

Partnership for Health System Sustainability and Resilience

BRAZIL

Sustainability and Resilience in the Brazilian Health System

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Abbreviations



AHP	Annual Health Programmes
ANAHP	National Private Hospital Associations
ANS	National Agency of Supplementary Health
ANVISA	National Agency of Health Surveillance
CIDACS	Centre for Integration of Data and Knowledge for Health
CIEVS	Health Surveillance Strategic Information Centre
CMED	Medicines Market Regulation Chamber
CONASEMS	National Council of Municipal Health Secretaries
CONASS	National Council of State Health Secretaries
CONITEC	National Committee for Technology Incorporation
DATASUS	Brazilian Health Informatics Department
EMA	European Medicines Agency
ESG	Environmental, Social, and Governance
ESPIN	Public Health Emergency of National Importance
FDA	U.S. Food and Drug Administration Agency
FHS	Family Health Strategy
Fiocruz	Oswaldo Cruz Foundation
FUNTEC	Technological Development Fund
GDP	Gross Domestic Product
GEI-ESPIN	Inter-ministerial Executive Group of ESPIN
HP	Health Plans
IBAMA	Brazilian Institute of Environment and Renewable Natural Resources
IBGE	Brazilian Institute of Geography and Statistics
IEPS	Health Policies Studies Institute
MoH	Ministry of Health
MHRA	UK Medicines and Healthcare Products Regulatory Agency
MHS	Municipal Health Secretary
NCD	Non-Communicable Disease
PAB	Primary Care Floor
PMAQ	National Programme for Improvement of Access and Quality of Primary Care
PROADESS	Health System Performance Assessment Project
RENASES	National List of Health Care Services
RENAME	National List of Medicines
SHS	State Health Secretary
SIA	Information Systems for Out-patient Production
SIH	Information Systems for Hospital Production
SUS	Unified Health System
UPA	Emergency Care Units
VPHI	Voluntary Private Health Insurance

Executive summary



Introduction

This report uses the COVID-19 health emergency as the basis to evaluate the sustainability and resilience of the Brazilian health system according to seven key domains, in alignment with the Partnership for Health System Sustainability and Resilience (PHSSR):

- Governance
- Financing
- Workforce
- Medicines and technology
- Service delivery
- Population health and social determinants
- Environmental sustainability

We also include two case-studies – (1) Brazilian health system preparedness in the COVID-19 pandemic, and (2) Social participation mechanisms and communication in Brazil: a national consortium to cover the federal government absence in the COVID-19 pandemic.

This report is supported by data from governmental and non-governmental reports, interviews, focus groups and technical and scientific papers for each domain. Thirteen stakeholders – practitioners with recognised expertise in each domain – were interviewed to provide the team with first-hand field knowledge. The focus group (launch event) had participation of representatives from some of the most important organisations involved with the Sistema Único de Saúde (SUS).

Findings: Key themes for sustainability and resilience

The response to the COVID-19 pandemic has emphasised key strengths and underlying issues for the health care system in Brazil. Table 1 summarises key findings for the seven domains.

