

Challenges for ensuring availability and accessibility to health care services under Brazil's Unified Health System (SUS)

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Abstract *Scarcity and imbalances in the distribution of the workforce in health are social and political problems which, together with socio-economic inequality, reduce the population's access to health services. This study aims to understand the challenges facing policy makers and managers of the SUS system of Brazil, to ensure geographical availability of and accessibility to services provided by physicians. The analysis was guided by an explanatory model of the health labour market and of health policy interventions. Two central problems were identified: (i) scarcity of physicians, and (ii) inadequate distribution of these professionals between levels of health care, and between geographical zones. In this review, the focus is on 8 initiatives in the last 30 years, the principal objective of which was to correct the inadequate distribution of physicians in the SUS. These were: the Rondon Project, the Health Employment Interiorization Program (PITS), the Pró-Residência Program (Program to Support the Training of Specialist Doctors in Strategic Areas), the Program to Value Primary Health Care Professionals (PROVAB), the Mais Médicos ('More Doctors') Program, and others. The discussion focusses on the factors that influenced the results of these initiatives.*

Key words *Human resources for health, Health labour market, Public health policies, Physicians distribution, Access to health care*

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Introduction

The Brazilian Health System comprises a complex network of public and private services, complementing each other in some services, and competing principally in the area of qualified human resources in health. In 1998 the Brazilian Unified Health System (*Sistema Único de Saúde* – ‘Unified Health System’, or SUS) was put in place, with the commitment to provide universal, integrated coverage of healthcare. This commitment becomes an even greater challenge in view of the fact that Brazil, although it is the largest economy in Latin America, has a high degree of economic and social inequality^{1,2}. The health systems are in need, among other changes, of an adequate workforce – human resources for healthcare are seen as one of the pillars for achieving the objective of reducing access barriers to the Healthcare Network (RAS) for the population³.

Availability of motivated, involved and supported health professionals with relevant competencies, in a sufficient number, allocated in the places where they are necessary, is essential for the management and provision of services of health in all countries^{4,6}, and performance is, in turn, determined by the policies and practices that define the number of people to be allocated, their qualifications and the working conditions⁵.

The imbalance in the workforce, with the inadequate geographical distribution and in particular the lack of qualified healthcare human resources in the rural or needy regions is a social and political problem that affects almost all countries^{2,4,5,7-11}. Associated with socio-economic inequality, this imbalance reduces the population’s access to health services.

The objective of the study is to understand the challenges facing policy makers and managers of the SUS in ensuring geographical availability and accessibility to doctors in the Brazilian public service. More specifically: to identify the challenges of geographical availability and accessibility, analyzing the causes, and mapping the timetable of the policy strategies that have been implemented, at a national level, that have aimed to guarantee the population’s access to health services from the SUS.

Methodology

This article is part of a multiple case study, focusing on the process of decision on policies directed to the problem of geographical distribution

of healthcare human resources, in Brazil and in Portugal, and whether or not it is informed by scientific evidence. The focus of this phase of the study is to analyze the policy context affecting healthcare human resources in Brazilian. Use was made of information from research documents, technical and political documents, and secondary quantitative data. To identify these documents and data three strategies were used, described in Chart 1.

To orient the analysis, an adaptation of the conceptual table of the employment market and health policy¹² was used, illustrated in Figure 1. The table can be used by policy makers and decision makers to help understand the flows of the employment market, and to orient policy interventions¹³, for work toward formation of a stock of that is desirable in terms of size, composition, distribution, quality and effectiveness for meeting the needs of healthcare and services.

Based on the conceptual table, the data were submitted to a subject analysis, extracting the information from the documents in accordance with predetermined categories and subcategories, including some categories based on reading of the documents, as shown in Chart 2.

An attempt was made to assess the continuity between the policies of governments for the problems of healthcare human resources, and especially on geographical availability and accessibility to doctors.

Results

Based on the research on the site and with the information from the key sources of advice consulted, it was possible to identify 22 policy and technical documents. In the database search a total of 2,191 documents were identified. After application of the criteria of eligibility, 20 were selected for analysis: see Figure 2. The complete list of the 44 documents used in this study is available on request.

I - Challenges for ensuring availability and geographical access to doctors, and the related determinant factors

The quantity, distribution and quality of the health professionals that are accessible to populations are fundamental conditioning factors for achieving gains in health¹⁴. In spite of the increasing evidence that the workforce in health is fundamental for improving the levels of cover-

Chart 1. Search strategies for identification of data and documents.

Location of search	Specifications of search	Criteria for inclusion and exclusion of documents
PubMed and BVS	Systematic search, in January 2016, in the databases of the Virtual Health Library (BVS), and PubMed of the National Library of Medicine, where the scientific documents were identified based on a search using the following terms: (physician OR physicians OR doctor OR doctors OR health professionals OR workforce OR health workers OR manpower) AND (geographical OR imbalance OR rural OR remote OR suburban OR scarcity OR lack) AND Brazil - details of the search are available on request. Finally, documents identified as relevant (related to the structure of the problem under study or to a specific strategy) as a result of the initial references selected, were included.	(i) The material should be about medical professionals, whether or not including other professionals; (ii) when about more than one country, it should enable information relating to Brazil to be identified in isolation; (iii) it must be available in computerized form, making possible searches for information in the text; (iv) dated 1994-2015; (v) and without language restrictions; (vi) principal subjects to include geographical availability or accessibility of healthcare human resources as principal focus of the article in one of three aspects: geographical availability/distribution of doctors; causes of scarcity or asymmetric distribution; or strategies for dealing with the problem: whether (a) describing or assessing the strategy in its implementation in Brazil, or (b) describing or assessing a strategy implemented in another country, raising considerations for its implementation in Brazil.
Websites	Research on websites of the Brazilian Health Ministry (HM), International organizations (World Bank, OECD, WHO, Inter-Agency Health Information Network (Rede Interagencial de Informação para a Saúde, RIPSAs), and Health Graduations Indicator Systems (Sistemas de Indicadores das Graduações em Saúde, SIGRAS), the Brazilian Federal Council on Medicine, and the Brazil Health Human Resources Observation Network (Rede Observatório de Recursos Humanos em Saúde do Brasil, ObservaRH), with a focus on the work situations that have lines of study or research on the subject in question.	Documents that presented data without the results of processing it or without introduction of new conclusions were excluded.
Individual key advice and information sources	In parallel, key information sources were consulted to identify possible documents not included in the previous phases (items published, and the 'gray literature'), or names of strategies that would enable a specific search on the sites described.	The year 1994 was chosen as a cutoff due to the implementation of the Family Health Strategy (ESF). This choice is justified by the fact of healthcare being organized based on the precept of Primary Health Care (PHC).

Source: Authors.

age of health services for the population, several countries still have serious problems with scarcity¹⁴⁻¹⁶, and inequalities in the distribution of these professionals^{4,5,17,18}. This problem is highlighted in countries that offer universal coverage, with a vast geographical area and an unequally distributed population. In this document we will focus on two principal problems identified in the studies: (a) scarcity of doctors, and (b) inadequate distribution. The latter relates to geograph-

ical zones and distribution between the levels of healthcare.

(a) Scarcity of doctors

Brazil's density of doctors per thousand population has grown over the last 20 years. In 1990 the country had 1.12 doctors per thousand population, and this increased to 1.86 in 2010¹⁹. Other sources with more up-to-date data showed that

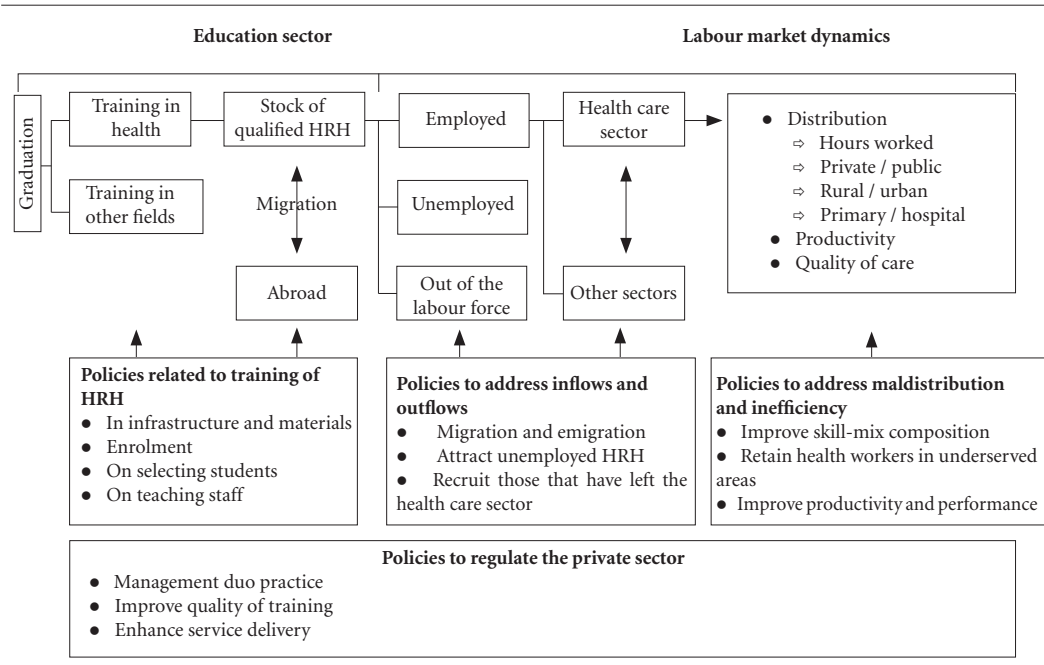


Figure 1. Reference table on the employment market and policy interventions.

Source: adapted from Sousa et al.¹².

Chart 2. Questions, categories and subcategories for the subject analysis of the data.

Question	Category	Subcategory
What are the challenges identified by policy makers and managers in ensuring geographical availability and accessibility to doctors within the SUS system?	Stock of qualified healthcare human resources and their characteristics in terms of distribution	Scarcity of professionals; distribution between rural and urban; distribution of professionals between public and private; among other aspects.
What are the determinant factors in these challenges?	Education sector and dynamics of the market	Number of graduate positions available, number of specialization positions, planning in the form in the training of healthcare professionals, number of retirements, loss to the private sector, unemployment, emigration, double employment, inefficacious contracting procedures; among other aspects.
What strategies and areas of policy interventions were used to correct the challenges faced by policy makers and managers at the national level to ensure geographical availability and accessibility for doctors within the SUS system?	Areas of political strategies	Policies surrounding training of healthcare professionals, policies surrounding flows of entry and exit, among other aspects.

Source: Authors.

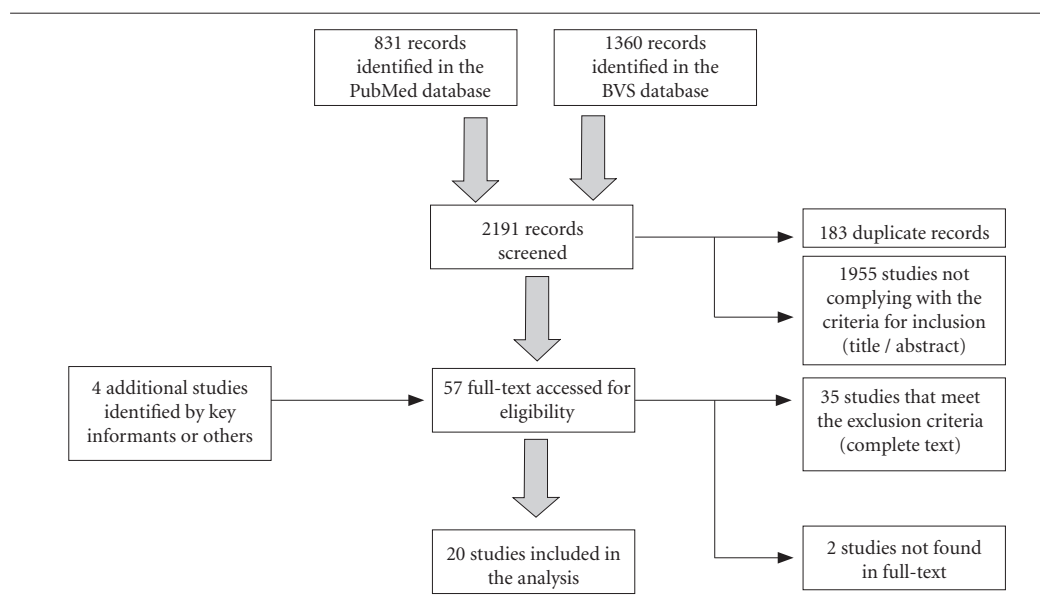


Figure 2. Flow diagram of selection of articles included in the analysis.

Source: Authors.

in 2013 this ratio was 1.89 per thousand population²⁰, and in 2015 it was 1.95²¹.

Decision on exactly what is the ideal ratio of doctors to population in a country is a polemical and complex subject. Various factors need to be taken into account, in particular: characteristics of the professional (social-demographic – age, gender); work processes (productivity, workload, non-clinical work and variations in level of activity), characteristics of the health system in place in the country (for example, coverage and type of services offered)²², and the population's conditions (socio-economic and epidemiological).

Making this ratio operational is in some cases limited by difficulties²², possibly caused by lack of information. Additionally, in Brazil there is no set planning of the future needs for healthcare human resources. This situation was reflected in the documents analyzed, which showed scarcity of doctors. These documents use data comparing ratio of doctors per thousand population between Brazil and other countries, to arrive at a desirable ratio and create targets for improvement. Sometimes, a fixed ideal minimum ratio is attributed, without considering the contextual factors referred to above.

The OECD data for numbers of doctors per thousand population of various countries should be used with caution. On this basis, Brazil is sixth

lowest of 39 countries that presented available data for the year 2010 (also the last year relating to Brazil)²³.

