

Inequalities in the provision of hospital care in the Covid-19 pandemic in Brazil: an integrative review

Desigualdades da oferta hospitalar no contexto da pandemia da Covid-19 no Brasil: uma revisão integrativa

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ABSTRACT The Covid-19 pandemic raises concern about global health systems' response capacity and resilience. In Brazil, several studies analyzed this issue of providing health services and resources to meet the Sars-CoV-2 cases. This study aims to understand and analyze the inequalities in providing hospital care of the Brazilian Unified Health System (SUS) to care for severe Covid-19 cases. An integrative literature review was carried out from March to December 2020, mainly in Public Health, focusing on the regional distribution and the public-private relationship of hospital care. We employed databases BVS and SciELO and institutional sources. Forty-two studies were analyzed from geographic space, seen by socio-spatial inequalities, and from the social protection system in health, through public-private relationships. The studies indicate significant inequalities in public-private arrangements and the regional distribution of the supply of resources analyzed in the most diverse spatial scales. Inequalities are significant even in regions historically privileged by hospital resources. Supply segmentation and interdependence between the public and private sectors impose severe limitations to combat Covid-19 in Brazil and exacerbate health inequalities.

KEYWORDS Health status disparities. Health systems. Health care. Covid-19. Emergencies.

RESUMO A pandemia da Covid-19 gera preocupações quanto à capacidade de resposta e resiliência dos sistemas de saúde. No Brasil, diversos estudos analisaram essa questão a partir da oferta de serviços e recursos de saúde para atender os casos de Sars-CoV-2. Este estudo objetivou compreender e analisar as desigualdades da oferta hospitalar do sistema de saúde brasileiro para atender os casos graves da Covid-19. Realizou-se revisão integrativa da literatura, no período de março a dezembro de 2020, fundamentalmente na área da saúde coletiva, com foco na distribuição regional e na relação público-privada da oferta hospitalar. As bases utilizadas foram BVS e SciELO, além de fontes institucionais. No total, 42 estudos foram analisados a partir da categoria de espaço geográfico, visto pelas desigualdades socioespaciais, e de sistema de proteção social em saúde, por meio das relações público-privadas. Apontam-se expressivas desigualdades nos arranjos público-privados e na distribuição regional da oferta dos recursos analisados nas mais diversas escalas espaciais. As desigualdades são significativas inclusive em regiões privilegiadas por recursos hospitalares. A segmentação e a interdependência na oferta entre os setores público e privado impõem sérias limitações para o enfrentamento da Covid-19 no Brasil e aprofundam as desigualdades em saúde do País.

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PALAVRAS-CHAVE Disparidades nos níveis de saúde. Sistemas de saúde. Atenção à saúde. Covid-19. Emergências.



Introduction

The Covid-19 pandemic caused by the new coronavirus (Sars-CoV-2) has resulted in the most devastating global health crisis in the last hundred years. The first recorded case occurred in Wuhan, located in the Chinese province of Hubei, in December 2019, and it quickly spread to other countries and continents. It arrived in Brazil in February 2020, after being declared by the World Health Organization (WHO) a Public Health Emergency of International Concern (PHEIC) on January 30¹, later being characterized as a global pandemic on March 11².

The first Covid-19 cases in Brazil occurred in its two most significant urban centers, São Paulo (SP) and Rio de Janeiro (RJ), globalized metropolises with intense global connectivity and essential connections with other urban centers, which facilitates the swift transmission of the virus to other parts of the country. Thus, while the States of São Paulo and Rio de Janeiro were the initial epicenters of the pandemic in Brazil, the disease quickly spread to other Brazilian capitals and suburbs and inland surrounding regions^{3,4}.

The arrival of Covid-19 in Brazil surfaced a particular concern with the distribution of public and private hospital care due to the need for access and the risk of disrupting the health system due to the rapid increase in demand without sufficient expansion of the health care capacity. The consequences of the pandemic pointed to the need to reduce transmissibility due to the imminent risk of the health system's collapse^{5,6}.

