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Medical demographics in municipalities in extreme poverty in Brazil

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Abstract

This article aimed to analyze the distribution of medical professionals linked to the Brazilian Unified Health System in municipalities in extreme poverty in the country. This is an observational, longitudinal and retrospective study based on secondary data provided by the Department of Informatics of the Unified Health System. In total, 16,267 physicians were identified, of which 1,360 worked in the private network and 14,907 in the public network. The regional distribution is as follows: 1,284 in the North; 9,186 in the Northeast; 3,071 in the Southeast; 837 in the South; and 529 in the Midwest. Among Brazilian municipalities in extreme poverty, 12.2% have three physicians; 10.7% of two physicians; and 9.2% of only one. The primary outcomes related to the demographics of medical personnel municipalities in extreme poverty show the disproportion in the distribution of professionals among Brazilian cities. The implementation of health policies that promote the equity of such demographics in the country is suggested.

Keywords: Unified Health System. Health services accessibility. Regional health planning.

Resumo

Demografia médica em municípios em extrema pobreza no Brasil

O objetivo deste artigo foi analisar a distribuição de profissionais médicos vinculados ao Sistema Único de Saúde em municípios em extrema pobreza do Brasil. Trata-se de estudo observacional, longitudinal e retrospectivo, desenvolvido com base em dados secundários disponibilizados pelo Departamento de Informática do Sistema Único de Saúde. Foram contabilizados 16.267 médicos, dos quais 1.360 atendiam na rede privada e 14.907 na rede pública. Dentre estes, 1.284 atendem na região Norte; 9.186, no Nordeste; 3.071, no Sudeste; 837, no Sul; e 529, no Centro-Oeste. Entre os municípios brasileiros em extrema pobreza, 12,2% dispõem de três médicos; 10,7%, de dois médicos; e 9,2%, de apenas um médico. Os desfechos primários relativos à demografia médica dos municípios em extrema pobreza afirmam a desproporção na distribuição de profissionais entre as cidades brasileiras. Sugere-se a implementação de políticas em saúde que promovam a equidade da demografia médica no país.

Palavras-chave: Sistema Único de Saúde. Acesso aos serviços de saúde. Regionalização da saúde.

Resumen

Demografía médica en municipios de extrema pobreza en Brasil

Este artículo analizó la distribución de los profesionales médicos vinculados al Sistema Único de Salud en municipios en extrema pobreza en Brasil. Se trató de un estudio observacional, longitudinal y retrospectivo, realizado con datos secundarios provenientes del Departamento de Informática del Sistema Único de Salud. De un total de 16.267 médicos; 1.360 estaban en la red privada y 14.907 en la red pública. De estos, 1.284 trabajaban en la región Norte; 9.186, en el Nordeste; 3.071, en el Sudeste; 837 en el Sur; y 529, en el Centro-Oeste. En tal condición, el 12,2% de los municipios tenía tres médicos; el 10,7%, dos; y el 9,2% solo uno. Los resultados primarios relacionados con el tema permiten atestar la desproporción en la distribución de profesionales entre las ciudades brasileñas. Se sugiere implementar políticas de salud que promuevan la equidad en la demografía médica en el país.

Palabras clave: Sistema Único de Salud. Accesibilidad a los servicios de salud. Regionalización.

Research

The authors declare no conflict of interest.

Brazil, the largest country in Latin America, had its population estimated at 210,147,125 inhabitants in 2019 [1]. The Unified Health System (SUS) in force in the country was established by the Federal Constitution of 1988 [2] which, in its article 196, defined health as the right of all and a duty of the State. SUS, financed with resources from the social security budget of the Union, the states, the Federal District, and the municipalities, has among its organizational principles the decentralization, regionalization, and hierarchization of the service. In this context, the functionality of a regionalized and hierarchical network of health services has been one of its main challenges. Structural problems overlap the incomplete apparatus of equipment and specialties (human and technological resources) throughout the territory, bringing to the fore the issue of territorial equity as the greatest obstacle to be faced for the implementation of the SUS integrality guideline [3].

Regionalization requires peculiar institutional arrangements, given that the creation of regions depends on a federative agreement between the state government and those of the municipalities that compose them, as well as horizontal agreements between the municipal secretaries, which go beyond the contractual mechanisms that prevail in consortia between cities [4]. Several categories make it possible to assess the quality of access to health, among which geographical accessibility, availability, feasibility, and acceptability are common. Geographic accessibility refers to the conformity of the location of health services in relation to the location of users, considering distance, means of transport, and travel time [5].