The publications reported scarcity, with inappropriate geographical distribution and shortage of professionals and specialists in Primary Healthcare^{9,10,16}, and attributed the causes of scarcity principally to:

- Growing demand for professionals, due especially to the increase in public and private medical service establishments^{10,21}. With the reform of primary healthcare in the Americas and implementation of the Family Health Strategy^{24,25}, which created multi-professional health teams and broadened service to the Brazilian population, there was a consequent increase in the need for doctors for primary healthcare. The number of health establishments at the end of the 1970s was 18,489, and by 2005 this number had grown to 77,004, an increase of approximately 76%¹⁰;

- Low number of people coming out of medical training, compared to the demand and the growing needs referred to above. It is shown by the significant growth in the number of medical courses in the country – approximately 63% from 94 to 251 over the period 2000 to 2014²⁶. More recent data show a total of 257 courses in 2015 a significant increase of 69 courses in ap-

proximately 6 years²¹. This increase was accompanied by an inversion in the predominance of courses in the public and private higher education institutions. In 2000 there were 48 higher education courses in public institutions and 82 in private institutions, and by 2010 these had risen to 78 and 103 respectively²⁶, public higher education institutions being concentrated in the state capital cities⁹. This predominance has been becoming more accentuated, and data show that the numbers of new places available in the last two years in private and public higher education institutions were respectively 3,600 and 1,700²⁷, with the places in private institutions being concentrated in the country's Southeastern Region, and those in public institutions in the Northern Region⁹.

b. Inappropriate distribution of doctors between the levels of healthcare and geographical zones

Considering the network model on the basis of which the SUS is organized²⁸, the problem of inadequate distribution cannot be analyzed only with the focus on primary healthcare, but also on the other levels of care. The specialists who operate exclusively in the private sector and the public sector total, respectively, 68.2% and 52%, while 74.3% of the total operate in both. It was found that in the private sector 40.1% are in consultation rooms, 38.1% in hospitals and 31.1% in outpatient facilities. In the public sector, 51.5% work in hospitals, 23.5% in primary healthcare and 4.8% in secondary care²¹. The number of pediatric surgeons showed imbalances between the regions of the country, the Southeast being the largest source of training and qualification of in this specialty²⁹. Among dermatologists, only 9.1% of the municipalities had a specialist in this area³⁰. In ophthalmology, the imbalance in geographical distribution results in scarcity in certain zones, however this analysis was not attributed to lack of specialists in the country. Those studies that dealt with inadequate distribution in other specialties were found.

The problem of inadequate geographic distribution of healthcare professionals in Brazil has been indicated as a challenge, and various policy strategies have been implemented to correct it^{7,10,14,21,31-37}. This inappropriate distribution is accentuated in qualified health professionals including nurses, doctors¹⁴ and dentists³⁸, and this situation is directly reflected in the population's health conditions^{14,16}.

This adverse distribution is seen in various geographic levels (between regions, between rural and urban, between the interior of a state and its capital city, and between the municipalities themselves). There is an asymmetry in the distribution of doctors between Brazil's five Regions. In the Southeastern Region there are 2.51 doctors per thousand population, that is to say a concentration 2.5 times greater than in the Northeast (0.9) in the year 2010. The ratio in the South (2.06) and the Center-West (1.76) is almost twice the ratio for the Northeast (1.09)¹⁹. So we see a greater intensity of the problem in the North and Northeast, which are below the national average^{10,21,33-37}. The inequality between Brazil's States is even greater, while the Federal District, Rio de Janeiro and São Paulo have respectively 3.61, 3.52 and 2.5 doctors per thousand population, in these states of Pará, Amapá and Maranhão this ratio falls to 0.77, 0.75 and 0.53 respectively¹⁹.

The inadequate distribution of doctors is more accentuated between municipalities. Those with the lowest population have the lowest number of doctors per inhabitant²¹. In 2009 approximately 42% of the population lived in municipalities with a ratio of less than 1 doctor per 4,000 population, and in 7% of municipalities there were no records of doctors at all¹⁰. Municipalities with population of up to 50,000 were 88.5% of the total (4,932 municipalities in 2014) and had between 0.23 and 0.64 doctors per thousand population. At the other extreme, municipalities with more than 500,000 population (a total of 39 in 2014) have 29% of the country's population and approximately 61% of the doctors²¹.

This imbalance is influenced by various factors, which can be divided into: individual; organizational; and related to the systems (health, education, institutional) and characteristics of the municipalities, including the economic, socio-cultural, historic and political environment¹¹. In the documents selected, the principal causes of inappropriate geographical distribution in Brazil were: the characteristics of the municipalities, including their GDP, their Human Development Index, levels of social vulnerabilities, conditions of violence, and work opportunities^{14,21,33,36}; individual characteristics, for example age, work opportunities for spouses, origin in urban environments and family income^{33,39}; characteristics of the education system, existence of a medical course, medical residency and possibilities of continued education^{21,33,36}; and finally organizational characteristics including remuneration, working conditions, career plan and professional recognition^{21,40}.

II - Strategies put in place to deal with the problem of scarcity and distribution

In 2003 the Brazilian Health Ministry created the Health Work & Education Management Department (SGTES), and now carries out a strategic role: it is responsible for formulation of policies for management of work in health; training and qualification of healthcare human resources; professional regulations; and decentralization of management of work and education in the states of Brazil⁴¹. Over recent years the subject of healthcare human resources, and in particular as regards geographical availability and accessibility, has been recurring and is closely related to the difficulties faced in the health sector. Analyzing the continuity of this subject, documents providing orientation on the interventions in health are seen as from the National Health Plans of 2004-2007, 2008-2011 and 2012-2015⁴²⁻⁴⁴, the National Basic Healthcare Policy²⁵, and Resolution 439 of the National Health Council⁴⁵, constituting a synergy in relation to the problem. However, it is seen that there is something lacking in the formulation of a clear, long-term policy to govern healthcare human resources in Brazil³¹, even though several specific and limited strategies have been identified for facing these challenges.

The interventions identified were: (a) the Rondon Project (*Projeto Rondon*); (b) the Interiorization Program of the SUS (*Programa de Interiorização do SUS – or PISUS*); (c) the Program to Move Health Work into the Interior (*Programa de Interiorização do Trabalho em Saúde – or PITS*), (d) Telessaúde ('Tele-Health'); (e) the Program to Support Training of Specialist Doctors in Strategic Areas (*Programa de Apoio à Formação de Médicos Especialistas em Áreas Estratégicas – 'Pró-Residência'*); (f) the Fund for Financing Higher Education Students (*Fundo de Financiamento ao Estudante do Ensino Superior – or FIES*); (g) the Program to Value Basic Healthcare Professionals (*Programa de Valorização dos Profissionais da Atenção Básica – or PROVAB*); and (h) the 'More Doctors' (*Mais Médicos*) Program – described in Chart 3.

In the policy initiatives that were implemented, there are superimpositions of its possible results on various fronts of the problems being dealt with, and we thus present the findings relating the initiative, the challenge (geographical availability and distribution) and the policy area, according to the logic of the conceptual framework of the employment market and policy interventions in health¹². The approaches are illustrated in Chart 4.

Discussion

Considering the health system implemented in Brazil, it is certainly a challenge for policy makers and managers to ensure availability and accessibility to health for the whole of the population. Another challenge is the growing increase in the demand for health professionals, both in the public and in the private sector, attributed principally to the expansion of the service network. Studies show that among the principal challenges are scarcity of doctors, and their inadequate distribution, both by geographical area and between levels of care.

As to scarcity, one sees that it is often difficult to quantify it, perhaps due to the lack of knowledge of present and future needs for doctors. Thus, an integrated analysis has been substituted by comparison using external benchmarks in an isolated form, comparing with other countries, without knowing whether these are appropriate for the Brazilian health system. The documents that were selected attribute the causes of scarcity as principally being demand for professionals and training, to the detriment of other elements such as inflow (example: immigration, and people returning from another sector) and outflow (e.g. termination of career, and retirement).

Scarcity exacerbates the difficulty of management of the distribution of doctors between the regions of the country and between the levels of care¹⁵. Geographical distribution is a problem that has long been diagnosed in Brazil and was significantly reported in the studies selected, showing that doctors are indeed concentrated in the South and Southeast, in major cities and in the more developed municipalities. However, wider and deeper analyses are necessary about the factors that could lead doctors to migrate to work in regions that are lacking care. The literature indicates that to become aware of these factors priority should be given to qualitative studies and Discrete Choice Experiments (DCE) – which as well as awarding points for isolated factors make it possible to identify the preferences of individuals based on comparisons between certain characteristics of the work since some benefits in the employment contract can be a counterpart to the location of the work^{32,46}.

Inadequate distribution between the levels of care, on its own, does not present a precise diagnosis in Brazil, but points to various factors: scarcity of doctors in primary care; concentrations of specialists in the private sector; and unequal distribution of some specialties in the re-

Chart 3. Description of the political interventions identified.

Political Intervention	Aim/Description	Important Points
Rondon Project: 1968 - 1989, and 2005 - present	This program aimed to promote service internships for university students ⁴⁸ and consequently bring students to the work in areas of difficult access and health services that were expanding ³⁶ . In 2005 it was re-launched and now has representatives from the Defense, Education, Health and other Ministries ⁴⁹ .	In its 22 years this project has served thousands of municipalities, most of them in the Center-West, Northeast and Northern Regions of Brazil ³⁶ . Some 350,000 university students and 13,000 teachers have taken part in the project ^{35,36} . The literature that was analyzed does not indicate the reasons why it was terminated. Since the re-launch of the project, it has involved 1,900 higher education institutions and carried out 69 operations in 854 municipalities in 23 States ⁵⁰ . This intervention focused on the area of policies directed to training and qualification, and did not coordinate with other areas of political interventions. Although the literature indicates that for a student to live in a less accessible environment widens his choice for future work ¹⁷ , no data was found for any monitoring of these students after graduation.
PISUS: 1993 - 1994	The objective was to take into the interior of each region or state a minimum health team comprising a Community Health Agent, Nurse and Doctor to support one health service ³⁵ . It was organized in four sub-programs: (i) first aid units, (ii) establishment of a doctor in a region of the interior (at least one to establish fixed residence in the participating municipality), (iii) interiorization of the nurse, and (iv) the Community Agents ³⁶ . It offered appropriate physical facilities, accommodation for nurses and doctors, payment for production, and a formal contract executed by the municipal manager using funds passed through from the Health Ministry ³⁵ .	This program reached 398 municipalities ³⁵ . Since it lasted only for a short time, the lack of information about the reasons why it was terminated prevents any future action in this area from correcting possible fragilities. This is a factor that inhibits continuity of political initiatives.
PITS: 2001 - 2004	This aimed to encourage placement of qualified health professionals in municipalities with proven shortage of medical and health resources ⁵¹ , distant from state capital cities, and also help expand basic healthcare and the Family Health Program (PSF) ³⁶ . Coordinated at a national level by the Health Ministry, it adopted the same strategy as the PSF, and made use of financial incentives, continuing education for participating professionals, and professional and personal support through appropriate work conditions (equipment and inputs), and accommodation, food and transport for them to carry out their activities ³⁶ . The participating doctors did the specialization course in Family Health ⁵² .	During the period, the program was applied for 421 health professionals, 181 of them doctors, in 300 municipalities ³⁵ . It can be seen that this program had greater articulation of the strategies to motivate the health professional, but as with the previous program (PISUS), above, it was also not possible to find out the reasons for its termination.

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Chart 3. continuation

Political Intervention	Aim/Description	Important Points
Telessaúde: 2007 - present	This was a strategy that was a part of the National Permanent Health Education Policy implemented as one of the actions of the Mais Saúde (More Health) program ^{55,56} . Its objective is to orient qualification and development of health human resources and improvement of care and management in basic healthcare in the SUS ^{55,57} . It integrates teaching and service, also providing distance healthcare and distance education, through ICT ⁵⁵ .	This strategy has been related to the attempt to improve the number of health professionals who establish permanent residence in remote areas, since it helps to reduce the possible sensation of isolation and clinical security ^{55,57} . Studies point to the contributions of «tele-health» in the sector ^{58,59} , demonstrating that technology can be a strong ally in exchange of knowledge and training of professionals of the network. This is an area that is expanding, and likely to be explored in the future in the policies relating to health human resources.
Pró-Residência: 2009 - present	An inter-sector measure between the Health Education Ministries. It aims, through award of grants, and training of specialists in basic and priority areas for some regions of the country (North, Northeast and Center-West), to provide support and opening of new residency programs based on the need of the region ⁶⁰ .	Since local and regional shortages in specialists in certain areas of medicine are diagnosed and reported, this initiative has the potential to help in the choice of the professional's activity, thus helping both the market and the doctor's career.
FIES: 2011 - present	In 2011 the government made it possible for doctors whose graduation had been financed by the FIES to pay off their debts by working in the teams of the Family Health Strategy (ESF) in areas where there was a shortage of doctors. For each month worked, the deduction was 1% of the debtor balance ⁶¹ .	It has contributed to expanding the number of doctors in the country, enabled various students to conclude their course through this financing. Linking the student debt to the professional working in the SUS is one more way of expanding the store of doctors in the service and contributing to a reduction of the disparities in health.
PROVAB: 2011 - present	This aims to provide Basic Healthcare and Family Health Strategy teams with nurses, dentists and doctors, in areas that are remote and more vulnerable (riverbank populations, Quilombo settlements, new country settlements, indigenous people, etc.), thus achieving integration between teaching, service and community. The professionals receive a study grant paid by the Federal Government, distance and in-person supervision, and the opportunity to carry out a specialization course focused on basic healthcare offered by universities participating in the UNASUS ⁶⁰ . At the end of the year, the doctors can receive up to 10% of the total 100% marking the points system of the process of selection for medical residency ³⁵ .	The number of participants increased from 381 in 2012 to over 3,300 in 2013, distributed between 1,157 municipalities, of which 573 are located in the Northeastern Region ⁶² . In 2015 the PROVAB was integrated into the PMM ('Mais Medicos') Program.