Table 1: Sustainability and resilience – summary of findings by key domain

DOMAIN 1 GOVERNANCE		
Strengths	<p>Sustainability</p> <ul style="list-style-type: none"> ↑ Provision of free-of-charge health services at all levels of complexity to the entire population. ↑ Health system decentralisation to the three levels of government (federal, state and municipal) with inter-federative committees allows a continuous and collaborative process for designing, planning and implementing health policies. ↑ Health conferences and councils allowed social participation in formulating and monitoring the implementation of health policies at federal, state and municipal levels. ↑ National health agencies linked to the Ministry of Health (MoH), National Agency of Supplementary Health (ANS) and the National Agency of Health Surveillance (ANVISA) improved the regulation of the private health care sector. ↑ The response to COVID-19 increased the population's trust in Sistema Único de Saúde (SUS). 	<p>Resilience</p> <ul style="list-style-type: none"> ↑ Maintenance of the health system response to COVID-19 in states and municipalities despite a confrontational political environment between federal and subnational governments. ↑ The National Councils of Health Departments became a source of data to monitor the COVID-19 situation in partnership with a press media consortium. ↑ Public and private partnerships to support the SUS response to COVID-19 at the national/regional and local levels. ↑ Federal legislation and national protocols for public health emergencies based on international health regulations and previous experiences with epidemics (e.g., dengue fever and chikungunya virus) created knowledge in preparedness and the design of response plans (emergency and contingency).
Weaknesses	<p>Sustainability</p> <ul style="list-style-type: none"> ↓ Short-term vision for health care strategic planning. There is no clear SUS agenda for the next 10 years. ↓ High turnover of health ministers and heads of health departments at the state and municipal government level. ↓ Fragile regional health system organisation leads to highly fragmented management models that burden municipalities with different fiscal, administrative and technical capacities. ↓ Low coordination between public and private sectors. ↓ Low integration between the health surveillance system and health care services. 	<p>Resilience</p> <ul style="list-style-type: none"> ↓ The lack of federal government coordination places a burden on local governments. ↓ Misinformation from political officials and the media is difficult to counter. ↓ Lack of coordination between government tiers and public/private sectors impaired an integrated response to COVID-19. ↓ The government did not coordinate a national assessment of the COVID-19 response and did not use the knowledge produced by previous and local research initiatives.

Table 1 (continued): Sustainability and resilience – summary of findings by key domain

DOMAIN 2 FINANCING		
Strengths	<p>Sustainability</p> <ul style="list-style-type: none"> ↑ Federal law defines sources of funds to the SUS from all three levels of government. ↑ Automatic and regular transfers from the federal government to states and municipalities (fund-to-fund transfers) guarantee financial flow for health service provision at the local level. ↑ Financing arrangements encourage the scaling-up of services provided by local governments (state and municipalities), such as the Family Health Strategy Programme. 	<p>Resilience</p> <ul style="list-style-type: none"> ↑ The creation of an “extra budget” by the National Congress supports socioeconomic measures (e.g., emergency support to vulnerable people and companies) and the expansion of SUS services provision. ↑ The fund-to-fund mechanism facilitates rapid financial flow to local governments.
Weaknesses	<p>Sustainability</p> <ul style="list-style-type: none"> ↓ Since its implementation, the SUS has been underfunded (only 42% of total health expenditure is public) and the share of federal financing has declined, while funding from municipal governments has increased, amplifying inequalities. ↓ Brazil spends 0.5% of GDP on tax exemptions for private health care, primarily to subsidise those who pay for private health insurance, without integration with public policies. ↓ Out-of-pocket expenditure accounts for approximately 28% of total health expenditure, burdening mostly poor households. ↓ Long-term fiscal austerity policies approved in 2016 decreased federal government health expenditure, increasing SUS underfinancing. ↓ The increase of legislative amendments since 2016 has reduced resource allocation efficiency. ↓ Health litigation negatively affects the health care budget. 	<p>Resilience</p> <ul style="list-style-type: none"> ↓ A late federal government initiative to help finance states and municipalities tackle the impact of the COVID-19 pandemic on health services. ↓ Efficiency has been used since 2016 as a pretext to justify health expenditure budget cuts, undermining SUS resilience. ↓ There is no planning/projection/trigger structure to enact additional budget or financial support for the system. ↓ The federal government did not take account of locoregional inequalities in its distribution of extraordinary resources in response to the COVID-19 pandemic.