The political-administrative decentralization of SUS, based on municipalization, favored the inflection of the regionalization process by expanding municipal attributions in the provision of services and by disregarding the role of the states [6]. The need arose, then, to discuss the management capacity of municipalities to implement this policy, and their capacity for government or management was debated [7]. Faced with the fragility of adapting to multiple Brazilian realities by disregarding the political, administrative, technical, financial, and health needs of municipalities, and aiming to reduce inequalities, it was observed, that in this first cycle of decentralization from 1988 to 2000, the key role of municipalities still prevailed in some territories, even with the establishment of Health Regions and Health Care Networks from 2000 onward [8].

Although there is a significant proportion of physicians in the Brazilian population, this number of professionals is unequally disseminated throughout the regions of Brazil, concentrating on centers with the highest monetary income [5]. Thus, access to health is scarce in many municipalities, especially in those in extreme poverty, which lack geographical accessibility.

According to the criteria adopted by the Brazilian Institute of Geography and Statistics (IBGE) [1], municipalities in extreme poverty are those in which at least 20% of the population lives in this condition. Data from the IBGE [9] Summary of Social Indicators show that extreme poverty reached 13.5 million Brazilians in 2019, reaching its highest level in seven years. People in this situation have a monthly household income of up to R$145 *per capita*, whereas those in poverty have a monthly household income between R$145 and R$420 *per capita*. The federative units with the highest incomes are in the South, Southeast, and Midwest regions, with emphasis on the Federal District, which has the highest average income. On the other hand, the states with the lowest incomes are all in the North and Northeast regions, the lowest of which is Maranhão [9], corresponding to regions in which public health coverage rates are lower [10].

Given the demographic and epidemiological scenario of inequality in Brazilian health coverage, the objective of this research was to analyze the distribution of medical professionals linked to SUS in municipalities in extreme poverty in Brazil to present the medical demographics of these locations. This analysis seeks to highlight, within the scope of effective access to health, the lack of physicians in these municipalities and nearby areas. Thus, reflection is encouraged, enabling the substantiation of actions to adapt health services to the needs of these vulnerable territories.

Method

This is an observational, analytical, longitudinal, and retrospective study based on secondary

quantitative data provided by the SUS Department of Informatics (Datasus) [11], collected in the public tabulator of health information (Tabnet) between December 1st and 31st, 2019. Variables of this study correspond to the category of care networks, lacking human resources, based on the *Cadastro Nacional de Estabelecimentos de Saúde* (National Register of Health Establishments), with professionals selected nationwide.

Among the various dimensions and aspects of organizational arrangements, this study prioritized the analysis of the compositions of physicians who work with SUS in municipalities in extreme poverty, according to region, federative unit, year or month – between October 2007 and October 2019 – legal nature, type of management, type of establishments, teaching, and research. To evaluate the distribution according to population size [11], sociodemographic data and number of inhabitants, estimated by the Federal Audit Court, were extracted from the DATASUS website.

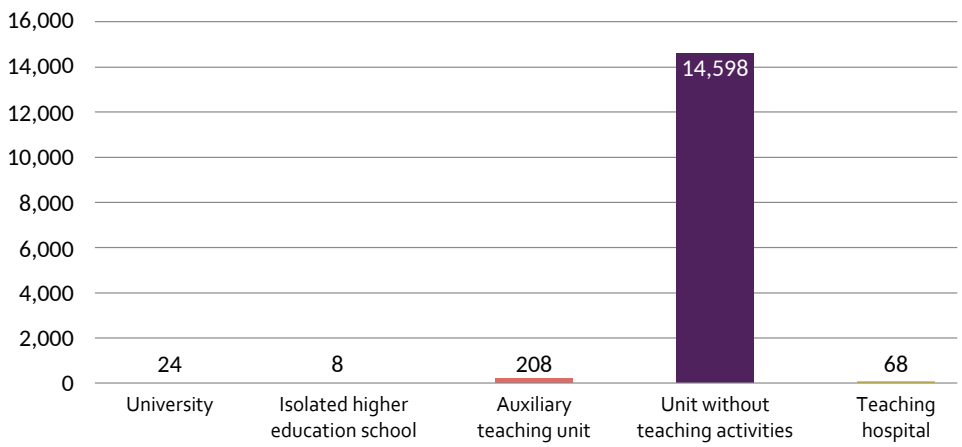
Collected data were processed in Microsoft Office Excel 2016 for simple and absolute frequency analysis. The measures of central tendency used were means, median, and mode and, as a measure of precision, the standard deviation was estimated.