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gions of the country. The studies indicate that for primary healthcare and consequently the Family Health Strategy to be more effective in providing solutions, in relation to availability of doctors, various challenges need to be met, including the problem of turnover and lack of confirmed permanent residence of these professionals⁴⁷. This

situation can be attributed to the low levels of stimuli in temporary work contracts⁵³, which in turn are often the result of budget restrictions of municipalities that are unable to adjust doctors' salaries enough to retain them, since that adjustment would infringe the Fiscal Responsibility Law⁵⁴. Additionally, studies point to structure

Chart 3. continuation

Political Intervention	Aim/Description	Important Points
'More Doctors' Program (PMM): 2013 - present	This program aims to train doctors and take them to regions where health professionals are scarce or absent ⁶⁵ . It is structured in three parts: (1) improvement of basic healthcare structure - improvement in infrastructure of the RAS, focused on Basic Health Units (UBSs); (2) medical training, changes in graduation - in medical residency and training of specialists, such as, for example, implementation of the new DCN and expansion of graduation courses in the public and private sectors; and (3) the emergency provision aspect - the program provides doctors on an emergency basis in vulnerable areas (by recruitment of Brazilian and foreign doctors either individually or through a bilateral agreement made with the government of Cuba) ³⁷ . The participant receives a monthly grant and cost support for the facility ³⁷ , of which the amounts are higher for those that travel further to more remote areas ⁷ .	This program was transferred from being a government policy to being a policy of the states ³⁷ . It also encompassed the medical professionals of the PROVAB, in which the characteristics were adjusted to the parameters of the PMM. Some results identified: (1) improvement of the basic healthcare structure: construction of 1,577 UBSs, two River UBSs in the Amazon region, refurbishment of 9,011 UBSs; (2) medical training: 47 new medicine courses opened (24 in federal institutions), increasing the number of places by 65% ³⁷ - we cannot yet comment on the change in the profile of doctors since none have yet emerged from the new curriculum; (3) the PMMB program reached 3,785 municipalities in less than two years, recruiting 14,462 doctors (1,846 Brazilian and 1,616 foreign doctors) from 49 countries ³⁷ .

Abbreviations: ACS = Community Health Agent; DCN – National Curriculum Guidelines; PMMB = 'More Doctors for Brazil' Program; ICT = Information & Communications Technology; UBS = Basic Healthcare Units; UNA-SUS = Open University System of the Single Health System.

Source: Authors.

problems, related to the process of work. The Family Health Strategy, and Primary Healthcare, should be organized in an equitable and efficient fashion to achieve their potential in facing the challenges imposed on health²⁴, but one still sees teams rooted in the traditional medical-hegemony model, which contributes to excess workload for the professional⁶³ without giving priority to multi-professional teamwork. On the other hand, although it is not its central aim, the Family Health Strategy can be considered to be the initiative that has most expanded the coverage of doctors³², contributing to improvement of accessibility to health services. In secondary care, on the other hand, the difficulty is attributed to contracting of specialists to work in the SUS^{9,64}.

The inadequate geographical distribution of doctors is a problem that has been present on the policy decision agenda for various governments in Brazil^{10,32}. Starting in 2011 the deficit in provision of professionals was defined as a priority area³⁷. Initiatives to deal with the challenge of inadequate distribution have been put in place since 1968. On the other hand implementation of initiatives for the problem of scarcity is more recent, with only two measures identified, *Pró-Residência* and the *PMM*. According to information pre-

sented (Charts 3 and 4) initial programs failed in their sustainability on a time horizon, although the pioneer program was re-established some 35 years later.

It can be seen from the analysis (Chart 4) that since 2011, with the PROVAB, the initiatives incorporated a larger number of strategies and although there are not yet evaluations of their impacts, considering the conceptual table used (Figure 1), it can be inferred that there is a greater possibility of success since the evidences on the subject indicate that initiatives carried out jointly are more efficacious than isolated ones⁸. It was observed that the policy initiatives are concentrated on distribution, with focus on primary care, neglecting distribution between other levels of care, perhaps for lack of a clearer diagnosis. Only the *Pró-Residência* program was identified as a program with effect in this regard.

The absence of evidence from actual research results to contribute to a diagnosis for the inadequate distribution of doctors between the levels of care, and its causes, makes it difficult to formulate initiatives that are informed by evidence, thus increasing the risk of their being formulated in an improvised manner or having their process dominated by other factors than evidence.

Chart 4. Policy interventions identified in accordance with the challenges to be faced and the policy area of the initiative.

Political initiative	Challenge			Areas of the political initiative involved			
	Geographical distribution	Distribution by level	Availability of doctors	Training of doctors	Inflow and outflow	Correct inadequate distribution and inefficiency	Regulation of the private sector
Rondon Project (curriculum internship in areas of difficult access and services in expansion) - 1968 - 1989 and 2005 - present	x	primary				educational*	
PISUS (payment for production, formal contract, appropriate physical installations and accommodation) - 1993 - 4	x	primary				financial, and personal and professional support*	
PITS (financial incentives, continued education, appropriate work conditions, accommodation, food and transport) - 2001 - 4	x	primary				financial, educational and personal and professional support*	
Telessaúde ('Tele-health' - distance care and distance education) - 2007 - present	x	primária				professional, personal and educational support*	
Pró-Residência (grants for residencies, and opening of residencies) - 2009 - present	x	specialists	x	x		financial and educational*	
FIES (amortization of undergraduate student debt) - 2011 - present	x	primary				financial*	

it continues

Chart 4. continuation

Political initiative	Challenge			Areas of the political initiative involved			
	Geographical distribution	Distribution by level	Availability of doctors	Training of doctors	Inflow and outflow	Correct inadequate distribution and inefficiency	Regulation of the private sector
PROVAB (grants, distance and in-person supervision, opportunity for specialization and additional points gained in selection process for residency) - 2011 - present	x	primary				personal and professional, educational and financial	
More Doctors (Mais Médicos) Program (improvement in infrastructure of the network, grants, opportunity for training and qualification and curriculum change, increased vacancies and recruitment) - 2013 -present	x	primary	x	x	x	regulatory/ administrative (including bilateral agreements), educational, financial, personal and professional support*	

* In particular, in terms of policy interventions to correct inadequate geographical distribution, we can classify them into four categories: regulatory/administrative; educational; financial; and personal and professional support^{11,17}.

Source: Authors.

In graduation courses, the articulation between teaching and service is reported in various studies. The dynamic between these subjects is justified by the quest for professionals with necessary competencies to act in the SUS, that is to say, the training should prepare the professional to work based on the principles, guidelines and policies of the health system that is in force⁶⁶. There are programs put in place for reorientation of professional training: highlights are the *IDA* Project, the *Uni and Rede Unida* project, prior to the creation of SGTE; and, subsequent to the SGTEs being put in place⁶⁷: the *PROMED*, *Ver SUS*, *Aprender SUS*, *Ensina SUS*, *Pró-Saúde (I and II)*, *PET-Saúde* and the *National Permanent Education Policy*. At the same time, there are situations where these articulations are fragile and there is a lack of planning and coordination between the need for training and the population demand²⁹.

Among the initiatives identified for facing the challenges, which are the focus of this study, the *PMM* is the one that has the most cross-sectional action, dealing with all the challenges identified in this review, and having strategies in almost all the four areas of policy intervention, only not acting in one area: regulation of the private sector.

The process of formulation of a policy can be influenced by various factors⁶⁸. Among these, scientific evidence can play an important role, since it helps policymakers and other actors to take well-informed decisions about policies, programs and projects so as to guarantee that the decision made is well informed by the best research evidence available⁶⁹, thus avoiding domination of the process by other factors.

When we evaluate the results of the efforts to highlight the use of evidence in formulation of policies, we should go beyond questioning whether the evidence was used in the process,

to find out when it was used^{70,71}; for what purpose⁷²⁻⁷⁴; and what approach was used to promote its use^{73,75,76}. In this study, according to the message chosen, it is possible only to observe the possibility of the use of the evidence in the phases of the policy cycle in accordance with the type of research/survey available.

The most common approach for studying public policies, the “policy cycle”, breaks down the political process into a series of functional stages (creation of the agenda, development of the formulation of the policy, implementation and assessment)^{77,78}. Scientific evidence can play a significant role in all the phases of the cycle. However, for each phase there is also a type of research, and a research question, that is most appropriate and relevant to that moment^{70,71}.

The demand by policy formulators for research in the area of Healthcare Human Resources cannot be considered insufficient in Brazil, as can be seen by the volume of research funding available in the country, from the fact that Healthcare Human Resources is among the priority research areas of the National Research and Health Agenda⁷⁹, and also from the collaboration of the *Human Relations Observatory Network in Brazil (ObservaRH)* with the SGTES, an initiative sponsored by the Health Ministry, together with the Technical Cooperation Program of the Pan-American Health Organization (PAHO) of the WHO⁸⁰. However, the focus of these surveys identified through the articles selected in the Brazilian context concentrates on the description of the problems, the diagnosis and its causes, and there is an absence of investigations that analyze alternatives and solutions for reduction of the problem concerned in a critical way, or assessment of alternatives implemented in other countries in light of the Brazilian context. Thus it can be asked whether there is a difficulty in communication between formulators of policy and researchers (which is reflected in the research questions being different from the need for reply from policy makers for intervention in the policy in question), or whether the means of disclosure is different from the ‘conventional’ medium of publication of articles?

Since this study is based on the analysis of documents there are limitations, especially as to the reach of the context of healthcare HR policies in Brazil. For this reason, an additional phase of the study is being developed, which consists of interviews with the makers of policy and researchers among other key actors.

Final considerations

When we relate the challenges to the initiatives implemented, it is seen that the governments were looking for solutions to ensure geographical availability and accessibility to doctors in the SUS. And they looked mainly at measures identified in other countries and recommended for application, with variations as to the strength of recommendations, arising from the evidence¹⁷. However, our analyses show that no policy initiatives were found in the areas of regulation of the private sector, showing that there is a need for initiatives and policies that consider all the facets of the health employment market in Brazil, such as, for example, the coexistence between the public and private sector. Equally, it is desirable that there should be execution of monitoring and assessments of the results achieved and the subsequent impact generated. Based on the evidences and the present context of health in Brazil, it is noted that policies directly made for human relations are essential for guaranteeing geographical accessibility for medical care in the SUS and for sustainability of the initiatives that have been put in place.

Collaborations

APC Oliveira worked on the conception of the study and methodology, collection and analysis of the data, structuring and writing of the article and revision of the drafting in all the versions including the final one; M Gabriel worked on collection and analysis of the data, structuring and writing the article in all the versions and revision of the final draft; and MR Dal Poz and G Dussault worked on the design of the study and revision of the drafting of the article in all the versions including the final one.

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p. 1165

onde se lê:

Challenges for ensuring availability and accessibility to health care services under Brazil's Unified Health System (SUS)

leia-se:

Challenges for ensuring availability and accessibility to health care services under Brazil's Unified Health System (SUS)

p. 1165

onde se lê:

Abstract Shortages and imbalances in the distribution of the health workforce, are social and political problems that, along with the socio-economic inequality, reduce the access of the population to the health services. This study aims to understand the challenges of SUS policy-makers and managers to ensure the availability and geographical accessibility to health service providers. The analysis was guided by a framework of the health labour market and health policy interventions. Two main problems have been identified: shortage of doctors and maldistribution of professionals between levels of health care and between geographical areas. This review focused on eight interventions in the last 30 years, whose main aim was to correct the maldistribution of physicians in the SUS such as Rondon Project, Interiorization of Health Work Program, Medical Specialists Training Program, PHC Program and More Doctors Program. The discussion focuses on the factors that influence the outcome of these interventions.

Key words Human resources in for health, Health employment labour market, Public health policies in health, Physicians distribution of doctors, Access to health care

leia-se:

Abstract Scarcity and imbalances in the distribution of the workforce in health are social and political problems which, together with socio-economic inequality, reduce the population's access to health services. This study aims to understand the challenges facing policy makers and managers of the SUS system of Brazil, to ensure geographical availability of and accessibility to services provided by physicians. The analysis was guided by an explanatory model of the health labour market and of health policy interventions. Two central problems

were identified: (i) scarcity of physicians, and (ii) inadequate distribution of these professionals between levels of health care, and between geographical zones. In this review, the focus is on 8 initiatives in the last 30 years, the principal objective of which was to correct the inadequate distribution of physicians in the SUS. These were: the Rondon Project, the Health Employment Interiorization Program (PITS), the Pró-Residência Program (Program to Support the Training of Specialist Doctors in Strategic Areas), the Program to Value Primary Health Care Professionals (PROVAB), the Mais Médicos ('More Doctors') Program, and others. The discussion focusses on the factors that influenced the results of these initiatives.

Key words Human resources for health, Health labour market, Public health policies, Physicians distribution, Access to health care

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onde se lê:

Introduction

The Brazilian Health System comprises a complex network of public and private services, complementing each other in some services, and competing principally in the area of qualified human resources in health. In 1998 the Brazilian Unified Health System (Sistema Único de Saúde – 'Unified Health System', or SUS) was put in place, with the commitment to provide universal, integrated coverage of healthcare. This commitment becomes an even greater challenge in view of the fact that Brazil, although it is the largest economy in Latin America, has a high degree of economic and social inequality^{1,2}. The health systems are in need, among other changes, of an adequate workforce – human resources for healthcare are seen as one of the pillars for achieving the objective of reducing access barriers to the Healthcare Network (RAS) for the population³.

Availability of motivated, involved and supported health professionals with relevant competencies, in a sufficient number, allocated in the places where they are necessary, is essential for the management and provision of services of health in all countries^{4,6}, and performance is, in turn, determined by the policies and practices that define the number of people to be allocated, their qualifications and the working conditions⁵.