In a diverse and unequal country like Brazil, with an essential concentration of resources and health services in capitals, the Metropolitan Regions (MR), and some centers in the inland regions, the virus spread to places with the inadequate provision of health services is a limitation for accessing the system. With historical and profound social and health inequalities⁷⁻¹¹, facing the coronavirus pandemic in Brazil is an enormous

challenge, exacerbated by the complex public-private relationship in the provision, supply, and access to health services, which reinforces inequalities in the country¹²⁻¹⁵.

Two years into detecting the new coronavirus, countries and their respective health systems still face challenges and uncertainties. By early February 2022, the global number of Covid-19 cases and deaths, according to the WHO, had already exceeded 386.5 million and 5.7 million, respectively. In the same period, according to data from the Ministry of Health, Brazil recorded more than 25.7 million infected people and 628 thousand deaths.

Although the Brazilian situation is relatively stable now regarding the number of new cases, the country has already been a great concern for the world due to the accelerated growth of cases and deaths and the contradictory results of the responses adopted by the Brazilian Federal Government¹⁶. Brazil has already faced other health emergencies, such as polio, smallpox, cholera, yellow fever, Zika, and other respiratory syndromes, such as influenza A (H1N1) – including responses from the public system that left an important legacy in fighting epidemics, as was the case with H1N1 in 2009, and scientific leadership, as was the case with Zika¹⁷. However, what has been observed in the current context is reducing this prestige in the management of global health problems¹⁸.

The country suffered an imminent collapse of its health system due to the lack of beds in the Intensive Care Unit (ICU), equipment, essential supplies, and health professionals to ensure adequate care for patients in severe conditions affected by the virus^{19,20}.

Historically, the provision of hospital care in Brazil is characterized by essential inequalities between regions and States, with more complex situations in the North and Northeast⁵, which accumulate to the differences between the total supply and that available to the Brazilian Unified Health System (SUS), as market dynamics are also related to the distribution of health resources^{7,11,12}.

The increase in inequalities is inherent to globalization, albeit with varying degrees between and within countries and societies²¹. As a crisis period, globalization's outstanding characteristic is the growing competitiveness between territories, markets, sectors, and technological systems, resulting in the spatial selectivity of investments, production, and consumption in different places^{21,22}.

Socio-spatial inequality expresses the asymmetry between places and is a product of selectivity²³. Unlike variation and segregation, selectivity presupposes that everything and everyone participates, yet unequally. Some places will respond better, be more apt, concentrate more resources, be more competitive, and have more conditions. In other words, selectivity starts from the unequal relationship between places in the world or within the scale of a country, and even a state, a region, and a city. In the current pandemic context, socio-spatial inequalities have been aggravated and are at the center of the crossroads we live in²⁴.

Inequalities have political content and are related to social injustice and human rights, directly affecting the health-disease-care processes⁶. In health, they are directly related to the socio-environmental characteristics in which one lives and result from the combination of different determinants and individual, social, structural, and situational conditions^{6,7,9}.

In health, socio-spatial inequality can be understood as the "concentration of power in the hands of certain groups and infrastructure and wealth in certain places and activities"⁸⁽¹⁰⁵⁶⁾, which, in practice, poses challenges to the equitable distribution of services and resources and universal access to the health system.

Public-private relationships in health systems have escalated with globalization and the advances of the neoliberal agenda since the 1990s and express inequalities because of the distribution of resources and the segmented access. While the SUS has significantly expanded the offer and access to health care for the Brazilian population over more than

30 years, the private sector has also grown – with and through the SUS²⁵, showing a crucial public-private interdependence in health care, especially in medium and high complexity²⁶⁻²⁸.

Considering such conditions that mark health care in the Brazilian territory and the pandemic context, the question is: In the analyzed period, how were the regional distribution and the public-private relationship of the hospital offer to meet the demands arising from Covid-19 in Brazil?

In this sense, this study primarily aims to understand and analyze the inequalities in the hospital offer of the health system to care for severe Covid-19 cases in the Brazilian territory from March to December 2020. The study's time frame can be characterized as the moment of the pandemic that precedes the collapse of the hospital system of adult Covid-19 ICU beds in Brazil, as suggested by a note from the Covid-19 Observatory of the Oswaldo Cruz Foundation (Fiocruz).

