES and DDES data, 2015.

Most of the seats created from 2013 to 2015 were in private institutions. The greatest absolute and proportional expansion in private seats occurred from 2003 to 2012, with the University for All Program (ProUni) and the Student Loan Fund (FIES)[3].

The new regulatory framework for the expansion of private medical education established that the new authorization to open new courses would be granted to selected cities through public notices. Selection criteria included the health network structure, and the doctor-per-inhabitant and the seat-per-inhabitant ratios of each state. Upon registration, the cities had to present evidence of a qualified services network in an assessment *in loco* conducted by a committee related to MEC. Additionally, they had to make commitments as to maintain and qualify the network. In 2013, the first public call covering the entire country was published. In 2015, a specific public call for North, Northeast and Midwest cities was also published.

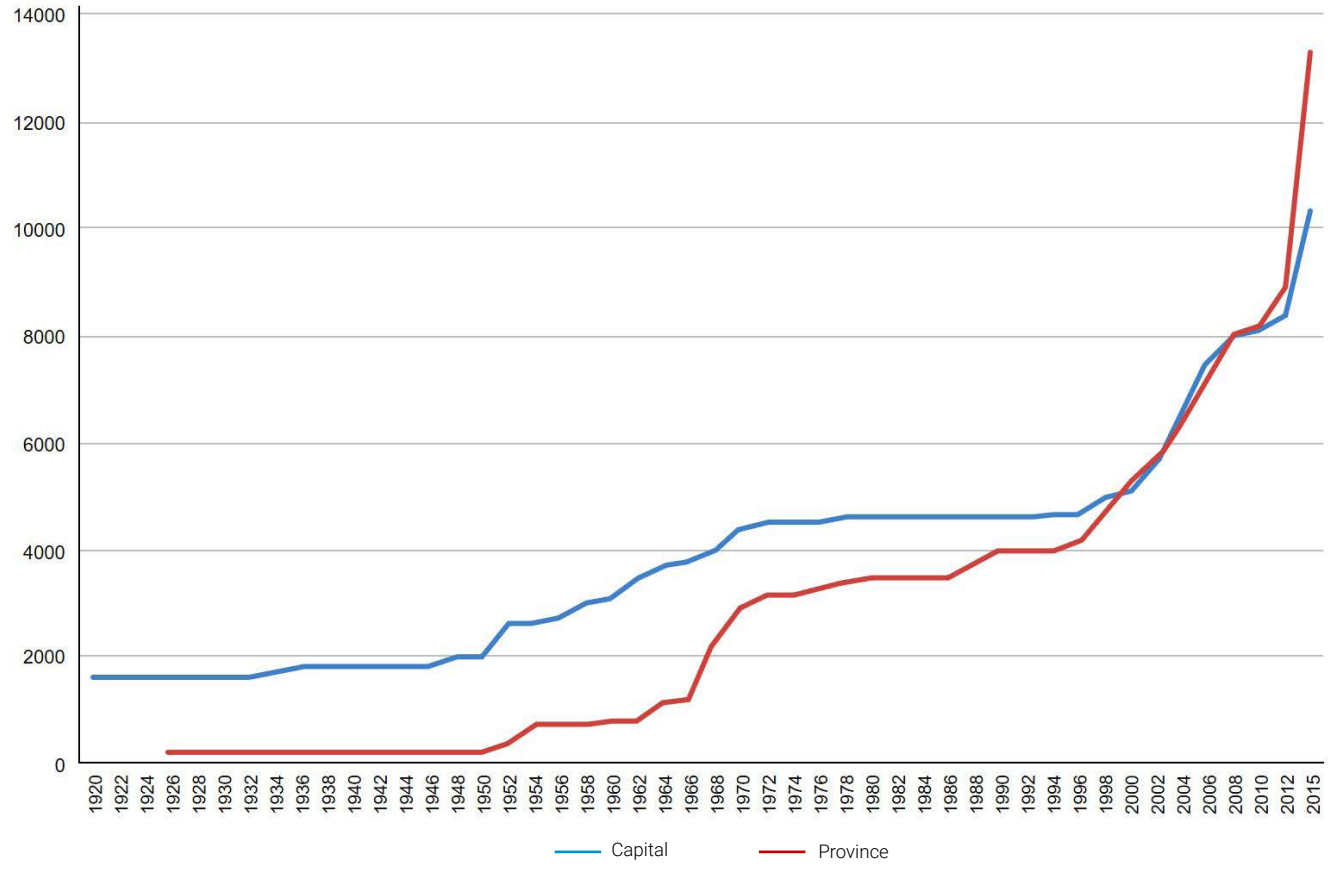
Supporting entities also started to be selected through public call notices in order to assess the ones that were able to create courses in the selected cities. The first notice was published in 2014 and established aspects that aimed at ensuring the feasibility and sustainability of the institution to implement a quality course adapted to SUS needs and to the new National Curricular Guidelines[26]. The criteria for choosing the supporting entities were: quality of the pedagogical project, course infrastructure and faculty, counterpart plan for the service structure, teacher education and development plan, medical residency implementation plan and student scholarship plan. According to this process, a committee comprised of specialists and representatives from MEC, the Brazilian Ministry of Health, the National Education Council (CNE) and the National Health Council (CNS) would oversee the selection.