The imbalance in the workforce, with the inadequate geographical distribution and in particular the lack of qualified healthcare human resources in the rural or needy regions is a so-

cial and political problem that affects almost all countries^{2,4,5,7-11}. Associated with socio-economic inequality, this imbalance reduces the population's access to health services.

The objective of the study is to understand the challenges facing policy makers and managers of the SUS in ensuring geographical availability and accessibility to doctors in the Brazilian public service. More specifically: to identify the challenges of geographical availability and accessibility, analyzing the causes, and mapping the timetable of the policy strategies that have been implemented, at a national level, that have aimed to guarantee the population's access to health services from the SUS.

leia-se:
Introduction

The Brazilian Health System comprises a complex network of public and private services, complementing each other in some sectors, and competing principally in the area of qualified Human Resources for Health (HRH). In 1998 the Brazilian Unified Health System (Sistema Único de Saúde – SUS) was put in place, with the commitment to provide universal and integral coverage of health care. This commitment is a great challenge in view of the fact that Brazil, although it is the largest economy in Latin America, has a high degree of economic and social inequality^{1,2}. Health systems are in need, among other challenges, of an adequate workforce, as HRH are one of the pillars for achieving the objective of reducing access barriers to the Health Care Network (Rede de Atenção a Saúde – RAS)³.

Availability of motivated, engaged and supported health professionals with relevant competencies, in a sufficient number, allocated in the places where they are needed, is essential for the management and provision of health services in all countries⁴⁻⁶; performance is, in turn, determined by the policies and practices that define the number of professionals to be allocated, their qualifications and their working conditions⁵.

Imbalances in the workforce, with the inadequate geographical distribution and in particular the lack of qualified HRH in the rural or needy regions, are a social and political problem that affects almost all countries^{2,4,5,7-11}. Associated with socio-economic inequality, these imbalances reduce the population's access to health services.

The objective of this study is to understand the challenges facing by policy makers and managers in ensuring geographical availability of and

accessibility to physicians in the Brazilian SUS. More specifically it is to identify the challenges of geographical availability and accessibility, analysing the causes of imbalances, and mapping the timetable of the policy strategies that have been implemented at national level aiming to guarantee the population's access to health services from the SUS.

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onde se lê:
Methodology

This article is part of a multiple case study, focusing on the process of decision on policies directed to the problem of geographical distribution of healthcare human resources, in Brazil and in Portugal, and whether or not it is informed by scientific evidence. The focus of this phase of the study is to analyze the policy context affecting healthcare human resources in Brazilian. Use was made of information from research documents, technical and political documents, and secondary quantitative data. To identify these documents and data three strategies were used, described in Chart 1.

To orient the analysis, an adaptation of the conceptual table of the employment market and health policy¹² was used, illustrated in Figure 1. The table can be used by policy makers and decision makers to help understand the flows of the employment market, and to orient policy interventions¹³, for work toward formation of a stock of that is desirable in terms of size, composition, distribution, quality and effectiveness for meeting the needs of healthcare and services.

Based on the conceptual table, the data were submitted to a subject analysis, extracting the information from the documents in accordance with predetermined categories and subcategories, including some categories based on reading of the documents, as shown in Chart 2.

An attempt was made to assess the continuity between the policies of governments for the problems of healthcare human resources, and especially on geographical availability and accessibility to doctors.

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Methodology

This article is part of a multiple-case study, focusing on the decision making process of HRH policies directed to the problem of geographi-

cal distribution in Brazil and in Portugal, and whether or not it is informed by scientific evidence. The focus of this phase of the study is the policy context affecting HRH in Brazil. Information from research documents, technical and political documents, and secondary quantitative data was collected and analysed. To identify these documents and data three strategies were used, described in Chart 1.

To orient the analysis, an adaptation of the conceptual model of the health labour market and policy interventions¹² presented in Figure 1 was used. The model can be used by policy and decision makers to help understand the flows of the health labour market, and to orient policy interventions¹³ to develop a workforce that is adequate in terms of size, composition, distribution, quality and effectiveness for meeting the needs of health care services.

A thematic data analysis based on the components of this conceptual model was conducted, by extracting the information from the documents in accordance with predetermined categories and subcategories, as shown in Chart 2.

We assessed the continuity between the policies of successive governments to address HRH problems, especially in relation to geographical availability and accessibility to physicians.

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Results

Based on the research on the site and with the information from the key sources of advice consulted, it was possible to identify 22 policy and technical documents. In the database search a total of 2,191 documents were identified. After application of the criteria of eligibility, 20 were selected for analysis: see Figure 2. The complete list of the 44 documents used in this study is available on request.

I - Challenges for ensuring availability and geographical access to doctors, and the related determinant factors

The quantity, distribution and quality of the health professionals that are accessible to populations are fundamental conditioning factors for achieving gains in health¹⁴. In spite of the increasing evidence that the workforce in health is fundamental for improving the levels of coverage of health services for the population, several coun-

tries still have serious problems with scarcity¹⁴⁻¹⁶, and inequalities in the distribution of these professionals^{4,5,17,18}. This problem is highlighted in countries that offer universal coverage, with a vast geographical area and an unequally distributed population. In this document we will focus on two principal problems identified in the studies: (a) scarcity of doctors, and (b) inadequate distribution. The latter relates to geographical zones and distribution between the levels of healthcare.

(a) Scarcity of doctors

Brazil's density of doctors per thousand population has grown over the last 20 years. In 1990 the country had 1.12 doctors per thousand population, and this increased to 1.86 in 2010¹⁹. Other sources with more up-to-date data showed that in 2013 this ratio was 1.89 per thousand population²⁰, and in 2015 it was 1.95²¹.

Decision on exactly what is the ideal ratio of doctors to population in a country is a polemical and complex subject. Various factors need to be taken into account, in particular: characteristics of the professional (social-demographic – age, gender); work processes (productivity, workload, non-clinical work and variations in level of activity), characteristics of the health system in place in the country (for example, coverage and type of services offered)²², and the population's conditions (socio-economic and epidemiological).

Making this ratio operational is in some cases limited by difficulties²², possibly caused by lack of information. Additionally, in Brazil there is no set planning of the future needs for healthcare human resources. This situation was reflected in the documents analyzed, which showed scarcity of doctors. These documents use data comparing ratio of doctors per thousand population between Brazil and other countries, to arrive at a desirable ratio and create targets for improvement. Sometimes, a fixed ideal minimum ratio is attributed, without considering the contextual factors referred to above.

The OECD data for numbers of doctors per thousand population of various countries should be used with caution. On this basis, Brazil is sixth lowest of 39 countries that presented available data for the year 2010 (also the last year relating to Brazil)²³.

The publications reported scarcity, with inappropriate geographical distribution and shortage of professionals and specialists in Primary Healthcare^{9,10,16}, and attributed the causes of scarcity principally to:

- Growing demand for professionals, due especially to the increase in public and private medical service establishments^{10,21}. With the reform of primary healthcare in the Americas and implementation of the Family Health Strategy^{24,25}, which created multi-professional health teams and broadened service to the Brazilian population, there was a consequent increase in the need for doctors for primary healthcare. The number of health establishments at the end of the 1970s was 18,489, and by 2005 this number had grown to 77,004, an increase of approximately 76%¹⁰;

- Low number of people coming out of medical training, compared to the demand and the growing needs referred to above. It is shown by the significant growth in the number of medical courses in the country – approximately 63% from 94 to 251 over the period 2000 to 2014²⁶. More recent data show a total of 257 courses in 2015 a significant increase of 69 courses in approximately 6 years²¹. This increase was accompanied by an inversion in the predominance of courses in the public and private higher education institutions. In 2000 there were 48 higher education courses in public institutions and 82 in private institutions, and by 2010 these had risen to 78 and 103 respectively²⁶, public higher education institutions being concentrated in the state capital cities⁹. This predominance has been becoming more accentuated, and data show that the numbers of new places available in the last two years in private and public higher education institutions were respectively 3,600 and 1,700²⁷, with the places in private institutions being concentrated in the country's Southeastern Region, and those in public institutions in the Northern Region⁹.

b. Inappropriate distribution of doctors between the levels of healthcare and geographical zones

Considering the network model on the basis of which the SUS is organized²⁸, the problem of inadequate distribution cannot be analyzed only with the focus on primary healthcare, but also on the other levels of care. The specialists who operate exclusively in the private sector and the public sector total, respectively, 68.2% and 52%, while 74.3% of the total operate in both. It was found that in the private sector 40.1% are in consultation rooms, 38.1% in hospitals and 31.1% in outpatient facilities. In the public sector, 51.5% work in hospitals, 23.5% in primary healthcare and 4.8% in secondary care²¹. The number of

pediatric surgeons showed imbalances between the regions of the country, the Southeast being the largest source of training and qualification of in this specialty²⁹. Among dermatologists, only 9.1% of the municipalities had a specialist in this area³⁰. In ophthalmology, the imbalance in geographical distribution results in scarcity in certain zones, however this analysis was not attributed to lack of specialists in the country. Those studies that dealt with inadequate distribution in other specialties were found.

The problem of inadequate geographic distribution of healthcare professionals in Brazil has been indicated as a challenge, and various policy strategies have been implemented to correct it^{7,10,14,21,31-37}. This inappropriate distribution is accentuated in qualified health professionals including nurses, doctors¹⁴ and dentists³⁸, and this situation is directly reflected in the population's health conditions^{14,16}.

This adverse distribution is seen in various geographic levels (between regions, between rural and urban, between the interior of a state and its capital city, and between the municipalities themselves). There is an asymmetry in the distribution of doctors between Brazil's five Regions. In the Southeastern Region there are 2.51 doctors per thousand population, that is to say a concentration 2.5 times greater than in the Northeast (0.9) in the year 2010. The ratio in the South (2.06) and the Center-West (1.76) is almost twice the ratio for the Northeast (1.09)¹⁹. So we see a greater intensity of the problem in the North and Northeast, which are below the national average^{10,21,33-37}. The inequality between Brazil's States is even greater, while the Federal District, Rio de Janeiro and São Paulo have respectively 3.61, 3.52 and 2.5 doctors per thousand population, in these states of Pará, Amapá and Maranhão this ratio falls to 0.77, 0.75 and 0.53 respectively¹⁹.

The inadequate distribution of doctors is more accentuated between municipalities. Those with the lowest population have the lowest number of doctors per inhabitant²¹. In 2009 approximately 42% of the population lived in municipalities with a ratio of less than 1 doctor per 4,000 population, and in 7% of municipalities there were no records of doctors at all¹⁰. Municipalities with population of up to 50,000 were 88.5% of the total (4,932 municipalities in 2014) and had between 0.23 and 0.64 doctors per thousand population. At the other extreme, municipalities with more than 500,000 population (a total of 39 in 2014) have 29% of the country's population and approximately 61% of the doctors²¹.

This imbalance is influenced by various factors, which can be divided into: individual; organizational; and related to the systems (health, education, institutional) and characteristics of the municipalities, including the economic, socio-cultural, historic and political environment¹¹. In the documents selected, the principal causes of inappropriate geographical distribution in Brazil were: the characteristics of the municipalities, including their GDP, their Human Development Index, levels of social vulnerabilities, conditions of violence, and work opportunities^{14,21,33,36}; individual characteristics, for example age, work opportunities for spouses, origin in urban environments and family income^{33,39}; characteristics of the education system, existence of a medical course, medical residency and possibilities of continued education^{21,33,36}; and finally organizational characteristics including remuneration, working conditions, career plan and professional recognition^{21,40}.

II - Strategies put in place to deal with the problem of scarcity and distribution

In 2003 the Brazilian Health Ministry created the Health Work & Education Management Department (SGTES), and now carries out a strategic role: it is responsible for formulation of policies for management of work in health; training and qualification of healthcare human resources; professional regulations; and decentralization of management of work and education in the states of Brazil⁴¹. Over recent years the subject of healthcare human resources, and in particular as regards geographical availability and accessibility, has been recurring and is closely related to the difficulties faced in the health sector. Analyzing the continuity of this subject, documents providing orientation on the interventions in health are seen as from the National Health Plans of 2004-2007, 2008-2011 and 2012-2015⁴²⁻⁴⁴, the National Basic Healthcare Policy²⁵, and Resolution 439 of the National Health Council⁴⁵, constituting a synergy in relation to the problem. However, it is seen that there is something lacking in the formulation of a clear, long-term policy to govern healthcare human resources in Brazil³¹, even though several specific and limited strategies have been identified for facing these challenges.

The interventions identified were:(a) the Rondon Project (*Projeto Rondon*); (b) the Interiorization Program of the SUS (*Programa de Interiorização do SUS* – or *PISUS*); (c) the Program to Move Health Work into the Interi-

or (*Programa de Interiorização do Trabalho em Saúde* – or *PITS*), (d) *Telessaúde* ('Tele-Health'); (e) the Program to Support Training of Specialist Doctors in Strategic Areas (*Programa de Apoio à Formação de Médicos Especialistas em Áreas Estratégicas* – '*Pró-Residência*'); (f) the Fund for Financing Higher Education Students (*Fundo de Financiamento ao Estudante do Ensino Superior* – or *FIES*); (g) the Program to Value Basic Healthcare Professionals (*Programa de Valorização dos Profissionais da Atenção Básica* – or *PROVAB*); and (h) the 'More Doctors' (*Mais Médicos*) Program – described in Chart 3.

In the policy initiatives that were implemented, there are superimpositions of its possible results on various fronts of the problems being dealt with, and we thus present the findings relating the initiative, the challenge (geographical availability and distribution) and the policy area, according to the logic of the conceptual framework of the employment market and policy interventions in health¹². The approaches are illustrated in Chart 4.

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The search of web sites and the consultation of key informants identified 22 relevant policy and technical documents. Regarding the database search a total of 2,191 documents were initially identified. After application of the criteria of eligibility, only 20 were selected for analysis: see Figure 2. The complete list of the 42 documents used in this study is available on request.