Results

In October 2019, of the 5,570 Brazilian municipalities, according to IBGE [9], 1,582 (28.4%) are catalogued in DATASUS as a municipality in extreme poverty, representing more than ¼ of the total. There are 466,135 active physicians in Brazil [12], 298,530 (64%) of which work in SUS [11]. In the municipalities in extreme poverty, 16,267 physicians were counted, of which 1,360 (8.4%) worked in the private network and 14,907 (91.6%) worked in SUS, with the legal nature of 10,438 (64.2%) of them being municipal; 1,031 (6.3%), state; 143 (0.9%), federal; 363 (2.23%), limited company; 264 (1.62%), the public agency of the municipal Executive Branch; 229 (1.4%), public associations; 70 (0.43%), the federal autarchy; 25 (0.15%), entrepreneurship, and the rest are divided between individual companies, union entities, and cooperatives, among others. Regarding the performance of physicians in *teaching and research in municipalities in extreme poverty, only 208 (1.3%) work in auxiliary teaching units*; 69 (0.4%), in teaching hospitals; 24 (0.2%), in universities; and 8 (0.1%), in isolated colleges. Therefore, 14,598 (89.7%) physicians are not linked to scientific work, as shown in Graph 1. Thus, the profile identified in municipalities in extreme poverty is mostly that of a medical professional who works within SUS, hired by the municipality and not linked to teaching and research occupations.

Among the physicians who work for SUS in the 1,526 Brazilian municipalities in extreme poverty, 1,284 (8.6%) work in the North; 9,186 (61.6%), in the Northeast; 3,071 (20.6%), in the Southeast; 837 (5.6%), in the South; and 529 (3.5%), in the Midwest (Table 1).

Graph 1. Teaching and research exercised by SUS physicians in municipalities in extreme poverty (Brazil, October 2019)



Source: Adapted from Brasil [11].

Table 1. Number of physicians working with SUS in municipalities in extreme poverty (Brazil, October 2009 to October 2019)

Region	Municipalities in extreme poverty		Number of physicians working with SUS	
	n	%	n	%
North	171	11.2	1,284	8.6
Northeast	936	61.3	9,186	61.6
Southeast	236	15.5	3,071	20.6
South	166	10.9	837	5.6
Midwest	73	4.8	529	3.5
Total	1,582	100.0	14,907	100.0

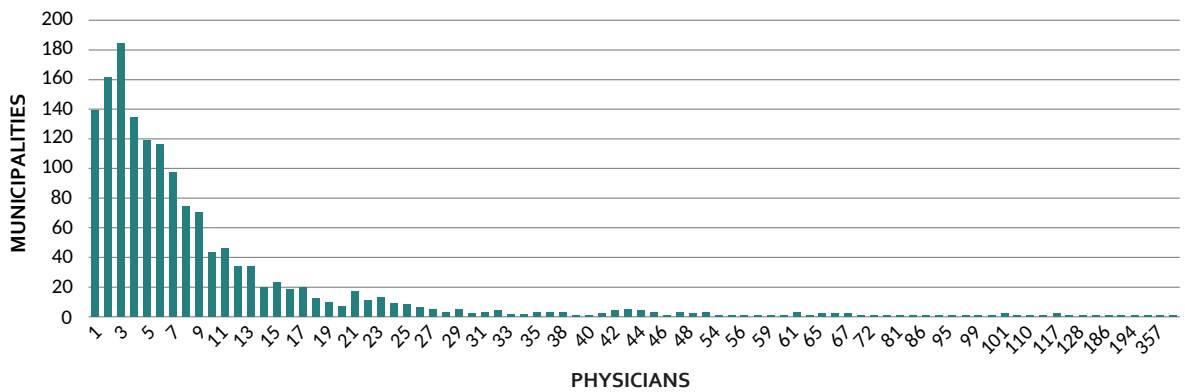
Source: Adapted from Brasil [11].

According to Graph 2, among the Brazilian municipalities in extreme poverty, 186 (12.2%) have three physicians; 164 (10.7%), two physicians; and 141 (9.2%), one physician. In this context, the opposite end is evidenced by the municipalities of Barbalha/CE, with 60,781 inhabitants and 353 physicians in SUS, indicating 5.8 physicians per thousand inhabitants; Guanambi/BA, with 84,481 inhabitants and 171 registered physicians, which is equivalent to 2.02 physicians per thousand inhabitants; and Arcoverde/PE, with 74,338 inhabitants and 168 physicians in SUS, which means 2.25 physicians per thousand inhabitants.