Table 1 (continued): Sustainability and resilience – summary of findings by key domain

DOMAIN 3 WORKFORCE		
Strengths	<p>Sustainability</p> <ul style="list-style-type: none"> ↑ An increase in the number per capita of healthcare professionals, including, including dentists, nurses, pharmacists, physiotherapists, medical residents, nursing assistants and medical doctors, among others. ↑ The number of all health professional schools is growing, driven mainly by the opening of private institutions. ↑ Successful initiatives/policies to deal with workforce vacancies and shortages, mainly in the most vulnerable regions. 	<p>Resilience</p> <ul style="list-style-type: none"> ↑ Rapid increase in the number of health professionals during the COVID-19 pandemic. ↑ Some “local” initiatives distributed the workforce, thus avoiding the need to increase. ↑ In previous emergencies (i.e., natural disasters and Zika virus), the SUS national force and community health workers were used to provide support in affected territories.
Weaknesses	<p>Sustainability</p> <ul style="list-style-type: none"> ↓ Geographic distribution of doctors is highly skewed towards larger and wealthier cities, while the most vulnerable and remote areas are deprived. ↓ Absence of a national policy or coordination to manage allocation, provision and working conditions of the health workforce. ↓ Wages and some working conditions in the private sector are more attractive for health professionals, creating competition between the private and public sectors. ↓ Faulty and weak control over the new health education schools has resulted in different outcomes. 	<p>Resilience</p> <ul style="list-style-type: none"> ↓ High mental health burden caused by the pandemic on health professionals without the provision of psychosocial support. ↓ All regions had difficulty hiring health care professionals during the pandemic. ↓ There was no national/institutional policy to share protocols and/or successful initiatives related to health care workforce management.

Table 1 (continued): Sustainability and resilience – summary of findings by key domain

DOMAIN 4 MEDICINES AND TECHNOLOGIES		
Strengths	<p>Sustainability</p> <ul style="list-style-type: none"> ↑ Brazil has independent agencies with capacity to analyse and register new medicines and vaccines in a short period of time. ↑ Brazil is internationally known as an attractive market for new medicines and technologies (large population, genetic diversity and high social inequalities). ↑ Brazil is home to a large pharmaceutical industry. Several foreign and national companies are large drug/medicine producers. ↑ The purchase of high-cost products (medicines and devices) is negotiated centrally by the federal government. ↑ The DATASUS database contains a high number of health indicators with municipal, health region, state and federal data. 	<p>Resilience</p> <ul style="list-style-type: none"> ↑ Regulatory governance maintained high standard levels to approve vaccines for COVID-19 even within the political neglect of the pandemic. ↑ A successful National Immunisation Programme, established before the COVID-19 pandemic, facilitated the vaccine roll-out across the country. ↑ Even during the COVID-19 pandemic, the pharmaceutical market continued to grow, demonstrating high resilience. ↑ Some state and municipal initiatives use digital tools as real-time data to support decision-making. ↑ An expansion of remote consultations during the pandemic helped to maintain some services.
Weaknesses	<p>Sustainability</p> <ul style="list-style-type: none"> ↓ A decrease in R&D investment in new medicines and technologies by both public and private sectors. ↓ Low capacity for disruptive innovation in health technologies by both public and private sectors. Most innovations are incremental. ↓ Absence of a strong and comprehensive industrial and technological park or of local clinical research capacity, owing to inefficient and short-term policies. ↓ Lack of public investments and excessive regulatory bureaucracy. ↓ Lack of resources and the National Institute of Intellectual Property's (INPI) extensive backlog hinder the improvement and innovation. 	<p>Resilience</p> <ul style="list-style-type: none"> ↓ There continue to be shortages of vital medical supplies and medicines. ↓ Absence of national and coordinated stockpile emergency health supplies monitoring and of a strategic stockpile of disasters kits. ↓ COVID-19 vaccine procurement by the federal government was slow and led Brazil to start the vaccination roll-out months later than adequate.