Not all schools authorized after PMM's creation followed these procedures and criteria, precisely because the program's law established this regulation would apply only to new course opening processes[3], and there were pending requests in MEC.

The challenges of a predominantly private expansion process are understood, where an effectively committed medical education that addresses social needs and democratizes the access to higher education is questioned. However, it is essential to analyze the entire regulation format suggested by PMM, not only the nature of the seat (public or private), as some studies have done[23]. This analysis is important to study and understand the differences in the expansion process throughout history. Additionally, new studies are necessary to understand how policies to induce and regulate higher education interfere in the access to medical education and in the permanence of doctors in their respective regions. These are relevant issues when we observe that there are insufficient studies on this perspective related to PMM.

Education internalization

An internalization process able to revert the absolute number of seats in capital cities and provinces and an increase in the number of cities with medical schools was observed, as shows Graph 4.



Graph 4. Evolution in medical course seats, per location (Brazilian capital or province) and period (1920 to 2015).

Source: DEGES and DDES data, 2015.

Among the evidence that attracts and retains doctors in remote areas, those related to education involving actions in rural areas are highlighted – opening of medical courses or of rural internships. Additionally, having students from rural areas is another important initiative to retain doctors in those areas[27]. PMM's focus on opening medical schools follows similar programs from other countries, particularly rural medical experiences in Canada, Australia and South Africa[3,12,28]. According to Cahill (2017)[28], in Australia, 25% of the students must be from rural areas. For these students, where they live is more important than their grades. Therefore, even not achieving an adequate grade, they will be accepted in the course because they come from a rural area. The author also mentions that the probability of Aboriginals being accepted in medical schools is even greater, since the number of Aboriginal doctors is not enough.

PMM undertook the commitment of taking the health regions[26,29] into consideration when planning the distribution of seats, thus reverting regional inequalities. Calls were exclusively aimed at non-capital cities with no medical courses and located within at least 70 km from a city with medical schools. The second call aimed at specifically addressing states with insufficient seats, considering the goal of 1.34 seats per 10,000 population, in the North, Northeast and Midwest regions.

A total of 61 cities were qualified in both notices. The effective implementation of authorized seats would increase the number of seats in Brazil in 4,347. This increase would result in a significant boost of health regions with medical course seats from 143 to 204. However, this did not actually occur in the studied period, because the Federal Accounting Court suspended the first notice.

Medical residency expansion and regulation

There was an expansion in medical residencies in the last period, with increasing participation of the Ministry of Health by funding scholarships and a trend towards a greater state planning and regulation on the specialty and location of new seats, as explained below.

It is possible to observe a process of induction of the residency expansion and the intention to guide specialties since 2009, when the Pró-Residência program was created by the Ministry of Health. Pró-Residência fostered the creation of medical residency seats in SUS by funding scholarships to residents, prioritizing the North, Northeast and Midwest regions[3,13]. Another relevant measure was the publication of Directive 1248[30], of 2013, right before PMM was launched. This directive created, in an unprecedented way, a credit line of R$ 100 million per year to structure and support services that would expand residency seats in priority specialties and regions.

Considering the intervention of Pró-Residência, a study related to the period prior to PMM evidences a decrease in the unequal distribution of residency seats throughout the country[13]. After the creation of PMM and the legal regulations for the medical residency expansion, this trend was accentuated. The proportion of seats funded by the Ministry of Health was expanded (from 14.4% in 2012 to 32% in 2015). Additionally, seats were created in specialties and regions that used to lack this education option.

The significant growth in the number of residency seats (from 12,477 in 2012 to 22,064 in 2015) evidences the effort to regulate medical residency in order to qualify medical education by offering specialization and, more importantly, guide this offer according to SUS needs.