There are 186 (12.2%) municipalities in extreme poverty with only three physicians, for example, Ministro Andreazza/RO, with 9,660 inhabitants and 0.31 physicians in SUS per thousand inhabitants; Jordão/AC, with 8,317 inhabitants and 0.36 physicians in SUS per thousand inhabitants; and Campo Azul/MG, with 3,817 inhabitants and 0.78 physicians in SUS per thousand inhabitants. At the extreme end are the 141 (9.2%) municipalities with one physician, such as Santa Tereza de Goiás/GO, with a population of 3,355 inhabitants and 0.29 physicians in SUS per thousand inhabitants; Cristal do Sul/RS, with 2,847 inhabitants and 0.35 physicians in SUS per thousand inhabitants; and Bacurituba/MA, with 5,644 inhabitants and 0.177 physicians in SUS per thousand inhabitants.

Graph 3 illustrates the allocation of SUS collaborating physicians in municipalities in extreme poverty between October 2009 and October 2019. During this period, the largest number of physicians was designated in 2018, totaling 15,487 professionals. However, in the last year, there has been a 3.7% decrease in the number of physicians in these territories, representing a reduction of 580 professionals in these locations.

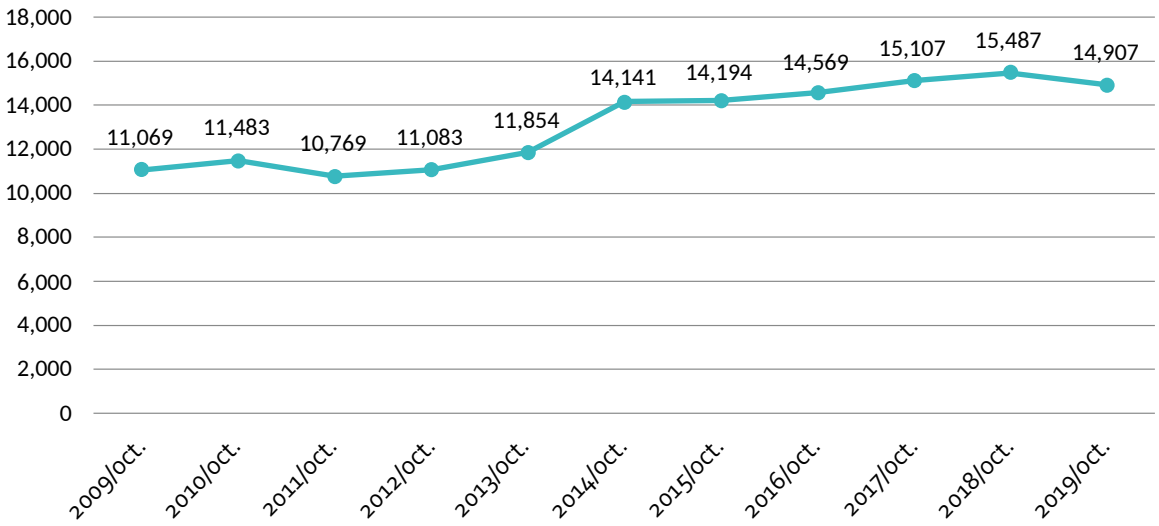
Graph 2. Distribution of SUS physicians by municipalities in extreme poverty (Brazil, October 2019)



Source: Adapted from Brasil [11].

Research

Graph 3. Physicians working with SUS in municipalities in extreme poverty (Brazil, October 2019)



Source: Adapted from Brasil [11].

Discussion

Regionalization, decentralization, and hierarchy are conditions of the SUS organization [10]. To sustain the care of the population in a country with continental dimensions [1], marked by cultural and environmental plurality, to the extent that socioeconomic and regional inequalities are accentuated [13], SUS relies on the provision of teams in primary health care through the Family Health Program. Such groups are closer to the community to assess their social determinants of health and intervene in a precise and comprehensive way. Each team must have at least one physician [10].

In Brazil, there are on average 2.18 physicians per thousand inhabitants. However, these professionals are concentrated in certain places and regions: 60.2% of physicians are in municipalities with more than 500,000 inhabitants, a population representing 30.2% of the country, and only 2.6% of physicians serve in municipalities with up to 20,000 people and lower financial income. The population of these municipalities, added together, is equivalent to 15.5% of the Brazilian total, denoting the disproportion in the distribution of physicians in the country [14].