Table 1 (continued): Sustainability and resilience – summary of findings by key domain

DOMAIN 4 MEDICINES AND TECHNOLOGIES		
Weaknesses	<p>Sustainability</p> <ul style="list-style-type: none"> ↓ Digital health is delayed and there is low health literacy among the general public and health professionals. ↓ Low interoperability of health information systems across the country. 	
DOMAIN 5 SERVICE DELIVERY		
Strengths	<p>Sustainability</p> <ul style="list-style-type: none"> ↑ Wide primary care coverage: Family Health Strategy (FHS) is a successful community-based model comprising multi-professional teams that provide comprehensive care to a population within a geographic area preventing unnecessary in-hospital care. ↑ Public and private healthcare facilities available to provide medium and high-tech procedures by SUS. ↑ The presence of a network of federal university hospitals in all states of Brazil, dedicated to serve the SUS. ↑ An emergency care network composed of ambulances (SAMU - Brazilian 911), Emergency Units (UPAs), hospitals, and an emergency coordination centre. 	<p>Resilience</p> <ul style="list-style-type: none"> ↑ Agility to quickly increase the number of temporary beds. ↑ System of health surveillance with teams in states and municipalities. ↑ Trained teams to act in the event of public health emergencies. ↑ Network of public laboratories and the availability of private services. ↑ Experience with telehealth, used for training and consulting among health professionals.
Weaknesses	<p>Sustainability</p> <ul style="list-style-type: none"> ↓ Unequal distribution of health services: there is a greater presence of FHS and primary care in the most vulnerable regions; while there is a greater presence of specialty care in high-income regions and in private sector facilities. ↓ Heterogeneity of primary care quality, resolution, management capacity and infrastructure across regions. ↓ Most SUS financed beds are provided by small hospitals, which have low resolving capacity when compared to larger hospitals. 	<p>Resilience</p> <ul style="list-style-type: none"> ↓ Insufficient number of intensive care unit (ICU) beds in the public sector. ↓ Higher availability of ICU beds in the private sector, available for less than 25% of the population. ↓ Low willingness of the private sector to make beds available to SUS. ↓ Misallocation of public funds in the COVID-19 pandemic, by attempting to create temporary beds in hospitals that were not ready on time.

Table 1 (continued): Sustainability and resilience – summary of findings by key domain

DOMAIN 5 SERVICE DELIVERY		
Weaknesses	Sustainability <ul style="list-style-type: none"> ↓ Persistent high inequality in access to medium and high complexity health services between different socioeconomic groups, including to public services via "private doors" ↓ There is a "gap" in the coordination of care of different complexity (primary, secondary or tertiary), government tiers or public/private sectors. ↓ Fragile SUS regional organization and inefficiencies in care coordination lead to high fragmentation among different levels of healthcare. ↓ Reimbursement fees from the national list of SUS procedures (<i>tabela</i> SUS) are usually below costs. 	<ul style="list-style-type: none"> ↓ During the COVID-19 pandemic, Brazil suffered significant disruption to screenings, diagnostic procedures, physician appointments, low-medium-high surgeries, transplants, treatments and clinical procedures. ↓ An unequal response to the different waves of COVID-19, due to unequal distribution of health infrastructure between regions and socioeconomic groups. ↓ There was no national or institutional initiative to share acquired knowledge arising from the COVID-19 pandemic experience.
DOMAIN 6 POPULATION HEALTH AND SOCIAL DETERMINANTS		
Strengths	Sustainability <ul style="list-style-type: none"> ↑ Social determinants improved in Brazil between 2000 and 2015/2016 (life expectancy, child and maternal mortality, etc.). 	Resilience <ul style="list-style-type: none"> ↑ Some past strategies (<i>Bolsa Família</i>) have been successful in improving social determinants in Brazil.
Weaknesses	Sustainability <ul style="list-style-type: none"> ↓ Brazil is a country with one of the highest income concentration rates globally, resulting in significant disparities in socioeconomic, educational, and health conditions. 	Resilience <ul style="list-style-type: none"> ↓ Since 2015/2016, Brazil has seen stability in child and maternal mortality indicators. ↓ In 2020/2021, there was a sharp increase in maternal mortality.