Material and methods

The integrative review encompasses research results with different designs and methods, simultaneously including empirical and theoretical studies and different publication types, allowing various perspectives on relevant problems, new themes, areas, and concepts²⁹. It aims to systematize the results obtained in an orderly and comprehensive manner, enabling, firstly, from a theoretical or contextual viewpoint, the identification of advances and gaps in the production of knowledge on the subject and the question of analysis^{30,31}. The integrative review in this study adopted the steps by Souza, Silva, and Carvalho³²: i) definition of the guiding question; ii) literature search strategy; iii) identification of studies and data collection; iv) analysis of included studies; and v) discussion of the results.

One of the significant challenges of the integrative review is to synthesize several complex data sources²⁹. In the case of this

study, the review prioritized production in Public Health through two fundamental databases – the Scientific Electronic Library Online (SciELO) and the Virtual Health Library (BVS). However, because many studies and initial publications were in the form of Technical Notes in the context of the Covid-19 pandemic, we expanded our search to the websites of federal and State education and research institutions and private institutions that have dedicated themselves to this type of analysis. Besides the databases mentioned above, the review included a survey of studies from the following sources: Institute of Applied Economic Research (Ipea), Fiocruz Covid-19 Observatory, Proadess/Icict/Fiocruz, Monitora Covid-19/Fiocruz, Região e Redes/University of São Paulo (USP), Cedeplar/Federal University of Minas Gerais (UFMG), Labdec/Nescon/UFMG, Northeast Consortium, Operations, Intelligence, and Health Center (Nois), Institute of Studies for Health Policies (Ieps).

The following inclusion criteria were defined: full texts published in national and international indexed scientific journals that addressed the issue of public and private distribution of health resources in the context of the Covid-19 pandemic, in Portuguese, English, and Spanish, in 2020, more specifically, from March to December, identifiable through descriptors registered in the Health Sciences Descriptors portal (DeCS), namely, “Health Resources”, “Health Care”, “Health services”, “Covid-19”, and “Brazil”. The search strategy allowed the words “Covid-19” and “Brazil” to always be among the descriptors in which the Boolean operator AND was applied. The exclusion criteria were studies that addressed the disease, exclusively focusing on epidemiological, contagion, symptoms, or clinical complications data, and studies that did not address the research topic or did not answer the guiding question, besides duplicated publications.

The categorization approach²⁹ was employed for multi-scale socio-spatial inequalities (national, regional, and local) and the public-private relationship in providing health services to systematize and analyze the results obtained with the review.

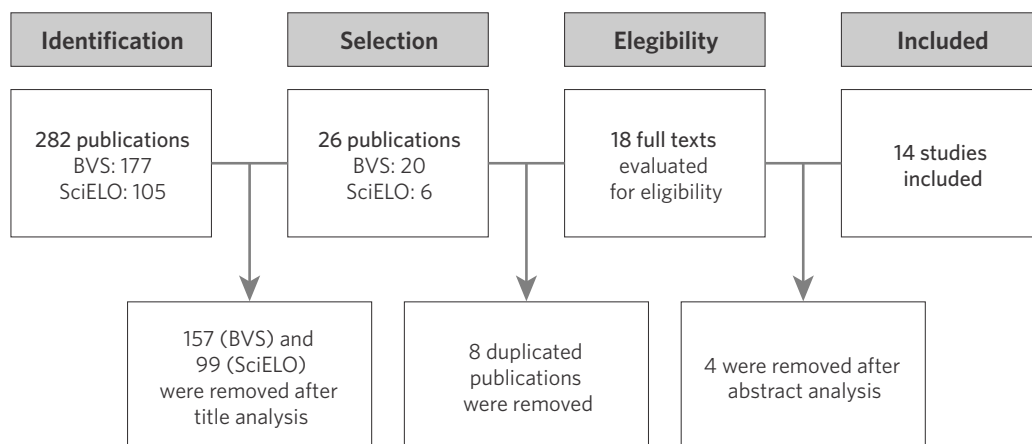
The analysis period was from March to December 2020, considering studies that analyzed the regional and segment (public-private) distribution of hospital care to meet the demand of severe Covid-19 cases in Brazil. This study was completed in March 2021, and while the pandemic persisted and even deteriorated in the first quarter of the year, affecting the hospital structure, we selected studies published in 2020, which, in many cases, already pointed to the current critical situation.