It is noteworthy the precarious availability of physicians in municipalities in extreme poverty in Brazil. If more than ¼ of Brazilian municipalities are in this condition, the disparity can be inferred from the fact that, of the total number of currently active physicians [12], only 3.5% work in these territories. This disproportionality is already verified in regional terms, since the Northeast concentrates 27.6% of the Brazilian population but holds 17.8% of the physicians in the country [14]. This region still concentrates more than half of the municipalities in extreme poverty in Brazil and more than half of the contingent of physicians who work in cities in this condition. However, this reality does not allow us to infer that the number of physicians in these locations reaches the average of 2.5 physicians per thousand inhabitants recommended by the Ministry of Health. Even among professionals working in municipalities in extreme poverty, there are discrepancies, according to the results shown. There are municipalities that do not have a physician per more than 3,000 inhabitants.

The Southeast, in turn, contains 15.5% of municipalities in extreme poverty and 20.6% of physicians working in these areas in Brazil. Most of the routes of shortage of physicians in the country, evaluated in relation to attractions for fixation, are in the Northeast and North [15], although there is a high concentration of physicians in the Southeast and the national average of physicians per inhabitant is satisfactory [14]. The same occurs in relation to the heterogeneous distribution perceived in the situation between the North with the lowest and the Southeast with the highest

number of physicians per inhabitant in Brazil [14]. Moreover, the concentration of physicians in the Northern capitals prevails, to the detriment of the interior of these states. The situation of Amazonas, the largest Brazilian state, is the most disproportionate. Its capital concentrates more than half of the state population and 93.1% of its physicians, leaving the remaining municipalities with 6.9% of its physicians. The population of Vitória/ES, which has 12 physicians per thousand inhabitants, the highest proportion in Brazil, has 25 times more physicians available per thousand inhabitants than in the Northern and Northeastern countryside [14].

This unequal medical distribution is subordinated to the prevalence of debilitating social determinants of health, especially in municipalities in extreme poverty [16]. To meet the need for physicians, especially in remote territories, the More Doctors Program (PMM) [17] was established in 2013, based on three axes. One of them addresses the hiring of more professionals, whose demand was filled by holders of registration in the Regional Council of Medicine (CRM), cooperators – originating from Cuba, employed through the Pan American Health Organization (PAHO) – and exchange students – physicians trained abroad. Another axis focuses on the improvement of medical degrees and residences, and the third aims to optimize the infrastructure of SUS establishments.

At the end of the first year of the PMM, in October 2014, there was an increase of 19.3% in the number of professionals working in SUS, including Cuban professionals. Although 34,450 physicians were enrolled in the CRM between 2013 and 2014 [12], few Brazilian professionals joined the program, totaling only 1,280 native physicians and exchange students. That is, the increase observed in the PMM was significantly influenced by the 5,400 medical cooperators who immigrated to the country in 2013 [18].

According to the Ministry of Health [18], the participation of Brazilians in the PMM stood out only in 2016, employed in 89% of vacancies. However, the average stay of these professionals in remote areas is less than 90 days. Thus, there is a need to incorporate in the discussion the determinants that influence the transfer and fixation of physicians [15] in municipalities in extreme poverty.

The PMM intends to surpass the number close to 2.18 physicians per thousand inhabitants in Brazil to reach the UK average of 2.7 physicians per thousand inhabitants since the country has the second largest health system in the world, after Brazil, and resembles the Brazilian management mode centered on universal primary care [18,19]. This measure is not recommended by both the World Health Organization and the PAHO since the ideal number of professionals in the health team should be planned considering the social determinants of health in the region [13].

This discussion, as shown by the results, should emphasize the excessive regional socioeconomic inequality reflected in a unique health system which transits between public and private services in a country with continental dimensions. In this sense, and even though 63% of the 4,716 physicians of the PMM in the Northeast have been destined to municipalities below the poverty line, Maranhão, a state with the lowest rate of physicians per inhabitant, received fewer physicians than Pernambuco, which before the establishment of the Program already had the highest rate of distribution of physicians per inhabitant in the Northeast [16]. This reality is caused by the need for municipalities to require the hiring of physicians by the PMM, which enables non-adherence to the program and, consequently, the prevalence of lack of medical care due to political oppositions [16,20].