Table 1 (continued): Sustainability and resilience – summary of findings by key domain

DOMAIN 7 ENVIRONMENTAL SUSTAINABILITY		
Strengths	<p>Sustainability</p> <ul style="list-style-type: none"> ↑ Compared with European countries, Brazil has a “cleaner” energy matrix, and uses more renewable sources. ↑ SUS plays an important role in environmental stewardship & education throughout its primary care multi-professional teams spread by all the Brazilian regions. 	<p>Resilience</p> <ul style="list-style-type: none"> ↑ Some publicly held companies need to follow environmental conditions to remain environmental, social, governance (ESG) companies. To achieve this, they must begin to follow environmentally-friendly approaches, such as assessing the environmental costs and benefits of managing waste, emissions and resource consumption.
Weaknesses	<p>Sustainability</p> <ul style="list-style-type: none"> ↓ The absence of a national policy to address climate change in Brazil. 	<p>Resilience</p> <ul style="list-style-type: none"> ↓ No national initiative to assess environmental costs and benefits of health system activities.

Recommendations

We make 42 recommendations across the seven domains, as shown in the table below.

Table 2: Recommendations across the seven domains

DOMAIN 1 GOVERNANCE	
1A	Improve regulation of the SUS principles – universality, comprehensiveness, decentralisation and social participation – to ensure sustainable and equitable progress towards universal health care access and coverage in Brazil.
1B	Create regional health system governance with defined regional public health authority and public administrative structures for health care financing, planning and management to alleviate health inequalities at the municipal level.
1C	Establish general indicators to monitor SUS quality and coverage, including geographical areas lacking assistance, regional imbalances and access and outcome indicators in health regions.
1D	Create mechanisms for the federal government to support the allocation of resources (professionals, products and technologies) in regions of greater vulnerability and difficult access (e.g., the Amazon region and indigenous areas).
1E	Improve transparency in the use of SUS resources by enhancing instruments for SUS accountability, auditing, social participation and social control.
1F	Integrate available health information and databases from different public and private sources to improve health system resilience by permanently monitoring a wide range of public health threats.

- 1G Improve the regulation and coordination of private health insurance and services by strengthening the Ministry of Health's role in coordinating the National Agencies for Supplementary Health (ANS) and Health Surveillance (ANVISA), in alignment with SUS policies.
- 1H Organise the chain of command for risk and crisis management, including in public and private sectors, and strengthen the network of Health Surveillance Strategic Information Centres (CIEVS).

DOMAIN 2 FINANCING

- 2A Establish a progressive increase in financial resources from 4% to 6% of GDP in 10 years to support SUS sustainability, including consideration of additional taxation on unhealthy products (e.g., tobacco, alcohol, sugar, etc.).
- 2B Redefine criteria for allocating financing and other resources according to population and epidemiological needs, health care infrastructure and expected outcomes in health system regions.
- 2C Expand financing for primary health care to support scaling up community-based family health teams, the diffusion of health promotion and prevention actions and integration with other health care levels within health regions.
- 2D Promote reforms in hospital and specialised care provider contracts and payment from fee-for-service to contracts based on capitation and performance to support integrated, equitable and cost-effective delivery models within health system regions.
- 2E Improve private insurance reimbursement mechanisms to the SUS when their beneficiaries receive care by the public sector.
- 2F Create a specific SUS reserve fund for use in the event of a public health emergency.

DOMAIN 3 WORKFORCE

- 3A Integrate health and education policies to align technical training, graduation, residencies and postgraduation according to health system needs.
- 3B Establish career plans in priority areas of the SUS administration, surveillance and assistance.
- 3C Improve mechanisms for the federal provision of medical professionals in the most difficult to staff areas within health regions.
- 3D Improve the capacity for planning, managing, monitoring and evaluation of the SUS workforce.
- 3E Establish a health care workforce plan for health crises and natural disasters, including the provision of psychological support for health workers.
- 3F Improve digital health capability across the health workforce and expand digital technology in care settings.