We selected studies that addressed hospital health resources demanded in more severe Covid-19 cases. The relevance of general and ICU beds, among other resources such as mechanical respirators/ventilators, was evident in the analyses due to their effectiveness in treating people affected by Covid-19. In this sense, publications on urgent and emergency, outpatient, and Primary Health Care (PHC) resources and services were not included, although they play a fundamental role in response to the pandemic.

Results

We obtained 177 publications of the 282 productions identified in the databases, in the BVS and SciELO returned 105. Subsequently, eight were excluded due to repetition/duplication, and 157 publications after analyzing the titles, leaving 18 eligible publications. After reading the abstracts, 14 studies were selected for full reading, which remained in the review. The study selection process is shown in the flow-chart in *figure 1*.

Figure 1. Flowchart of the study search and analysis methodological process



Source: Own elaboration, 2021.

Technical Notes were also part of the review due to their relevance to understanding the subject in question and the production boom, especially in the early days of the pandemic. Thus, 28 notes were selected, besides the 14

publications from the BVS Portal and the SciELO database, totaling 42 studies for analysis. The systematization of the number of studies by source can be seen in *table 1*.

Table 1. Number of studies selected for review, by source

Source	BVS	SciELO	Institutional Technical Notes	Total studies
Total studies	11	3	28	42

Source: Own elaboration, 2021.

Most of the studies were published in March (11), April (15), and May (8), 2020. Thirty-four of the 42 selected studies were published in the first three months of the analyzed period, which reveals an essential profusion of publications in the initial period of the pandemic, given the various uncertainties, concerns, and effects of the health crisis in other countries.

The studies published between March and May 2020, the initial stage of the pandemic in Brazil, represent the first efforts to produce

knowledge to analyze certain aspects, such as the virus spread and the resource-deficient locations and propose alternatives and help management in overcoming any constraints or bottlenecks identified in the Brazilian health system. In other words, based on the analysis of the spread of the virus and its routes, the productions aimed to support decision-making to respond to the potential impacts of the Covid-19 pandemic in the country, especially concerning the health system risk of collapse.

Data from health information systems and other secondary sources were fundamental in the publications analyzed for estimating, quantifying, and mapping the supply of resources at different spatial scales and sectors. The same sources generally support the studies (demographic censuses and population estimates from the Brazilian Institute of Geography and Statistics – IBGE; National Registry of Health Establishments, Hospital Admissions System, Mortality Information System Datasus-Sivep Gripe; and National Supplementary Health Agency). However, the approaches, the spatial and time frames, the methods, and the indicators used by the studies were different.

Considering the growing demand for resources, such as ICU beds and mechanical respirators/ventilators in the pandemic, a very recurrent aspect in the studies was the elaboration of mathematical models to predict the availability of resources and the creation of different backdrops on supply and demand to calculate the systems' rupture risk stages. We projected growth rates in the number of cases, virus propagation time, and supply of beds and other equipment to identify the health system's collapse risks and, at the same time, the locations with greater demand and need to resize investments to expand the offer³³⁻³⁷. We produced several projections regarding the pandemic's evolution and updated them based on the analysis of several factors and the refinement of statistical models. Many productions by the same group were updates or complemented the analyses^{35,38-43}, which is not uncommon.

We aimed to predict the increase in demand and reduce the health system's collapse risks, considering the temporal and spatial dynamics of the pandemic in the country. We included municipalities, States, and regions with a greater probability of a rapid increase in the number of cases and low care capacity by the health system the most vulnerable. It is noteworthy that the initial projections were alarming regarding the increase in cases and deaths even in the most optimistic settings.

Some studies have analyzed the geographic distribution of health professionals⁴⁴⁻⁴⁸, which is very important, representing the limit for expanding hospital care. There is no point in having the resource and equipment if there is no qualified professional to operate it, especially when resources require qualified training and experience.