I - Challenges for ensuring availability and geographical access to physicians, and the related determinant factors

The quantity, distribution and quality of the health professionals that are accessible to populations are fundamental conditioning factors for achieving gains in health¹⁴. In spite of the increasing evidence that the health workforce is fundamental for improving the levels of coverage of health services, several countries still have serious problems with shortages¹⁴⁻¹⁶, and inequalities in the distribution of these professionals^{4,5,17,18}. This problem is more obvious in countries that offer universal coverage, with a vast geographical area and an unequally distributed population. Two principal problems were identified in the studies analysed: (a) shortages of physicians, and (b) inadequate distribution. The latter relates to geo-

graphical zones and to distribution between the levels of health care.

(a) Shortages of physicians

Brazil's density of physicians per thousand population has grown over the last 20 years. In 1990 the country had 1.12 physicians per thousand population, and this increased to 1.86 in 2010¹⁹. Other sources with more up-to-date data showed that in 2013 this ratio was 1.89²⁰, and 1.95 in 2015²¹.

The "ideal" ratio of physicians to population in a country is a polemical and complex subject. Various factors need to be taken into account to decide the desirable ratio, such as the characteristics of professionals (age, sex), work processes (productivity, workload, non-clinical work and variations in the volume of activity), the characteristics of the health system (coverage and type of services offered)²², and the population's conditions (socio-economic and epidemiological).

Making this ratio operational is fraught with difficulties²², generally caused by lack of information. In Brazil there is no planning of HRH future needs, a problem mentioned in the documents which described shortages of physicians. These documents use data comparing ratio of physicians per thousand population between Brazil and other countries to arrive at a desirable ratio and create targets for improvement. In some documents, an ideal minimum ratio is defined, but without considering the contextual factors mentioned above. In OECD data for physicians per thousand population, Brazil is sixth lowest of 39 countries that presented data for 2010, but caution is needed in interpreting this information²³.

The literature reviewed reports shortages of professionals and specialists in PHC^{9,10,16}, as well as inappropriate geographical distribution. The following causes are said to be at the origin of shortages:

- A growing demand for health professionals, especially due to the increase in public and private organizations providing medical services^{10,21}. The reform of PHC in the Americas and the implementation of the ESF^{24,25}, which created multi-professional health teams and expanded services to the population, generated increase in the need for primary health care physicians. The number of health provider organizations at the end of the 1970s was 18,489, and by 2005 this number had grown to 77,004, an increase of 76%¹⁰;

- Low numbers of medical graduates in relation to demand and to growing needs; this is in

spite of significant growth in the number of medical schools from 94 to 251 over the period 2000 to 2014²⁶. In 2015, there were 257 programs, a significant increase of 69 programs in the previous 6 years²¹. This increase was accompanied by an inversion in the proportion of programs public and private institutions. In 2000, there were 48 programs in public institutions and 82 in private institutions, and by 2010 these had risen to 78 and 103 respectively²⁶, the former being concentrated in the state capital cities⁹. The numbers of new places available in the last two years in private and public institutions were respectively 3600 and 1700²⁷; the former are concentrated in the Southeastern Region, and the latter in the Northern Region⁹.

(b) Inappropriate distribution of physicians between levels of health care and geographical zones

In view of the network model on the basis of which the SUS is organized²⁸ the problem of the imbalanced distribution of physicians cannot be analysed only in PHC, but at all other levels of care. 68.2% of the physicians who work exclusively in the private sector, 52% of the physicians who work exclusively in the public sector and 74.3% of the physicians who work in both sectors have a specialization. In the private sector 40.1% work in clinics, 38.1% in hospitals and 31.1% in outpatient facilities. In the public sector, 51.5% work in hospitals, 23.5% in PHC and 4.8% in secondary care²¹. The distribution of paediatric surgeons between regions is the most imbalance, as the Southeastern region is the largest producer of these specialists. Only 9.1% of municipalities had a dermatologist³⁰. Imbalances are also reported in ophthalmology, even though there is no lack of these specialists in the country. We did not find studies showing inadequate distribution in other specialties.

The problem of inadequate geographic distribution of health professionals in Brazil has been recognized as a challenge, and various policy strategies have been implemented to address it^{7,10,14,21,31-37}. This problem concerns all categories of health professionals including nurses, physicians¹⁴ and dentists³⁸, and it directly affects the population's health conditions^{14,16}.

This maldistribution is observed various geographic levels; between regions, between rural and urban, between the interior of a state and its capital city, and between the municipalities themselves. There is an asymmetry in the

distribution of physicians between Brazil's five Regions. In the Southeastern Region, there are 2.51 physicians per thousand population, which was 2.5 times more than in the Northeast (0.9) in 2010. The ratio in the South (2.06) and the Centre-West (1.76) is almost twice the ratio for the North (1.09)¹⁹. There is a greater intensity of the problem in the North and Northeast, which are both below the national average^{10,21,33-37}. The differences between States are even greater; the Federal District, Rio de Janeiro and São Paulo have respectively 3.61, 3.52 and 2.5 physicians per thousand population, whereas Pará, Amapá and Maranhão have only 0.77, 0.75 and 0.53 respectively¹⁹.

As regards municipalities, those with the lowest population have the lowest number of physicians per population²¹. In 2009, approximately 42% of the population lived in municipalities with a ratio of less than 1 physician per 4,000 population, and in 7% of municipalities there were no physicians at all¹⁰. Municipalities with a population of up to 50,000 represented 88.5% of the total (4,932 municipalities in 2014) and had between 0.23 and 0.64 physicians per thousand population. At the other extreme, municipalities with more than 500,000 population (39 in 2014) had 29% of the country's population and approximately 61% of the physicians²¹.

These imbalances are influenced by various factors, which are typically categorized into individual, organizational and related to the systems (health, education, institutional) and to the characteristics of the municipalities, including the economic, socio-cultural, historical and political environment¹¹. In the documents selected, the principal causes of inappropriate geographical distribution were: the characteristics of the municipalities, including their Gross Domestic Product, their Human Development Index, levels of social vulnerabilities and of violence, and work opportunities^{14,21,33,36}; individual characteristics of HRH, for example age, work opportunities for spouses, origin in urban environments and family income^{33,39}; characteristics of the education system, existence of a medical program, or of residency and possibilities of continued education^{21,33,36}; and finally organizational characteristics including remuneration, working conditions, career plan and professional recognition^{21,40}.

II - Strategies to deal with shortages and imbalanced distribution

In 2003, the Ministry of Health created the Secretary for Work and Education Management in Health (*Secretaria de Gestão do Trabalho e Educação em Saúde - SGTES*), which is now responsible for the formulation of policies for management of work in health, for training and qualification of HRH, for professional regulation, and for decentralization of management of work and education at State level⁴¹. Along the years, the subject of HRH, and in particular of geographical availability and accessibility, has been a recurring discussion, in the National Health Plans of 2004-2007, 2008-2011 and 2012-2015⁴²⁻⁴⁴, in the National Primary Health Care Policy²⁵, and in Resolution 439 of the National Health Council⁴⁵. Several specific and targeted strategies have been devised to face these challenges, but there is a lack of an explicit, long-term policy to manage the health workforce in Brazil³¹.

Specific interventions identified were: (a) the Rondon Project (*Projeto Rondon*); (b) the Program to strengthen the SUS in the interior of the country (*Programa de Interiorização do SUS - PISUS*); (c) the Program for the Interiorization of Health Workers (*Programa de Interiorização do Trabalho em Saúde - PITS*), (d) Tele-Health (*Telessaúde*); (e) the Program to Support the Training of Specialist Doctors in Strategic Areas (*Programa de Apoio à Formação de Médicos Especialistas em Áreas Estratégicas - Pró-Residência*); (f) the Fund for Financing Higher Education Students (*Fundo de Financiamento ao Estudante do Ensino Superior - FIES*); (g) the Program of Valorization of Primary Health Care Professionals (*Programa de Valorização dos Profissionais da Atenção Básica - PROVAB*); and (h) the 'Mais Médicos' (More Doctors) Program – described in Chart 3.

In the policy initiatives that were implemented, there are superimpositions of their possible impact on the various problems, e.g. geographical and level of care maldistribution, and shortages, and by areas of policy intervention (Chart 4).

Chart 1. Search strategies for identification of data and documents.

Location of search	Specifications of search	Criteria for inclusion and exclusion of documents
PubMed and BVS	Systematic search, in January 2016, in the databases of the Virtual Health Library (BVS), and PubMed of the National Library of Medicine, where the scientific documents were identified based on a search using the following terms: (physician OR physicians OR doctor OR doctors OR health professionals OR workforce OR health workers OR manpower) AND (geographical OR imbalance OR rural OR remote OR suburban OR scarcity OR lack) AND Brazil – details of the search are available on request. Finally, documents identified as relevant (related to the structure of the problem under study or to a specific strategy) as a result of the initial references selected, were included.	(i) The material should be about medical professionals, whether or not including other professionals; (ii) when about more than one country, it should enable information relating to Brazil to be identified in isolation; (iii) it must be available in computerized form, making possible searches for information in the text; (iv) dated 1994-2015; (v) and without language restrictions;
Websites	Research on websites of the Brazilian Health Ministry (HM), International organizations (World Bank, OECD, WHO, Inter-Agency Health Information Network (Rede Interagencial de Informação para a Saúde, RIPSAs), and Health Graduations Indicator Systems (Sistemas de Indicadores das Graduações em Saúde, SIGRAS), the Brazilian Federal Council on Medicine, and the Brazil Health Human Resources Observation Network (Rede Observatório de Recursos Humanos em Saúde do Brasil, ObservaRH), with a focus on the work situations that have lines of study or research on the subject in question.	(vi) principal subjects to include geographical availability or accessibility of healthcare human resources as principal focus of the article in one of three aspects: geographical availability / distribution of doctors; causes of scarcity or asymmetric distribution; or strategies for dealing with the problem: whether (a) describing or assessing the strategy in its implementation in Brazil, or (b) describing or assessing a strategy implemented in another country, raising considerations for its implementation in Brazil.
Individual key advice and information sources	In parallel, key information sources were consulted to identify possible documents not included in the previous phases (items published, and the ‘gray literature’), or names of strategies that would enable a specific search on the sites described.	Documents that presented data without the results of processing it or without introduction of new conclusions were excluded. The year 1994 was chosen as a cutoff due to the implementation of the Family Health Strategy (ESF). This choice is justified by the fact of healthcare being organized based on the precept of Primary Health Care (PHC)

Source: Authors.

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Chart 1. Search strategies for identification of data and documents.

Location of search	Specifications of search	Criteria for inclusion and exclusion of documents
PubMed and BVS	Systematic search, in January 2016, in the databases of the Virtual Health Library (BVS), and PubMed of the National Library of Medicine. Search terms were: (physician OR physicians OR doctor OR doctors OR health professionals OR workforce OR health workers OR manpower) AND (geographical OR imbalance OR rural OR remote OR suburban OR scarcity OR lack) AND Brazil – details of the search are available on request. Documents identified as relevant (related to the structure of the problem under study or to a specific strategy) as a result of the initial references selected, were included.	(i) The material should be about medical professionals, whether or not including other professionals; (ii) when about more than one country, it should include information relating to Brazil separately from other countries; (iii) it must be available in a computerized form, making possible searches for information in the text; (iv) dated 1994-2015;
Websites	Research on websites of the Brazilian Ministry of Health (MoH), International organizations (World Bank, OECD, WHO), Inter-Agency Health Information Network (<i>Rede Interagencial de Informação para a Saúde - RIPSAs</i>), and Health Graduations Indicator Systems (<i>Sistemas de Indicadores das Graduações em Saúde - SIGRAS</i>), the Brazilian Federal Council on Medicine, and the Brazil Health Human Resources Observatories Network (<i>Rede Observatório de Recursos Humanos em Saúde do Brasi - ObservaRH</i>), with a focus on lines of study or research on the subject in question.	(v) without language restrictions; (vi) principal subjects to include geographical availability of or accessibility to HRH as principal focus of the article in one of three aspects: geographical availability / distribution of physicians; causes of scarcity or asymmetric distribution; or strategies for dealing with the problem: whether (a) describing or assessing the strategy in its implementation in Brazil, or (b) describing or assessing a strategy implemented in another country, with relevance for its implementation in Brazil.
Individual key advice and information sources	In parallel, key informants were consulted to identify documents not included in the previous phases (published, and the ‘grey literature’), or strategies that would enable an additional specific search.	Documents that presented data without the results of processing it or without introduction of new conclusions were excluded. The year 1994 was chosen as a cut-off point as it corresponds to the implementation of the Family Health Strategy (ESF). This choice is justified by the fact of health care was meant to be organized along the principles of Primary Health Care (PHC)

Source: Authors.