DOMAIN 4 MEDICINES AND TECHNOLOGY

- 4A Strengthen health technology and productive development policies to ensure universal access and increase local production competitiveness, reducing external dependence and the high trade balance deficit in high-cost products.
- 4B Establish institutional and tributary reforms, and establish regulatory process improvements, such as reduction of red tape and refinement of Intellectual Property scheme, to create a competitive advantage over external markets.
- 4C Foster local research and development through increased investment in public and private sectors of the health economic and industrial complex in the country.
- 4D Prioritise the digital transformation of the health system to improve health system management, coordination and integration of levels of care.
- 4E Integrate health informational systems across different levels of care (primary, secondary and tertiary), government tiers (municipal, state and federal) and public and private sectors (SUS, supplementary and private).
- 4F Align the expansion of telehealth access with primary care expansion, to create a well-connected network.

DOMAIN 5 SERVICE DELIVERY

- 5A Prioritise primary care as the main source of access for comprehensive care, encompassing preventive, diagnostic (e.g, early screening), treatment and palliative care in the SUS and its integration with other levels of care, including mental health care and emergency services.
- 5B Define national and regional lists of health services and products based on health technology assessments offered by the SUS to ensure efficient, effective and equitable use of resources to address health care needs.
- 5C Establish emergency actions to address unmet needs worsened by the COVID-19 pandemic, prioritising cancer, cardiovascular and infectious diseases.
- 5D Establish national, state and municipal contingency plans for public health emergencies involving both public and private sectors.
- 5E Promote efficient models of public-private partnerships to expand specialised and hospital services delivery reach prioritising areas of care and regions of the country with greater needs.

DOMAIN 6 POPULATION HEALTH AND SOCIAL DETERMINANTS

- 6A Increase preventive health policies for people of all ages and prioritise vulnerable groups – women, afro-descendants, quilombolas (descendants of Afro-Brazilian slaves who escaped from plantations), and rural and indigenous populations.
- 6B Implement emergency measures aimed at protecting the indigenous child population.
- 6C Strengthen the monitoring capacity of the SUS health surveillance for early detection the rise of infectious diseases with epidemic potential.

- 6D Improve the quality of mortality registries to identify target regions where health interventions are needed.
- 6E Strengthen the indigenous health subsystem within the SUS, in partnership with National Indian Foundation (FUNAI) and indigenous communities, in order to improve preventive measures, healthcare services, and health surveillance for indigenous populations.
- 6F Improve regulation of commercial activities and practices that affect health, including tobacco, unhealthy foods and/or alcohol.
- 6G Promote Health in All Policies and intersectoral action capacities by addressing policies, such as those influencing transport, housing and urban planning, the environment, education, agriculture, finance, taxation and economic development.

DOMAIN 7 ENVIRONMENTAL SUSTAINABILITY

- 7A Foster the participation of the health sector in environmental agendas, including strategies to strengthen SUS in the Amazon region enhancing the role of local communities.
- 7B Study strategies and commit to the transition to green energy sources within SUS.
- 7C Increase the severity of penalties for environmental crimes that cause damage to public health, such as the indiscriminate use of pesticides, illegal mining in indigenous areas and the logging industry.

Introduction



Brazil's unified health system (*Sistema Único de Saúde* (SUS)) was created in the late 1980s, underpinned by constitutional principles of universality, comprehensiveness, decentralisation and social participation (Castro et al., 2019). Funded by tax revenues and contributions from the three levels of government, the provision of service delivery is under state and mainly municipal government responsibility. Considered one of the largest and most comprehensive public health care systems in the world, all residents and visitors, including undocumented individuals, can access free, comprehensive services, including primary, out-patient specialty, mental health and hospital care, as well as prescription drug coverage. No application process is necessary. There is no cost-sharing for health care services at the point of care.