Inequalities in the spatial distribution of hospital resources to provide care for Covid-19 in Brazil

Although Brazil has a good mean proportion of ICU beds (2.2 per 10,000 inhabitants) per the standards established by the WHO and the Ministry of Health (1 to 3 beds per 10,000 inhabitants)⁴⁹, their supply was insufficient in this pandemic, and its regional distribution was very uneven within the national territory.

Different scales were applied in the studies, such as the Major Regions, Federation Units (UF), Health Regions (RS), Cities' Influence Regions (Regic/IBGE), Metropolitan Region (MR), and Municipalities. Without exception, the studies point to expressive regional inequalities in the arrangements, supply, and distribution of resources at different spatial scales.

Palamim and Marson⁵⁰ point out that only 11 of the 26 Brazilian states and the Federal District had above one ICU bed/10,000 inhabitants by August 2020. Among the 11 were the four States of the Southeast (São Paulo, Rio de Janeiro, Minas Gerais, and Espírito Santo). They also emphasize that each State has an unequal distribution of these beds by total area. In Amazonas, for example, the largest State in Brazil with 559,168.12 km², ICUs are concentrated only in its capital, Manaus.

Although it is the most privileged in providing health services and resources, the Southeast harbors significant differences and inequalities between its underlying States and long commuting times by patients^{38,40,51}. It is also the region with the most significant

shortage of beds at absolute levels due to the high population density, which increases the care demand³⁶. Calculating the possible need for additional beds (general and ICU), Almeida et al.³³ highlight the situation of the State of Rio de Janeiro, the only one in the Federation to demand general beds even in a moderate setting (0.5% of the infected population).

In Minas Gerais, the average minimum distance traveled to receive care in an ICU bed is relatively low, around 85 km⁴⁰. Access difficulties may be present in 18% of the 853 municipalities in the State, which patients would need to travel, on average, a distance equal to or greater than 120 km. Most of these municipalities (8.65%) are in the Northeastern macro-region of the State. These locations are, in general, more vulnerable from a socioeconomic viewpoint and regarding access to the health system. For these locations, the authors suggest providing aeromedical transport (air ambulance/ICU), which may be more cost-effective than creating installed capacity.

The challenges related to care shortcomings and gaps and access to services have escalated in the pandemic, especially in the North and Northeast, with a historically significant deficit in the supply of hospital resources and the need for extensive commuting times by users and patients.

More than 7 million Brazilians are more than four hours away from a high-complexity care hub municipality, where ICU beds, equipment, and specialized professionals are available for severe and acute respiratory diseases, such as Covid-19⁵². In the Northern States, such as Amazonas, Pará, and Acre, more than 20% of the population lives in areas that take up to four hours to travel to a high-complexity service hub. In the Northeast, locations with low resource infrastructure also pose a challenge given the distances to be traveled to places with greater infrastructure, as observed by Pedrosa and Albuquerque⁵³ when analyzing the distribution of cases and ICU beds in the State of Ceará. Kerr et al.⁵⁴ recognize the limited health infrastructure in this region,

primarily because of socioeconomic and demographic conditions. Even so, the authors emphasize that there was an essential regional response regarding the early mitigation measures implemented by the governors, which mitigated the effects of the pandemic. In particular, the case of Maranhão stands out as it is one of the poorest states in the Federation and had one of the best responses, illustrating the importance of the capacity of local entities to respond to health emergencies, including concerning the expansion of hospital care⁵⁵.

The commuting means, time, and conditions in Brazil are also quite different given the heterogeneous or inadequate means and transport networks and the possibilities of using these means and networks. Although most of the population adopts land routes (Midwest, Southeast, South, and Northeast) and waterways (North)⁵⁶, a portion has easier and faster access to large hospitals in other states and regions of the country through air transport for the transportation of severe cases, increasing access inequalities.

When analyzing the RS, we identified considerable heterogeneity and inequalities in most country regions' regional supply and scarcity of resources. Currently, Brazil has 450 RS, and data from March 2020 showed that more than half of the RS would have a proportion of ICU beds below the indicated parameter, even in a typical setting (without a pandemic); more than 70% of RS would already be below the parameter indicated for SUS beds. The lack of ICU beds was reported in 32.6% of RS³⁶.