Still on this issue, the discrepancy in the number of physicians by number of municipalities is remarkable. For example, Minas Gerais, a Brazilian state with the most cities (853) and about half of the municipalities in extreme poverty in the country, has 52,496 active physicians, an average of 61.54 physicians per city. In the 1,526 municipalities in the sample of this study, the average is 10.65 physicians. Aware of the hetrogeneous standard deviation of 17.08, it is evident, according to a study by the Regional Council of Medicine of the State of São Paulo [13], that estimating the average to be reached in the municipalities according to the number of physicians per population, as had been planned by the government strategy when expanding hiring and positions in medical courses, is neither reliable nor effective as a base indicator for the distribution of physicians.

The decentralization of the management of public health policies, through the agreement

between the Union, federal units and municipalities, is based on the protagonism of cities to legitimize the local SUS [20]. In this sense, the PMM, the SUS Interiorization Program, the Primary Care Professional Appreciation Program or even the Popular Pharmacy Program do not agree with strategies adopted in developed countries because they fail to highlight effective measures according to epidemiological studies, prioritizing the strengthening of health networks and, consequently, comprehensiveness in the SUS [21].

When analyzing the discrepancy of 1 to 353 physicians who work within SUS in municipalities in extreme poverty, with mode 3, the inequality even between each of these territories is emphasized. The three municipalities with the highest number of professionals are in the Northeast and correspond to 4.6% of the physicians working in SUS in the 1,526 municipalities studied.

The Gini index quantifies income distribution, showing spheres of inequality based on a scale in which 0 corresponds to full equality and 1 means the extreme of inequality. According to the Continuous National Household Sample Survey [22] of 2018, the North shows the greatest difference in average monthly household income *per capita*, with a Gini coefficient of 0.551, followed by the Northeast, with 0.545. Thus, the bureaucratic health system in Brazil, in the face of regional social inequality and lack of human and material resources, embargoes the structuring of national projects in a homogeneous manner between the municipalities [20,21].

Thus, especially in municipalities in extreme poverty, it is necessary for the physician to understand the importance of social determinants of health in his/her area of activity [21]. Teaching and research are great allies for the exercise of evidence-based medicine but only 2% of physicians in the SUS in municipalities in extreme poverty are dedicated to this type of function, as illustrated. The data found corroborate the trend of newly graduated physicians about work in higher education: upon entering college, 9.2% of students believed that they could pursue a scientific career and 9.1%, a teaching career. However, when asked about their claims as graduates, less than 3% intended to dedicate themselves to research, teaching or management of health services [14]. A study conducted at the Medical School of Botucatu, São Paulo State University, analyzed the Health Work Education Program in the consolidation of the research to improve the service of the Family Health Strategy, showing an increase in the motivation of the team involved in scientific research to study and update themselves, perform actions in the community, recognize the area, update protocols, and develop health promotion materials, reflecting an improvement in meeting the demand of the territory [23].

It is evident, therefore, the primordiality of discussing efficient measures to reduce the inequality of medical demographics, safeguarding regional peculiarities, and encouraging the participation of physicians, other health professionals, and the population, noting the fixation or not of physicians in remote areas [21]. The scarcity of public policies that influence the distribution of physicians in municipalities in extreme poverty reinforces the vulnerability of this population, such as the decrease in the number of these professionals in these cities between October 2018 and October 2019, after a political position contrary to the current federal management of the Cuban regime and, consequently, the evasion of employees from that country from the national territory [24].

Therefore, it is necessary to restructure from graduation to medical practice, with incentives for the distribution of professionals in the territory and investments in human and material resources [16,20,21]. According to the book *Medical demographics in Brazil 2018* [14], 84% of recent graduates indicate good working conditions as the main factor in deciding to settle in a given location, and 66.2% of them consider quality of life. This process depends on the strengthening of SUS principles and basic guidelines to value integrality, supported by strategies between public and private, technologies, adequate financial investments, and reformulation of accurate standards of health services [21].

Final considerations

The primary outcomes related to the medical demographics of municipalities in extreme poverty affirm the disproportion in the distribution of professionals among Brazilian cities. There remains

a need for health policies that advocate the equity of medical demographics throughout the country to respect the economic and social particularities of each region and municipality, as well as to promote the restructuring of the public health system and invest in human and material resources to significantly reduce health disparities in the national territory.

Therefore, one must encourage new studies that discuss attractive factors or the fixation of physicians in remote areas with lower monetary income in Brazil, considering a medical career plan to propose effective actions. At the same time, one should discuss the profile of healthcare providers and their performance in different locations, as well as the formation of new curricular guidelines.

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