However, nearly 25% of Brazilians, mostly middle- and higher-income residents, use private health care services through out-of-pocket payments and/or voluntary private health insurance to circumvent bottlenecks in accessing, for the most part, specialised and hospital care (Massuda et al., 2020). Private health insurance costs, as well as health-related purchases, qualify as tax deductions. Despite being a source of care for about a quarter of the population, the private sector is responsible for more than 55% of total health expenditure, thus generating broad inequality in the distribution of health resources in the country.

Table 3: Definitions of health system sustainability and governance

Health system sustainability	A health system's ability to continually deliver the key health system functions of providing services, generating resources, financing and stewardship, incorporating principles of fair financing, equity in access and efficiency of care, in pursuit of its goals of improving population health and responsiveness to the needs of the populations it serves, and to learn and improve while doing so.
Health system resilience	A health system's ability to absorb, adapt to, learn and recover from crises born of short-term shocks and accumulated stresses, to minimise their negative impact on population health and disruption caused to health services.

The report draws on a review of recent data, health policy and available evaluations in each of the domains. Interviews were held with 13 stakeholders (see Acknowledgements) relevant to the domains, to add to the analysis and emerging recommendations.

The report includes a non-exhaustive set of focused recommendations which aim to be suitable for rapid implementation. It does not address more fundamental shifts in policy beyond the health system that may be required to address important and enduring issues, such as persistent health inequalities. Further work and mechanisms to ensure learning from the pandemic are paramount. Nonetheless, the recommendations contribute to the debate of which actions are necessary to ensure the sustainability and resilience of Brazil's health and care system to future shocks.

1. DOMAIN 1

Governance



The health system governance domain is divided into sustainability and resilience subdomains. The sustainability subdomain explores governance structure and leadership, multilevel governance, accountability, integrity and trust, and the evaluation of programmes and policies. The resilience subdomain examines preparedness, response, recovery and learning.