Studies that addressed RS in the states identified significant inequalities. When analyzing the case of Rio Grande do Sul, Smolski et al.⁵⁷ concluded that, in the RS and its respective municipalities, inequalities in the distribution and supply of hospital beds and respirators/ventilators forces most of the population to travel to have access to these resources, which are concentrated in regional reference centers. The authors identified that three of the 30 (10%) RS in the state do not have records on

Adult ICU beds, namely, Carbonífera/Costa Doce, Botucaraí, and Rota da Produção. The resources are concentrated in the MR of Porto Alegre, the capital of the State, and in the RS of Vale do Gravataí.

Thirty-eight significant discrepancies were identified in the State of Rio de Janeiro in the availability of beds among the nine RS. The inequality between Baía da Ilha Grande (BIG) and Metropolitana I is highlighted. While BIG has only 299 inpatient hospital beds and 8 ICU beds, this number reaches 9,337 beds and 596 ICU beds in Metropolitana I. Even in the latter region, the distribution is uneven among its 12 municipalities: 516 ICU beds are concentrated in Rio de Janeiro, the State capital, and only 80 are distributed among the other municipalities. Inequalities persist even when considering the number of ICU beds per 10,000 inhabitants. While the Northwest has 2.4 ICU beds/10,000 inhabitants, this value is only 0.3 in the BIG region. Data from Regic/IBGE and DATASUS show that more municipal centers within RS could be valued and strengthened, focusing on Covid-19 care⁵⁸.

We also observed inequalities among the nine RS in the Southeast of Minas Gerais, comprising 33 municipalities. Batista et al.⁵⁹ affirm that most municipalities and regions in the analyzed area do not have ICU beds, either SUS or supplementary health. Juiz de Fora alone concentrates more than half of these total beds (public and private) and SUS beds (190 of the 334 and 133 of the 253 respectively), followed by Muriaé. The setting is somewhat better when analyzing the general beds, in which all the municipalities of the RS in the Southeast of Minas Gerais have them available and some only through the SUS.

When analyzing the MR, we could identify intra-metropolitan inequalities in the supply of hospital resources, given their great concentration in hub municipalities and central areas, which are usually better equipped regarding available resources^{60,61}. Even in the MRs, including the richest in the country, we observe a vital care deficiency in the suburbs or inland

regions to address Covid-19. Fortes, Oliveira and Sousa⁶⁰ analyzed the Baixada Fluminense (BF), part of the MR of Rio de Janeiro. They highlighted that most of its municipalities are densely populated, with great difficulties in implementing social distancing, poor living conditions, and insufficient health facilities and equipment in their territory. Rocha⁶² identified 4,089 beds (general and ICU) at the beginning of the pandemic in Brazil for a population of almost four million inhabitants in the 13 municipalities of the BF. When analyzing the number of beds per thousand inhabitants in each municipality, the scenario deteriorates. Exception for Guapimirim (2.28), which surpassed the largest economic centers in the region – Nova Iguaçu (1.47) and Duque de Caxias (1.45) –, the other municipalities (Japeri, Seropédica, Queimados, São João de Meriti, Belford Roxo, Itaguaí, and Magé) have than one bed per thousand inhabitants.

On the municipal scale, Portela et al.⁴¹ point out that 90.4% (5,034 in absolute numbers) of the 5,570 Brazilian municipalities did not have ICU beds. They also indicate that 84.7% did not have CT scanners, and 59.3% did not have respirators/ventilators. The data refer to February 2020. Although most Brazilian municipalities have no scale-scope for the demand and use of specific medium and high-complexity resources, such as those demanded in these cases, they require coordinated and integrated actions on a regional scale to organize specialized health care. While limitations have also been pointed out in the RS, this is a challenge to achieve universal access to health in the country⁶³.

An alternative to expanding the supply in this context has been the construction of field hospitals. However, Brazil faced problems in the procurement of resources, supplies, and the recruitment of professionals, which hampered their ability to operate or even open these hospitals fully.

We observed that the inequalities related to hospital supply distribution to provide care for Covid-19 cases permeate all the spatial scales

analyzed without exception. Therefore, the inequality in the supply of health resources is relational; it does not only concern the poverty or wealth of a place or region, for example. It is a relationship that also affects the most affluent places and regions in the country and is a necessary condition for the risks and responses to the pandemic.