However, PMM's intended universalization defines an itinerary of specialist education. In this itinerary, Family and Community Medicine would be a prerequisite for most of the other specialties, except for nine of them (Medical Genetics, Sports Medicine, Rehab and Physical Medicine, Legal Medicine, Occupational Medicine, Traffic Medicine, Pathology and Radiotherapy), which add up to a small number of seats. Thereby, approximately 90% of the direct access seats would have to be to Family and Community Medicine. This would turn PMM's objective of having most doctors with a one or two-year education in this specialty into reality, even if they would subsequently work in a different specialty. Among the seats created in this period, 58% of them were indeed in the Family and Community Medicine area.

The creation of seats is absolutely insufficient compared to the need for creating approximately 16,500 seats to achieve universalization with Family and Community Medicine as a prerequisite. This might be one of PMM's goals that mostly require an institutional effort and ability to face resistances from medical corporation sectors that are against public regulations in medical residency and the establishment of Family and Community Medicine as a central specialty in the education of other specialties[31]. This institutional effort involved actions to make the implementation of programs feasible and to encourage graduates to take on residency seats.

As one of the actions in this field, the Ministry of Health and MEC launched, in late 2015, the National Preceptor Education Plan. The plan's objective was to foster and support the implementation of Family and Community Medicine programs, to qualify preceptor education and to offer incentives to working as a preceptor and to filling residency seats. The plan enabled the identification of existing preceptors in the healthcare network and ensured a new funding for its education. It also encouraged future specialists to study preceptorship during their residency in order to be inserted into this specialization field when they graduate.

Another measure was the creation, in October 2015, of the National Registration of Specialists. This registration gathered information of all specialist doctors in the country, their place of work, where and how they graduated. The objective was to plan and regulate the education of specialists, adapting it to the public interest and to the population's health needs[1,3,32].

Among the objectives and goals studied in this article, the following face the greatest resistance from a significant part of the medical corporation: determining the education itinerary of specialists, valuing Family and Community Medicine and expanding its seats towards universalization, and using the National Registration of Specialists to regulate the education of specialists. Analyzing the context and trends towards the correlation of forces does not justify an optimist point of view as to the achievement of these objectives in the short and medium term.

Medical education qualification

In 2014, the new National Curricular Guidelines were published by CNE. The creation process was comprised of public hearings and meetings with MEC; the Ministry of Health; university directors, teachers and students; SUS managers; and different sectors of the society, including CNS and medical entities. This action faced a great resistance from conservative education and medical practice sectors[33]. Until 2015, it was

possible to identify the progresses made in normative elements. However, it was not possible to identify which were the effects in universities and the relationship between education and health services.

The guidelines maintained the previous document's central elements and the graduate profile. They structured the development of competencies in healthcare, education and management, and strengthened the education of strategic areas to the development of SUS, such as primary healthcare, urgency and emergency, and mental health, particularly during the residency period. By adapting to changes in the Brazilian society, new elements were added to the education process and existing ones were reinforced. Examples of these elements are: respect to user's autonomy, patient safety, respect to human diversity, care for disabled people, care for ethnic-racial issues, interprofessionality and teamwork, socioenvironmental issues and the role of social determinants in the health-disease process.

The new guideline was oriented towards the diversification of scenarios of practice and the insertion into health services throughout the course, in accordance with the current medical education premises. These premises, in turn, are oriented towards an education based on the development of competencies and towards understanding the interdependence and need for integration between education and health systems[34]. The permanent education program was determined as mandatory for teachers and network professionals, as was the process to strengthen the contract of network services.

The assessment process in undergraduate courses was strengthened, evidencing tools that contemplate cognitive, psychomotor and behavioral aspects, and the adaptation of these assessments according to the National Curricular Guidelines' objectives. Furthermore, a specific assessment aimed at medical students was instituted according to the same precepts. Its mandatory, procedural and educational nature was established, as well as its use in residency selective processes. This assessment was called National Serial Assessment of Medical Students (ANASEM). It was instituted in 2016 as a longitudinal assessment.

The National Curricular Guidelines publication was followed by a series of developments to effectively implement them and strengthen the regulation process by the society. COAPES managing committee was created to come up with national guidelines for contracts. It involved SUS managers and representatives of MEC, CNS, Brazilian Association of Medical Education (ABEM) and National Executive Directorship of Medical Students (DENEM).