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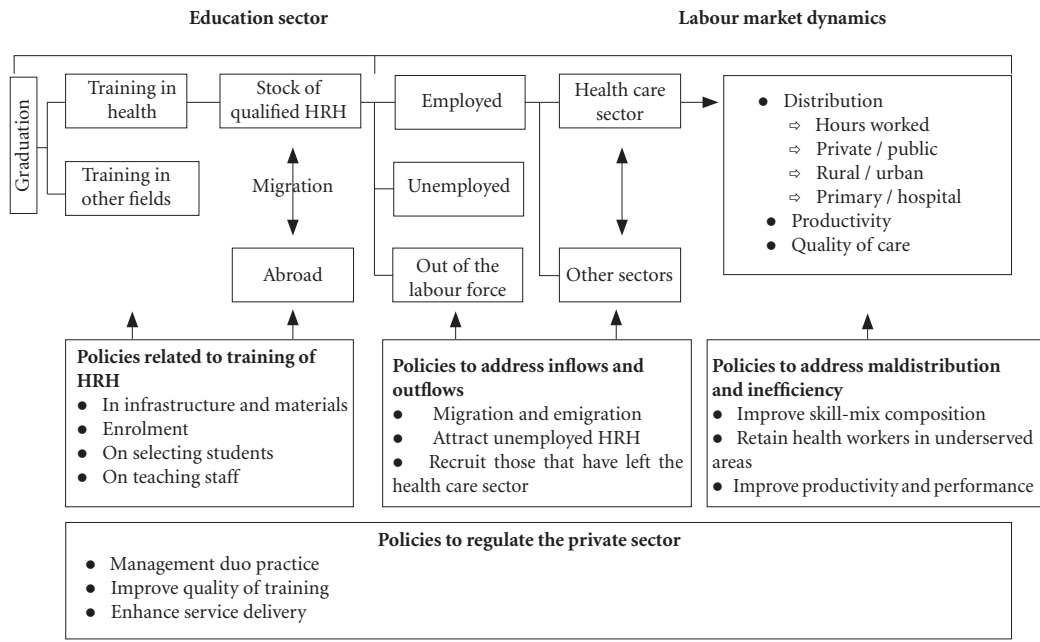


Figure 1. Reference table on the employment market and policy interventions.

Source: adapted from Sousa et al.¹².

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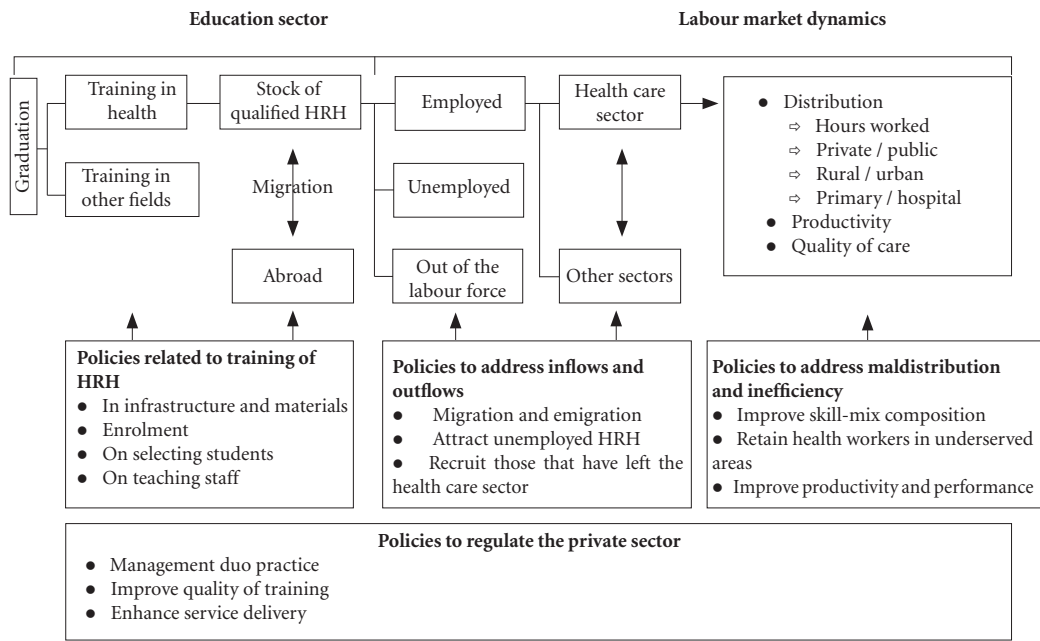


Figure 1. Conceptual model of the health labour market and policy interventions.

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Chart 2. Questions, categories and subcategories for the subject analysis of the data.

Question	Category	Subcategory
What are the challenges identified by policy makers and managers in ensuring geographical availability and accessibility to doctors within the SUS system?	Stock of qualified healthcare human resources and their characteristics in terms of distribution	Scarcity of professionals; distribution between rural and urban; distribution of professionals between public and private; among other aspects.
What are the determinant factors in these challenges?	Education sector and dynamics of the market	Number of graduate positions available, number of specialization positions, planning in the form in the training of healthcare professionals, number of retirements, loss to the private sector, unemployment, emigration, double employment, inefficacious contracting procedures; among other aspects.
What strategies and areas of policy interventions were used to correct the challenges faced by policy makers and managers at the national level to ensure geographical availability and accessibility for doctors within the SUS system?	Areas of political strategies	Policies surrounding training of healthcare professionals, policies surrounding flows of entry and exit, among other aspects.

Source: Authors.

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Chart 2. Questions, categories and subcategories for the thematic document analysis.

Question	Category	Subcategory
What are the challenges identified by policy makers and managers in ensuring geographical availability and accessibility to physicians within the SUS system?	Stock of qualified HRH and their characteristics in terms of distribution	Scarcity of professionals; distribution between rural and urban; between public and private; among other aspects.
What are the determinant factors in these challenges?	Education sector and dynamics of the labour market	Number of graduate positions available, number of specialization positions, planning of the training of health care professionals, number of retirements, losses to the private sector, unemployment, emigration, double employment, ineffective contracting procedures, among other aspects.
What strategies and areas of policy interventions were used to correct the challenges faced by policy makers and managers at national level to ensure geographical availability and accessibility to physicians within the SUS system?	Areas of political strategies	Policies on training of HRH, policies on flows of entry and exit, among other aspects.

Source: Authors.

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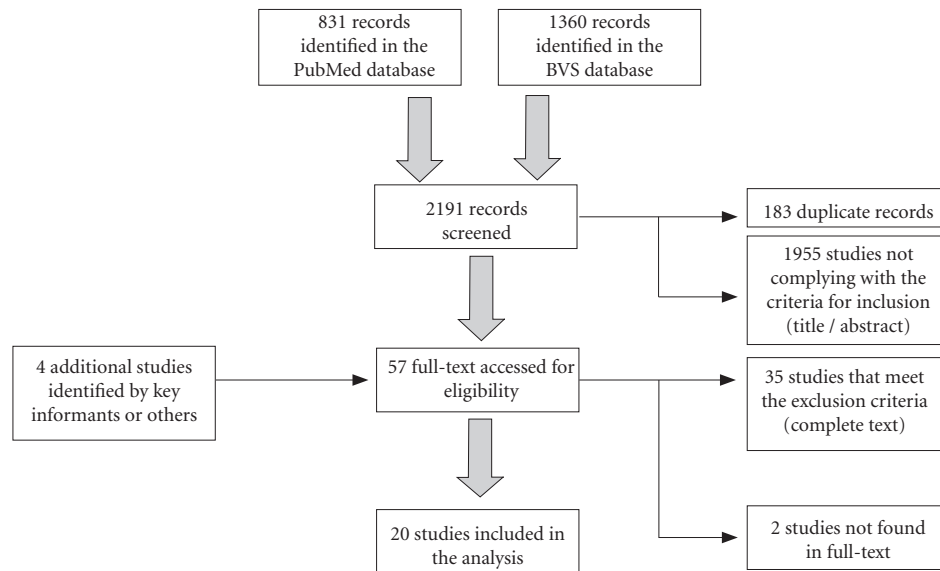


Figure 2. Flow diagram of selection of articles included in the analysis.

Source: Authors.

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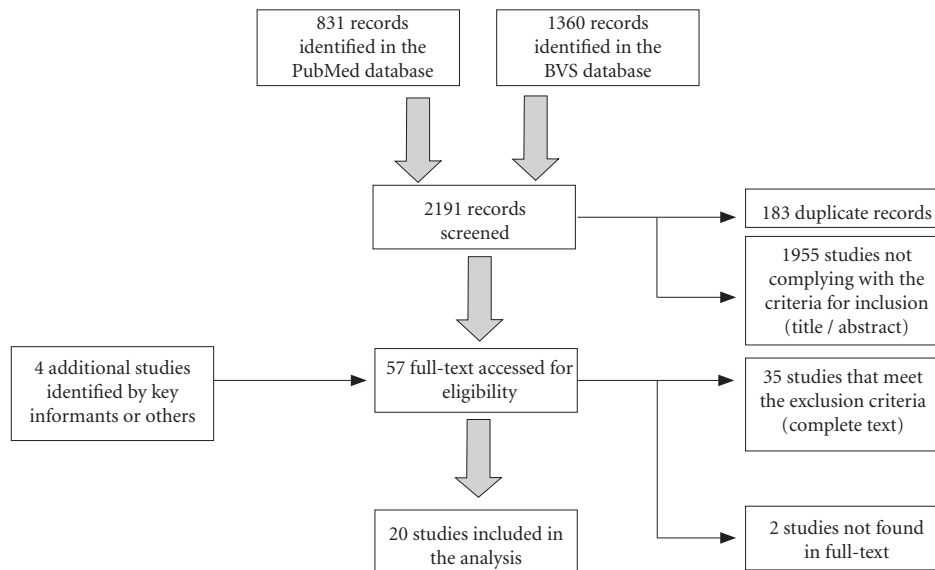


Figure 2. Flowchart of selection of articles included in the analysis.

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Discussion**

Considering the health system implemented in Brazil, it is certainly a challenge for policy makers and managers to ensure availability and accessibility to health for the whole of the population. Another challenge is the growing increase in the demand for health professionals, both in the public and in the private sector, attributed principally to the expansion of the service network. Studies show that among the principal challenges are scarcity of doctors, and their inadequate distribution, both by geographical area and between levels of care.

As to scarcity, one sees that it is often difficult to quantify it, perhaps due to the lack of knowledge of present and future needs for doctors. Thus, an integrated analysis has been substituted by comparison using external benchmarks in an isolated form, comparing with other countries, without knowing whether these are appropriate for the Brazilian health system. The documents that were selected attribute the causes of scarcity as principally being demand for professionals and training, to the detriment of other elements such as inflow (example: immigration, and people returning from another sector) and outflow (e.g. termination of career, and retirement).

Scarcity exacerbates the difficulty of management of the distribution of doctors between the regions of the country and between the levels of care¹⁵. Geographical distribution is a problem that has long been diagnosed in Brazil and was significantly reported in the studies selected, showing that doctors are indeed concentrated in the South and Southeast, in major cities and in the more developed municipalities. However, wider and deeper analyses are necessary about the factors that could lead doctors to migrate to work in regions that are lacking care. The literature indicates that to become aware of these factors priority should be given to qualitative studies and Discrete Choice Experiments (DCE) – which as well as awarding points for isolated factors make it possible to identify the preferences of individuals based on comparisons between certain characteristics of the work since some benefits in the employment contract can be a counterpart to the location of the work^{32,46}.

Inadequate distribution between the levels of care, on its own, does not present a precise diagnosis in Brazil, but points to various factors:

scarcity of doctors in primary care; concentrations of specialists in the private sector; and unequal distribution of some specialties in the regions of the country. The studies indicate that for primary healthcare and consequently the Family Health Strategy to be more effective in providing solutions, in relation to availability of doctors, various challenges need to be met, including the problem of turnover and lack of confirmed permanent residence of these professionals⁴⁷. This situation can be attributed to the low levels of stimuli in temporary work contracts⁵³, which in turn are often the result of budget restrictions of municipalities that are unable to adjust doctors' salaries enough to retain them, since that adjustment would infringe the Fiscal Responsibility Law⁵⁴. Additionally, studies point to structure problems, related to the process of work. The Family Health Strategy, and Primary Healthcare, should be organized in an equitable and efficient fashion to achieve their potential in facing the challenges imposed on health²⁴, but one still sees teams rooted in the traditional medical-hegemony model, which contributes to excess workload for the professional⁶³ without giving priority to multi-professional teamwork. On the other hand, although it is not its central aim, the Family Health Strategy can be considered to be the initiative that has most expanded the coverage of doctors³², contributing to improvement of accessibility to health services. In secondary care, on the other hand, the difficulty is attributed to contracting of specialists to work in the SUS^{9,64}.

The inadequate geographical distribution of doctors is a problem that has been present on the policy decision agenda for various governments in Brazil^{10,32}. Starting in 2011 the deficit in provision of professionals was defined as a priority area³⁷. Initiatives to deal with the challenge of inadequate distribution have been put in place since 1968. On the other hand implementation of initiatives for the problem of scarcity is more recent, with only two measures identified, Pró-Residência and the PMM. According to information presented (Charts 3 and 4) initial programs failed in their sustainability on a time horizon, although the pioneer program was re-established some 35 years later.

It can be seen from the analysis (Chart 4) that since 2011, with the PROVAB, the initiatives incorporated a larger number of strategies and although there are not yet evaluations of their impacts, considering the conceptual table used (Figure 1), it can be inferred that there is a greater possibility of success since the evidences on

the subject indicate that initiatives carried out jointly are more efficacious than isolated ones⁸. It was observed that the policy initiatives are concentrated on distribution, with focus on primary care, neglecting distribution between other levels of care, perhaps for lack of a clearer diagnosis. Only the *Pró-Residência* program was identified as a program with effect in this regard.

The absence of evidence from actual research results to contribute to a diagnosis for the inadequate distribution of doctors between the levels of care, and its causes, makes it difficult to formulate initiatives that are informed by evidence, thus increasing the risk of their being formulated in an improvised manner or having their process dominated by other factors than evidence.

In graduation courses, the articulation between teaching and service is reported in various studies. The dynamic between these subjects is justified by the quest for professionals with necessary competencies to act in the SUS, that is to say, the training should prepare the professional to work based on the principles, guidelines and policies of the health system that is in force⁶⁶. There are programs put in place for reorientation of professional training: highlights are the IDA Project, the Uni and Rede Unida project, prior to the creation of SGTE; and, subsequent to the SGTEs being put in place⁶⁷: the PROMED, Ver SUS, Aprender SUS, Ensina SUS, Pró-Saúde (I and II), PET-Saúde and the National Permanent Education Policy. At the same time, there are situations where these articulations are fragile and there is a lack of planning and coordination between the need for training and the population demand²⁹. Among the initiatives identified for facing the challenges, which are the focus of this study, the PMM is the one that has the most cross-sectional action, dealing with all the challenges identified in this review, and having strategies in almost all the four areas of policy intervention, only not acting in one area: regulation of the private sector.