Public-private inequalities in the supply of hospital resources to care for Covid-19 in the country

While the SUS has most hospital beds (general), most ICU beds are private. Although Brazil has a fair proportion of ICU beds according to international and national parameters, when data from the public and private systems are segmented, we observe that the SUS has a mean of 1.4 beds per 10,000 inhabitants. In comparison, the supplementary private network has 4.9 beds per 10,000 inhabitants⁴⁹.

In March 2020, the country had 45,848 ICU beds, of which 22,844 were of the SUS and 23,004 of private supplementary health⁴⁹. Considering that the share of people benefiting from private health insurance (24.2%) is lower than the exclusive to the SUS (75.8%), the supply ratio is even more unequal between sectors. When analyzing the differences in the total proportion of ICU beds per 10,000 inhabitants, the proportion of these beds in supplementary health care was higher than in the SUS in the five Major Brazilian Regions, including the South, Northeast, and North, where the absolute number of ICU beds SUS outnumber supplementary health beds.

Palamim and Marson⁵⁰ observed that all UFs had above three private ICU beds per 10,000 inhabitants, except for the State of Santa Catarina (2.61/10,000). The most significant proportion was found in the State of Mato Grosso, with a rate above 10 per 10,000 inhabitants. São Paulo, the State with the highest percentage of private insurance beneficiaries, had rates of 1.2 and 3.8 ICU

beds/10,000 inhabitants in public (SUS) and private health systems, respectively.

Although the supply of private ICU beds is higher than the public one, it is highly concentrated in capital cities⁶⁴, which means that the inhabitants of small and medium-sized cities – and municipalities that are not health centers in the MRs – may face severe difficulties or even barriers to accessing intensive care even as beneficiaries of a health plan or insurance.

Addressing general ICU beds (SUS and supplementary health) in the RS, Rache et al.³⁶ observed that more than half of the regions have less than one bed per 10,000 inhabitants. More than 70% of the regions were below the parameter in the SUS alone. It is noteworthy that these regions were already in this situation in a typical year. More than half of these, 70%, did not have an ICU bed (almost 15% of the population dependent on the SUS do not have this resource in their residing region). These gaps prevail in the North, Northeast, and Midwest. A little less than half of the RS had numbers below the parameter in the private sector, showing a more favorable setting.

On the municipal scale, 374 (69.8%) of the 536 Brazilian municipalities with ICU beds had more favorable rates or exclusive availability in the SUS. On the other hand, 71 of these municipalities even had a supplementary health ratio of more than eightfold⁴³. The authors note that, although the offer in the SUS is more diffuse, several areas concentrate private resources, especially in the Southeast, South, and Midwest. Furthermore, the vastness of spaces devoid of any offer is visible, especially for ICU beds.

Adopting a single list for beds, regardless of sectors or patients, was a debated proposal⁶⁵⁻⁶⁷. In general terms, the public sector would manage access to public and private hospital beds and ICUs in Brazil, regardless of patients' ability to pay or whether they have private health plans and insurance. Marinho⁶⁷ highlighted the advantages and disadvantages of the proposal and described two possible models for the single list (general and partial).

Usually, studies recommend coordination efforts to use all existing hospital beds in Brazil to better cope with the pandemic.

In a comparative analysis study on strategies adopted by countries with public health systems that expanded the supply of beds using private hospitals in response to Covid-19, researchers concluded that, while there are different possibilities for the use of private hospital structures by public health systems, all of them can promote the rapid expansion of care capacity in health emergencies⁶⁸.

In Brazil, the capture of beds from private hospitals already equipped and ready to receive patients waiting for care was specific and restricted to certain cities⁶⁹. Conte et al.⁶⁹ also point out that, while public intensive care units reached their maximum occupancy rate, the private sector accounted for idle beds.

The increase in ICU beds in the country during the pandemic was insufficient to reduce inequalities in supply between sectors, and even expanded them. Junior and Cabral⁷⁰ found that only 3,104 of the 14,220 new ICU beds in Brazil were allocated to the SUS, while the private sector installed more than 11,000 beds, representing 78.18% of the new intensive care beds throughout the territory for a much smaller portion of the population.