PMM created a demand to adapt the assessment tool of undergraduate courses assessed by the National Higher Education Assessment System (SINAES) to the new National Curricular Guidelines. In late 2015, the process was well advanced and was, indeed, concluded on April 2016, after a public consultation that analyzed the tool. The tool was created by a committee comprised of representatives of MEC, Ministry of Health, ABEM, INEP, Federal Council of Medicine (CFM), DENEM and CNS. This tool added 15 new indicators. The objective was to assess compliance with the new rules established by the National Curricular Guidelines, strengthen the teaching-service integration, create permanent education programs to teachers and health network professionals, expand the articulation between undergraduate courses and residency programs, strengthen the social responsibility of schools and their adaptation to regional social health needs, and expand society's participation in the medical educa-

tion process. Still in 2016, this regulation was replaced by a tool that does not include important aspects established in the program and that somehow weaken the society's regulation ability.

PMM expanded actions of qualification of teachers and preceptors. The creation of ProfSaúde is highlighted among these actions. ProfSaúde is a professional Master's Degree that prioritizes professionals who work in primary care, providing the necessary teacher education to new medical courses in provinces.

Subsequent developments are beyond the objectives of this study and shall be dealt with in other studies. One such example is the effective implementation of the program by the Ministry of Health and MEC and its effects in medical schools, health services, teacher practice and student education.

Conclusion

Over the last decades, there were intense discussions about medical education. These discussions pointed towards the need for changes based on SUS and the population's social needs. Despite the advances, the resulting changes were insufficient to effectively transform medical education.

PMM was considered a government priority. It was instituted by a law drafted under a broad and fierce national debate. The intersectoral performance and the creation of a policy with strategies that aimed at changing the (undergraduate and postgraduate) medical education with short and medium term planning are PMM's differentials.

The creation of new structures in the federal government, such as DDES in MEC and DEPREPS in the Ministry of Health, jointly with PMM, shows the density of this provoked movement.

The available evidence enables to affirm that, in less than three years of implementation, PMM achieved a series of results related to its objectives, both in short and medium term, in the education change axis. Several actions were inspired by international programs with effective results, such as from Canada and Australia.

The program was created with devices that aim at adapting the process of seat expansion according to the population's needs, as well as with a series of regulatory devices to ensure the quality of the courses. Planning was based on a context of public policy drafting that fostered the improvement of access to education and health, expansion of services and maintenance of constitutional prerogatives of funding expansion proportionally to the economic growth.

The current suspension of the expansion of public seats and the greater "flexibility" in the expansion of existing private courses tend to generate a market bias towards education with difficulty of access to students from the public high school system. Investments in expansion and maintenance of Federal Higher Education Institutions would have to continue in order to achieve PMM's objectives. Some processes, such as COAPES agreement, were also discontinued. Law no. 13350, of December 2017, recently withdrew the mandatory need for assessment of medical courses every two years and for the specific assessment of medical residency every year.

The need to move forward with a proposal that enables to attract and value teachers of the courses implemented in provinces is highlighted. Changes made in the teacher

assessment and progress processes of federal institutions are provided by law and enable the creation of a proposal.

Another important issue to be highlighted is the need to expand Family and Community Medicine education aimed at preparing doctors with a more comprehensive and generalist view. Should this expansion not meet expectations, the provision axis might not have an emergency characteristic anymore and be permanently postponed when faced with the need for foreign doctors on the outskirts of large cities and in remote areas.

In order to achieve the necessary number of doctors with adequate education according to our population's needs, it is essential to effectively comply with the education axis' objectives, following the trend studied and indicated here, from 2013 to 2015. Brazil needs to increase its number of doctors and improve the quality of their education in order to address the reasons that required the creation of PMM. This is also necessary so that the country can consistently move forward to ensure the right to health through a free, universal, comprehensive and equal public system with popular participation.

In conclusion, the Brazilian National Health System currently struggles to survive with a political and democratic project in a scenario with a strong feeling of collapse of the public area and deep difficulty in the continuity of social policies. The creation of SUS by the 1988 Federal Constitution occurred under an ideological dispute context, reorganizing relationships between the State and the society. The foundation of its creation was marked by neoliberalism, on the one hand, and by the fight for a democratic reform of the State, which was the assumption of SUS creators, on the other. Describing and reflecting upon PMM in the education dimension is an effort of contribution to recent history, as an effort not to lose this rich collective construction. Thereby, anyway, it is prudent to wait a bit longer to assess the concrete result of these adopted policies. However, it is the government, the society and the academia's responsibility to carefully follow up on this process.

Authors' contributions

Felipe Proenço de Oliveira, Hêider Aurélio Pinto, Alexandre Medeiros de Figueiredo and Eliana Goldfarb Cyrino contributed to writing and designing the work and to the creation of the manuscript. Aristides Vitorino de Oliveira Neto and Vinícius Ximenes Muricy da Rocha participated in the discussion of the results and in the critical review of the content. All authors actively participated in the content's final review and in the approval of the manuscript's final version.

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