The process of formulation of a policy can be influenced by various factors⁶⁸. Among these, scientific evidence can play an important role, since it helps policymakers and other actors to take well-informed decisions about policies, programs and projects so as to guarantee that the decision made is well informed by the best research evidence available⁶⁹, thus avoiding domination of the process by other factors.

When we evaluate the results of the efforts to highlight the use of evidence in formulation of policies, we should go beyond questioning

whether the evidence was used in the process, to find out when it was used^{70,71}; for what purpose⁷²⁻⁷⁴; and what approach was used to promote its use^{73,75,76}. In this study, according to the message chosen, it is possible only to observe the possibility of the use of the evidence in the phases of the policy cycle in accordance with the type of research/survey available.

The most common approach for studying public policies, the “policy cycle”, breaks down the political process into a series of functional stages (creation of the agenda, development of the formulation of the policy, implementation and assessment)^{77,78}. Scientific evidence can play a significant role in all the phases of the cycle. However, for each phase there is also a type of research, and a research question, that is most appropriate and relevant to that moment^{70,71}.

The demand by policy formulators for research in the area of Healthcare Human Resources cannot be considered insufficient in Brazil, as can be seen by the volume of research funding available in the country, from the fact that Healthcare Human Resources is among the priority research areas of the National Research and Health Agenda⁷⁹, and also from the collaboration of the Human Relations Observatory Network in Brazil (ObservaRH) with the SGTEs, an initiative sponsored by the Health Ministry, together with the Technical Cooperation Program of the Pan-American Health Organization (PAHO) of the WHO⁸⁰. However, the focus of these surveys identified through the articles selected in the Brazilian context concentrates on the description of the problems, the diagnosis and its causes, and there is an absence of investigations that analyze alternatives and solutions for reduction of the problem concerned in a critical way, or assessment of alternatives implemented in other countries in light of the Brazilian context. Thus it can be asked whether there is a difficulty in communication between formulators of policy and researchers (which is reflected in the research questions being different from the need for reply from policy makers for intervention in the policy in question), or whether the means of disclosure is different from the ‘conventional’ medium of publication of articles?

Since this study is based on the analysis of documents there are limitations, especially as to the reach of the context of healthcare HR policies in Brazil. For this reason, an additional phase of the study is being developed, which consists of interviews with the makers of policy and researchers among other key actors.

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Discussion

In a health system such as that of in Brazil, it is certainly a challenge for policy makers and managers to ensure availability and accessibility to health services to all. Part of the challenge is the growing the demand for health professionals, both in the public and in the private sectors, as the services network expands. Studies show that among the principal challenges are shortages of physicians, and their inadequate distribution by geographical area and between levels of care.

As regards shortages, it is difficult to quantify them, due to the lack of information on present and future needs for physicians. As a substitute, external benchmarks by comparing Brazil with other countries are used, without checking whether these are appropriate for the Brazilian health system. Documents reviewed here attribute the causes of shortages to a higher demand for professionals, to low other sources of inflow, such as immigrants and returnees and to high outflows, namely by interruption of career, and retirement.

Shortages exacerbate the difficulty of managing the distribution of physicians between regions and between levels of care¹⁵. Geographical distribution is a problem that has long been diagnosed in Brazil and is abundantly reported in the studies reviewed, showing that physicians are indeed concentrated in the South and Southeast, in major cities and in the more developed municipalities. However, deeper analyses are needed about factors that could bring physicians to accept to work in regions where there are unmet service needs. The literature suggests the utilization of qualitative studies and of Discrete Choice Experiments (DCE) to identify and understand these factors. These make it possible to identify the preferences of individuals based on comparisons between certain characteristics of the work, assuming that some benefits in the employment contract and conditions can compensate the low attractiveness of the location of the work^{32,46}.

The imbalanced distribution between the levels of care has not been the object of a detailed diagnosis in Brazil, but some of its aspects have been documented, e.g. shortages of primary care physicians, the concentration of specialists in the private sector, and unequal distribution of some specialties in the regions of the country. Studies indicate that for PHC and consequently the ESF to be more effective, in addition to increasing the availability of physicians, the issues of high

turnover and of retention of these professionals must be addressed⁴⁷. Insufficient incentives in temporary work contracts⁵³, which often result of budget restrictions of municipalities as adjusting physicians' salaries enough to retain them would infringe the Fiscal Responsibility Law⁵⁴. Additionally, studies point to structural problems, related to the process of work. They argue that the ESF and PHC should be promote an "equitable and efficient" organization of work²⁴, instead of the traditional medical-hegemony model, which contributes to excessive workloads for physicians⁶³ and does not prioritize multi-professional teamwork. On the other hand, even though it is not its central objective, the ESF can be considered to be the initiative that has most expanded the coverage of physicians³², contributing to improving significantly accessibility to health services. In secondary care, the principal difficulty is the contracting of specialists to work in the SUS^{9,64}.

The inadequate geographical distribution of physicians is a problem that has been present on the policy agenda of successive governments in Brazil^{10,32}. Initiatives to deal with the challenge of inadequate distribution have been put in place since 1968. On the other hand, the deficit in the production of health professionals has been defined as a priority area more recently³⁷: Two initiatives addressing shortages have been launched, Pró-Residência in 2009 and the PMM in 2013. Since 2011, with the PROVAB, the initiatives incorporated a larger number of strategies (Chart 4); although, no evaluations of their impacts are available, there is a greater possibility of success since the evidence suggests that initiatives carried out jointly are more efficacious than isolated ones⁸. Other policy initiatives focussed on distribution issues in primary care, neglecting other levels of care, with the exception of Pró-Residência.

The absence of research on the maldistribution of physicians between the levels of care, and its causes, makes it difficult to formulate initiatives that are informed by evidence, thus increasing the risk that policies be formulated in an improvised manner or influenced by other factors, such as the pressures of professional organizations.

In pre-service education programs, the alignment between teaching and service is discussed in various studies, as training should prepare professionals to work in accordance with the principles, guidelines and policies of the SUS⁶⁶. There are indeed programs to promote the reorientation of professional training in that direction: the IDA

Project, the Uni and Rede Unida project, prior to the creation of SGTE⁶⁷, and, subsequently, PROMED, Ver SUS, Aprender SUS, Ensina SUS, Pró-Saúde (I and II), PET-Saúde and the National Permanent Education Policy. At the same time, there are situations where these articulations are fragile and there is a lack of planning and coordination between the need for training and population needs²⁹.

Among the initiatives for facing the challenges the PMM is the most cross-sectoral; it deals with all the challenges identified in this study, and proposes strategies in three of the four areas of policy intervention, only not acting in the area of regulation of the private sector.

The process of formulation of a policy can be influenced by various factors⁶⁸. Among these, scientific evidence can play an important role, since it helps policy makers and other actors to take decisions about policies, programs and projects that are well informed by the best research evidence available⁶⁹, thus avoiding domination of the process by other factors.

When we evaluate the results of the efforts to highlight the use of evidence in the formulation of policies, we should go beyond questioning whether the evidence was used in the process, and find out when it was used^{70,71}; for what purpose⁷²⁻⁷⁴; and what approach was used to promote its use^{73,75,76}. In this study, the method used only allowed to assess the possibility of the use of the evidence in the policy cycle, given the type of research that was available.

The most common approach for studying public policies, the “policy cycle”, breaks down the political process into a series of functional stages: agenda-setting, policy formulation, implemen-

tation and assessment^{77,78}. Scientific evidence can play a role in all the phases of the cycle. However, for each phase there is also a type of research and research questions that are more appropriate and relevant^{70,71}.

The demand by policy formulators for research in the area of HRH cannot be considered insufficient in Brazil, as can be seen by the volume of research funding available, by the fact that HRH is among the priority research areas of the National Research and Health Agenda⁷⁹, and by the collaboration of the HRH Observatory Network (ObservaRH) with the SGTES, an initiative sponsored by the MoH, together with the Technical Cooperation Program of the Pan-American Health Organization (PAHO)⁸⁰. The focus of the studies identified is on the description of problems, the diagnosis of their causes; however, there is an absence of investigations on alternatives and solutions for the reduction of the problem and their critical analysis, nor assessments, taking into account the context of Brazil, of interventions implemented in other countries. A relevant question is whether there is a difficulty in the communication between formulators of policy and researchers, for example whether research questions do not correspond to policy makers’ needs, or whether the ‘conventional’ medium of publication of articles to disseminate research results is appropriate?

Since this study is based on documentary analysis of documents, which is an important limitations, an additional phase is being developed, consisting of interviews with policy makers, researchers and other key informants to better understand the links between research and policy, from the point of view of actors.

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Chart 3. Description of the political interventions identified.

Political Intervention	Aim/Description	Important Points
Rondon Project: 1968 - 1989, and 2005 - present	This program aimed to promote service internships for university students ⁴⁸ and consequently bring students to the work in areas of difficult access and health services that were expanding ³⁶ . In 2005 it was re-launched and now has representatives from the Defense, Education, Health and other Ministries ⁴⁹ .	In its 22 years this project has served thousands of municipalities, most of them in the Center-West, Northeast and Northern Regions of Brazil ³⁶ . Some 350,000 university students and 13,000 teachers have taken part in the project ^{35,36} . The literature that was analyzed does not indicate the reasons why it was terminated. Since the re-launch of the project, it has involved 1,900 higher education institutions and carried out 69 operations in 854 municipalities in 23 States ⁵⁰ . This intervention focused on the area of policies directed to training and qualification, and did not coordinate with other areas of political interventions. Although the literature indicates that for a student to live in a less accessible environment widens his choice for future work ¹⁷ , no data was found for any monitoring of these students after graduation.
PISUS: 1993 - 1994	The objective was to take into the interior of each region or state a minimum health team comprising a Community Health Agent, Nurse and Doctor to support one health service ³⁵ . It was organized in four sub-programs: (i) first aid units, (ii) establishment of a doctor in a region of the interior (at least one to establish fixed residence in the participating municipality), (iii) interiorization of the nurse, and (iv) the Community Agents ³⁶ . It offered appropriate physical facilities, accommodation for nurses and doctors, payment for production, and a formal contract executed by the municipal manager using funds passed through from the Health Ministry ³⁵ .	This program reached 398 municipalities ³⁵ . Since it lasted only for a short time, the lack of information about the reasons why it was terminated prevents any future action in this area from correcting possible fragilities. This is a factor that inhibits continuity of political initiatives.
PITS: 2001 - 2004	This aimed to encourage placement of qualified health professionals in municipalities with proven shortage of medical and health resources ⁵¹ , distant from state capital cities, and also help expand basic healthcare and the Family Health Program (PSF) ³⁶ . Coordinated at a national level by the Health Ministry, it adopted the same strategy as the PSF, and made use of financial incentives, continuing education for participating professionals, and professional and personal support through appropriate work conditions (equipment and inputs), and accommodation, food and transport for them to carry out their activities ³⁶ . The participating doctors did the specialization course in Family Health ⁵² .	During the period, the program was applied for 421 health professionals, 181 of them doctors, in 300 municipalities ³⁵ . It can be seen that this program had greater articulation of the strategies to motivate the health professional, but as with the previous program (PISUS), above, it was also not possible to find out the reasons for its termination.

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Chart 3. continuation

Political Intervention	Aim/Description	Important Points
Telessaúde: 2007 - present	This was a strategy that was a part of the National Permanent Health Education Policy implemented as one of the actions of the Mais Saúde (More Health) program ^{55,56} . Its objective is to orient qualification and development of health human resources and improvement of care and management in basic healthcare in the SUS ^{55,57} . It integrates teaching and service, also providing distance healthcare and distance education, through ICT ⁵⁵ .	This strategy has been related to the attempt to improve the number of health professionals who establish permanent residence in remote areas, since it helps to reduce the possible sensation of isolation and clinical security ^{55,57} . Studies point to the contributions of «tele-health» in the sector ^{58,59} , demonstrating that technology can be a strong ally in exchange of knowledge and training of professionals of the network. This is an area that is expanding, and likely to be explored in the future in the policies relating to health human resources.
Pró-Residência: 2009 - present	An inter-sector measure between the Health Education Ministries. It aims, through award of grants, and training of specialists in basic and priority areas for some regions of the country (North, Northeast and Center-West), to provide support and opening of new residency programs based on the need of the region ⁶⁰ .	Since local and regional shortages in specialists in certain areas of medicine are diagnosed and reported, this initiative has the potential to help in the choice of the professional's activity, thus helping both the market and the doctor's career.
FIES: 2011 - present	In 2011 the government made it possible for doctors whose graduation had been financed by the FIES to pay off their debts by working in the teams of the Family Health Strategy (ESF) in areas where there was a shortage of doctors. For each month worked, the deduction was 1% of the debtor balance ⁶¹ .	It has contributed to expanding the number of doctors in the country, enabled various students to conclude their course through this financing. Linking the student debt to the professional working in the SUS is one more way of expanding the store of doctors in the service and contributing to a reduction of the disparities in health.
PROVAB: 2011 - present	This aims to provide Basic Healthcare and Family Health Strategy teams with nurses, dentists and doctors, in areas that are remote and more vulnerable (riverbank populations, Quilombo settlements, new country settlements, indigenous people, etc.), thus achieving integration between teaching, service and community. The professionals receive a study grant paid by the Federal Government, distance and in-person supervision, and the opportunity to carry out a specialization course focused on basic healthcare offered by universities participating in the UNA-SUS ⁶⁰ . At the end of the year, the doctors can receive up to 10% of the total 100% marking the points system of the process of selection for medical residency ³⁵ .	The number of participants increased from 381 in 2012 to over 3,300 in 2013, distributed between 1, 157 municipalities, of which 573 are located in the Northeastern Region ⁶² . In 2015 the PROVAB was integrated into the PMM («Mais Medicos») Program.