We observed that the pandemic has highlighted the inequalities of supply between the public and private sectors and amplified them. Even with the expansion of hospital beds, regional and public-private distribution remained uneven in the country.

Discussion

The Covid-19 pandemic has escalated the historical inequalities in the Brazilian health system. Although the problems are not new, they are updated in this context, in an even more complex perspective of regional distribution and public-private relationship in health. While a public, universal system is spread throughout the national

territory, there are challenges such as care gaps, public-private segmentation, a fragmented health system due to municipalist decentralization, the deficient regulation of access to specialized care, the difficulty for PHC to play an influential role in coordinating care, and a chronic defunding that has become underfunding in recent years, given the austerity policies imposed, mainly from Constitutional Amendment No. 95/2016.

The clashes between federal, State, and municipal governments became evident in the pandemic⁷¹. The lack of coordination by the Federal Government to formulate a consistent national response meant that State and municipal governments had to make their own decisions to address Covid-19. However, given the different and unequal political, administrative, and economic capacities of Brazilian municipalities and States, we observed a recrudescence of inequalities in the supply and access to services. The lack of national leadership placed the country among the worst responders to the pandemic⁷¹⁻⁷³.

When analyzing the five Major Regions, we identified a known aspect regarding the geographic distribution of Brazilian health services. The North and Northeast, when compared to the Midwest, South, and, mainly, Southeast, are historically disadvantaged concerning the provision of services, equipment, and health resources^{5,8}. Also, when analyzing the MRs that concentrate health resources, we noted internal inequalities between their municipalities, which hinder access for those in need, evidenced by the consequences of the pandemic^{60,61}.

In the RS case, we observed that this has been the priority segment to achieve scale/scope: ensuring access and reducing health inequalities⁶³. On the other hand, even if regionalization is a possible and feasible course to universal access to health in Brazil, the limits and challenges of the process must be recognized. Not all currently established RS guarantee adequate hospital care, especially in the Covid-19 pandemic. Thus, knowing

the population's health needs is essential to provide an adequate supply structure and plan new investments.

Furthermore, the installed capacity and the high-complexity care production are highly concentrated in the private sector in most of the RS in the country, including services provided by the SUS, which shows that the inequality in hospital care for Covid-19 results from the combination of insufficient spatial distribution, segmented access, and strong interdependence between the public and private sectors.

The offer of health infrastructure reflects the socio-spatial inequality of places regarding the pandemic^{74,75}. Moreover, the interaction between poverty, unemployment, level of education, ethnicity, gender, and skin color have also been identified as Covid-19 determinants^{76,77}.

Among the limitations identified in the studies analyzed, we highlight that most did not consider the beds already occupied or occupied by other demands. Other aspects that still need to be further studied are geographic accessibility to health services for those affected by Covid-19, the geographic distribution of health professionals, and the technical and financial capacity of States and municipalities to expand the supply of ICU beds.

Final considerations

In Brazil, the relationship of interdependence between municipalities, regions, and States and between the public and private sectors is highlighted and exacerbated in the current

pandemic backdrop. The distribution of services, professionals, and equipment more equitably has been a great challenge to health care for Covid-19 cases and the health system's risk of collapse.

Inequality is a relationship that permeates the hospital offer to care for severe Covid-19 cases at all spatial scales, including historically favored regions that concentrate the supply of health resources, such as MRs and capitals. Fighting these inequalities requires a multi-scale analysis of the supply and demand for services and resources to guide the Brazilian health system's investments, policy, planning, and management. Furthermore, care gaps and access barriers must be addressed, primarily due to the possibility of future health emergencies, which will demand a quick and effective response from the health system.

The public-private relationship in health, from assisting the population to managing the system, is an additional challenge for coping with the pandemic in Brazil. Segmentation and, at the same time, interdependence between sectors seem to increase inequalities in the offer and access to the health system, aggravating existing inequalities.

Collaborators

Santos PPGV (0000-0002-8464-2793)* contributed to the article's design, production, finalization, and review. Oliveira RAD (0000-0003-0144-7288)* and Albuquerque MV (0000-0002-0763-6357)* contributed to the article's design and review. ■

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