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Chart 3. continuation

Political Intervention	Aim/Description	Important Points
<p>'More Doctors' Program (PMM): 2013 - present</p>	<p>This program aims to train doctors and take them to regions where health professionals are scarce or absent⁶⁵. It is structured in three parts:(1) improvement of basic healthcare structure - improvement in infrastructure of the RAS, focused on Basic Health Units (UBSs); (2) medical training, changes in graduation - in medical residency and training of specialists, such as, for example, implementation of the new DCN and expansion of graduation courses in the public and private sectors; and (3) the emergency provision aspect - the program provides doctors on an emergency basis in vulnerable areas (by recruitment of Brazilian and foreign doctors either individually or through a bilateral agreement made with the government of Cuba)³⁷. The participant receives a monthly grant and cost support for the facility³⁷, of which the amounts are higher for those that travel further to more remote areas⁷.</p>	<p>This program was transferred from being a government policy to being a policy of the states³⁷. It also encompassed the medical professionals of the PROVAB, in which the characteristics were adjusted to the parameters of the PMM. Some results identified: (1) improvement of the basic healthcare structure: construction of 1,577 UBSs, two River UBSs in the Amazon region, refurbishment of 9,011 UBSs; (2) medical training: 47 new medicine courses opened (24 in federal institutions), increasing the number of places by 65%³⁷ - we cannot yet comment on the change in the profile of doctors since none have yet emerged from the new curriculum; (3) the PMMB program reached 3,785 municipalities in less than two years, recruiting 14,462 doctors (1,846 Brazilian and 1,616 foreign doctors) from 49 countries³⁷.</p>

Abbreviations: ACS = Community Health Agent; DCN – National Curriculum Guidelines; PMMB = 'More Doctors for Brazil' Program; ICT = Information & Communications Technology; UBS = Basic Healthcare Units; UNA-SUS = Open University System of the Single Health System.

Source: Authors.

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Chart 3. Description of the political interventions analysed.

Political Intervention	Aim/Description	Important Points
Rondon Project: 1968–1989, and 2005–present	This program aimed to promote service internships for university students ⁶ and consequently bring students to work in areas of difficult access and where health services were expanding ³⁶ . In 2005 it was re-launched and now involves the Defence, Education, Health and other Ministries ⁴⁷ .	In its 22 years this project has served thousands of municipalities, most of them in the Centre-West, Northeast and Northern Regions ³⁶ . Some 350,000 university students and 13,000 teachers have taken part in the project ^{35,36} . The literature does not indicate the reasons why it was terminated. Since the re-launch of the project, it has involved 1,900 higher education institutions and carried out 69 operations in 854 municipalities in 23 States ⁴⁸ . This intervention focused on the area of policies directed to training and qualification, and did not coordinate with other areas of political interventions. Although the literature indicates that for a student to live in a less accessible environment widens his choice for future work ¹⁷ , no information was found on monitoring of these students after graduation.
PISUS: 1993–1994	The objective was to take into the interior of each region or state a minimum health team comprising an ACS, a nurse and a physician to support one health unit ³⁵ . It was organized in four sub-programs: (i) first aid units, (ii) establishment of a physician in a region of the interior (at least one residing in the participating municipality), (iii) recruitment of nurses, and (iv) ACS ³⁶ . It offered appropriate physical facilities, accommodation for nurses and physicians, payment by performance, and a formal contract with by the municipality using funds from the Ministry of Health ³⁵ .	This program reached 398 municipalities ³⁵ . Since it lasted only for a short time, the lack of information about the reasons why it was terminated prevents any future action in this area from correcting possible fragilities. This is a factor that inhibits continuity of political initiatives.
PITS: 2001–2004	This aimed to encourage placement of qualified health professionals in municipalities with a proven shortage of medical and health resources ⁴⁹ , distant from state capital cities, and to help expand primary health care and the PSF ⁴⁹ . Coordinated at a national level by the Ministry of Health, it adopted the same strategy as the PSF, and used financial incentives, continuing education, and professional and personal support through improved working conditions (equipment and inputs), and accommodation, food and transport for them to carry out their activities ³⁶ . The participating physicians did a specialization course in Family Health ⁵⁰ .	During the period, the program was applied to 421 health professionals, 181 of them physicians, in 300 municipalities ³⁵ . This program had greater articulation of the strategies to motivate health professional, but as with the previous program (PISUS), it was also not possible to identify the reasons for its termination.

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Chart 3. continuation

Political Intervention	Aim/Description	Important Points
Telessaúde: 2007–present	This strategy was part of the National Permanent Health Education Policy implemented as one of the actions of the More Health program ^{51,52} . Its objective is to orient qualification and development of HRH and improvement of care and management in PHC in the SUS ^{51,53} . It integrates teaching and service, also provides distance health care and distance education, through ICT ⁵¹ .	This strategy has been related to the attempt to improve the number of health professionals who establish permanent residence in remote areas, since it helps to reduce the possible sensation of isolation and clinical insecurity ^{51,53} . Studies point to the contributions of ‘tele-health’ in the sector ^{54,55} , demonstrating that technology can be a strong ally in the exchange of knowledge and training of professionals of the network. This is an area that is expanding, and likely to be in developed the future in the policies relating to HRH.
Pró-Residência: 2009–present	An inter-sectoral measure between the Ministries of Health and Education. It aims, through grants and training of specialists in basic and priority areas for some regions of the country (North, Northeast and Centre-West), to provide support and opening of new residency programs based on the needs of the region ⁵⁶ .	Since local and regional shortages of specialists in certain areas of medicine are diagnosed and reported, this initiative has the potential to help in the choice of the professional’s activity, thus both responding to demand and helping the physician’s career.
FIES: 2011–present	In 2011 the government made it possible for physicians whose education had been financed by the FIES to pay off their debts by working in a team of the ESF in areas where there was a shortage. For each month worked, the deduction was 1% of the debt balance ⁵⁷ .	It has contributed to expanding the number of physicians in the country, by enabling students to conclude their course thanks to this financing. Linking the student debt to work in the SUS is one more way of expanding the stock of physicians and of contributing to a reduction of the disparities in health.
PROVAB: 2011–present	This aims to provide PHC and ESF teams with nurses, dentists and physicians, in areas that are remote and more vulnerable (riverbank populations, Quilombo settlements, new country settlements, indigenous people, etc.), thus achieving integration between teaching, service and community. The professionals receive a study grant paid by the Federal Government, distance and in-person supervision, and the opportunity to access a specialty course focused on PHC offered by universities participating in the UNA-SUS ⁵⁶ . At the end of the year, the physicians can receive up to 10% of the total 100% mark in the points system of the process of selection for medical residency ³⁵ .	The number of participants increased from 381 in 2012 to over 3300 in 2013, distributed between 1157 municipalities, of which 573 are located in the Northeastern Region ⁵⁸ . In 2015 the PROVAB was integrated into the PMM.

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Chart 3. continuation

Political Intervention	Aim/Description	Important Points
More Doctors Program (PMM): 2013–present	This program aims to train physicians and take them to regions where health professionals are scarce or absent ⁵⁹ . It is structured in three parts: (1) improvement of PHC structure – improvement in infrastructure of the RAS, focused on Basic Health Units (UBSs); (2) medical training, changes in pre-service education – in medical residency and training of specialists, such as the implementation of the new DCN and expansion of medical programs in the public and private sectors; and (3) the emergency provision aspect – the program make physicians available on an emergency basis in vulnerable areas (by recruitment of Brazilian and foreign physicians either individually or through a bilateral agreement made with the government of Cuba) ³⁷ . The participant receives a monthly grant and cost support for the facility ³⁷ , of which the amounts are higher for those in more remote areas ⁷ .	This program evolved from being a government policy to being a policy of the states ³⁷ . It also encompassed the professionals of the PROVAB, whose characteristics were adjusted to the parameters of the PMM. Some results were: (1) improvement of the PHC structure: construction of 1577 UBSs, two River UBSs in the Amazon region, refurbishment of 9011 UBSs; (2) medical training: 47 new medicine programs (24 in federal institutions), increasing the number of places by 65% ³⁷ – we cannot yet comment on the change in the profile of physicians since none have yet graduated from the new curriculum; (3) the PMMB program reached 3785 municipalities in less than two years, recruiting 14462 physicians (1846 Brazilians and 12616 foreign physicians) from 49 countries ³⁷ .

Abbreviations: ACS = Community Health Agent; DCN – National Curriculum Guidelines; PMMB = ‘More Doctors for Brazil’ Program; ICT = Information & Communications Technology; UBS = Basic Health Care Units; UNA-SUS = Open University System of the Unified Health System.

Source: Authors.

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Chart 4. Policy interventions identified in accordance with the challenges to be faced and the policy area of the initiative.

Political initiative	Challenge			Areas of the political initiative involved			
	Geographical distribution	Distribution by level	Availability of doctors	Training of doctors	Inflow and outflow	Correct inadequate distribution and inefficiency	Regulation of the private sector
Rondon Project (curriculum internship in areas of difficult access and services in expansion) - 1968 - 1989 and 2005 - present	x	primary				educational*	
PISUS (payment for production, formal contract, appropriate physical installations and accommodation) - 1993 - 4	x	primary				financial, and personal and professional support*	
PITS (financial incentives, continued education, appropriate work conditions, accommodation, food and transport) - 2001 - 4	x	primary				financial, educational and personal and professional support*	
Telessaúde ('Tele-health' - distance care and distance education) - 2007 - present	x	primária				professional, personal and educational support*	
Pró-Residência (grants for residencies, and opening of residencies) - 2009 - present	x	specialists	x	x		financial and educational*	
FIES (amortization of undergraduate student debt) - 2011 - present	x	primary				financial*	

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Chart 4. continuation

Political initiative	Challenge			Areas of the political initiative involved			
	Geographical distribution	Distribution by level	Availability of doctors	Training of doctors	Inflow and outflow	Correct inadequate distribution and inefficiency	Regulation of the private sector
PROVAB (grants, distance and in-person supervision, opportunity for specialization and additional points gained in selection process for residency) - 2011 - present	x	primary				personal and professional, educational and financial	
More Doctors (Mais Médicos) Program (improvement in infrastructure of the network, grants, opportunity for training and qualification and curriculum change, increased vacancies and recruitment) - 2013 -present	x	primary	x	x	x	regulatory/ administrative (including bilateral agreements), educational, financial, personal and professional support*	

* In particular, in terms of policy interventions to correct inadequate geographical distribution, we can classify them into four categories: regulatory/administrative; educational; financial; and personal and professional support^{11,17}.

Source: Authors.

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Chart 4. Policy interventions corresponding to the challenges to be faced and policy area of the initiative.

Political initiative	Challenge			Areas of the political initiative involved			
	Geographical distribution	Distribution by level	Availability of physicians	Training of physicians	Inflow and outflow	Correct imbalanced distribution and inefficiency	Regulation of the private sector
Rondon Project (curriculum internship in areas of difficult access and services in expansion) – 1968–1989 and 2005–present	x	primary				educational*	
PISUS (payment by performance, formal contract, adequate physical installations and accommodation) – 1993–4	x	primary				financial, and personal and professional support*	
PITS (financial incentives, continued education, adequate working conditions, accommodation, food and transport) – 2001–4	x	primary				financial, educational and personal and professional support*	
Telessaúde (Telehealth – distance care and distance education) – 2007–present	x	primary				professional, personal and educational support*	
Pró-Residência (grants for residencies, and opening of residencies) – 2009–present	x	specialists	x	x		financial and educational*	
FIES (amortization of undergraduate student debt) –2011– present	x	primary				financial*	

Chart 4. continuation

Political initiative	Challenge			Areas of the political initiative involved			
	Geographical distribution	Distribution by level	Availability of physicians	Training of physicians	Inflow and outflow	Correct imbalanced distribution and inefficiency	Regulation of the private sector
PROVAB (grants, distance and in-person supervision, opportunity for specialization and additional points gained in selection process for residency) – 2011– present	x	primary				personal and professional, educational and financial	
<i>More Doctors Program</i> (improvement in infrastructure of the network, grants, opportunity for training and specialization and curriculum change, increased of number of positions and recruitment) – 2013– present	x	primary	x	x	x	regulatory/ administrative (including bilateral agreements), educational, financial, personal and professional support*	

* In particular, in terms of policy interventions to correct inadequate geographical distribution, we can classify them into four categories: regulatory/administrative; educational; financial; and personal and professional support^{11,17}.

Source: Authors.

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Final considerations

When we relate the challenges to the initiatives implemented, it is seen that the governments were looking for solutions to ensure geographical availability and accessibility to doctors in the SUS. And they looked mainly at measures identified in other countries and recommended for application, with variations as to the strength of recommendations, arising from the evidence¹⁷. However, our analyses show that no policy initiatives were found in the areas of regulation of the private sector, showing that there is a need for initiatives and policies that consider all the facets of the health employment market in Brazil, such as, for example, the coexistence between the public and private sector. Equally, it is desirable that there should be execution of monitoring and assessments of the results achieved and the subsequent impact generated. Based on the evidences and the present context of health in Brazil, it is noted that policies directly made for human relations are essential for guaranteeing geographical accessibility for medical care in the SUS and for sustainability of the initiatives that have been put in place.

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Conclusion

When we link the challenges and the initiatives taken by successive governments, we observe real efforts to elaborate solutions to ensure geographical availability and accessibility to physicians in the SUS, including on the basis of international recommendations, such as those of the World

Health Organization¹⁷. Our analysis showed that no policy initiatives were taken in the area of regulation of the private sector; there is therefore a need for initiatives and policies that consider all the facets of the health labour market in Brazil, including the coexistence between the public and private sector. Also, it is important that there is monitoring and evaluation of the results of interventions and their subsequent impact. In the current context of health in Brazil, HRH policies are essential for guaranteeing sustained geographical accessibility to medical services in the SUS.

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Acknowledgments

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