1.1 Sustainability

1.1.1 Governance structure and leadership

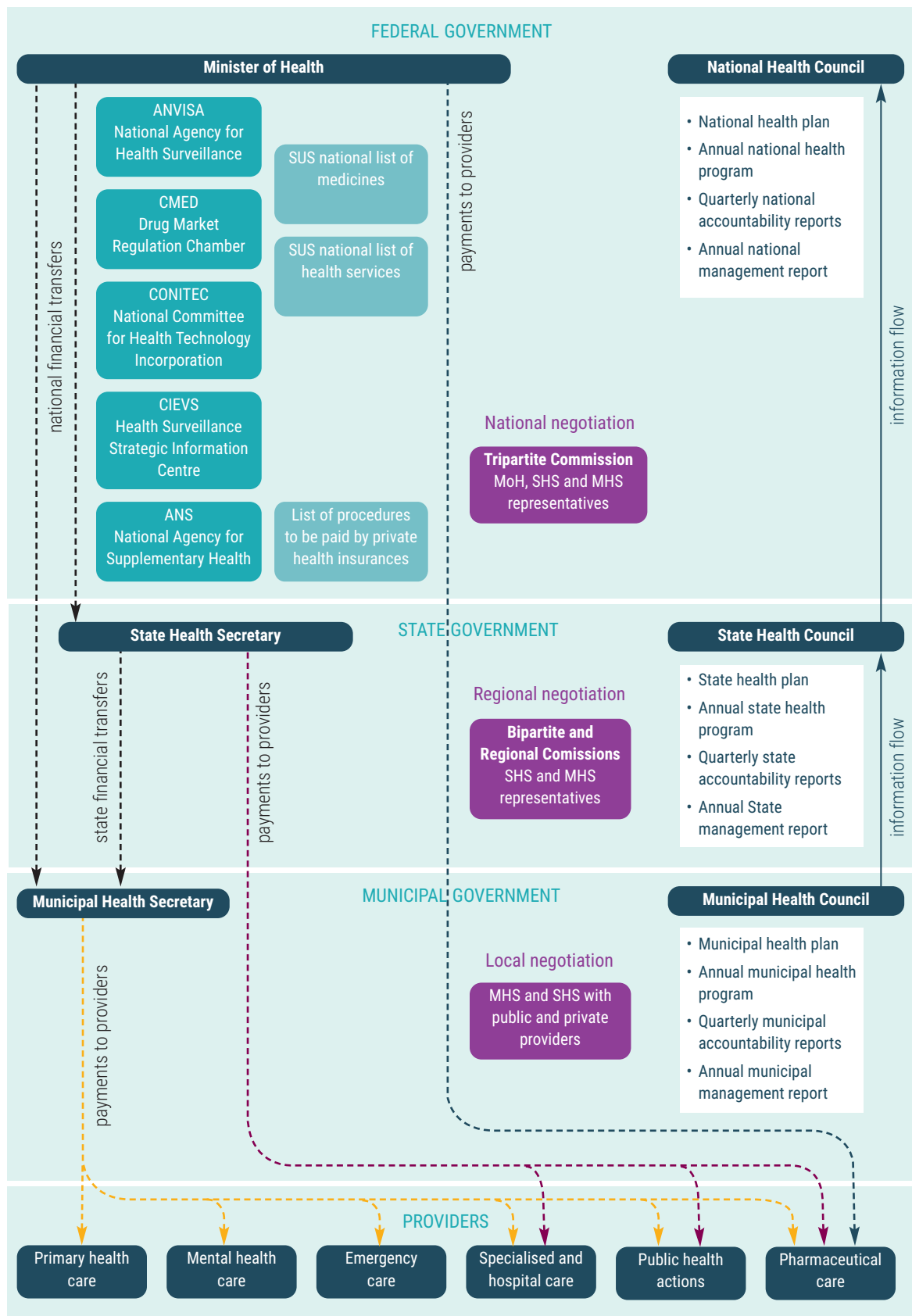
The Unified Health System (*Sistema Único de Saúde* (SUS)) was established by the 1988 Federal Constitution and regulated by Federal Laws, Decrees and Ministerial Ordinances (Brasil, 1990a, 1990b, 2011, 2012, 2017). Underpinned by a political and social pact to restore democracy and political rights in Brazil, the Constitution expanded social rights and defined the rules of Brazilian federalism. Health was defined as a universal right and a governmental responsibility shared between the three tiers of government – federal, state and municipal – with political, financial and administrative autonomy. The Constitution also guarantees community participation and is open to private-sector initiatives in the health system. The key health system actors, inter-federative arrangements, negotiation instances, planning and accountability instruments, financial flows and service delivery roles and responsibilities are presented in Figure 1.

Health system decentralisation to the municipal level is based on shared responsibilities and cooperation between the three tiers of government. The Federal Government, through the Ministry of Health (MoH), undertakes a stewardship role in SUS coordination at the national level. This includes formulating health policies, coordinating health system planning and co-financing states and municipalities for health care service delivery. It also provides direct health care services to approximately 755,000 indigenous people living in villages. At the local level, through the Municipal Health Secretariats (MHS), municipal governments (5,570 in total) are responsible for municipal health planning, co-financing the health system and coordinating the delivery of health care services to residents. While municipal governments have autonomy in how to provide health services, they must follow national guidelines to receive funding from the MoH. Through State Health Secretaries (SHS), the states governments (27 in total, including the Federal District) are responsible for state health planning, co-financing the health system, coordinating strategic programmes, delivering health services that have not been decentralised to municipalities and leading the organisation and planning of health regions. The Brazilian health regions (485 in total) are composed of municipalities in the same geographical area and aim to integrate the organisation, planning and provision of health services into networks.

Linked to the MoH, the National Supplementary Health Agency (*Agência Nacional de Saúde Suplementar* (ANS)) regulates the operation of voluntary private health insurance (VPHI) while the Sanitary Surveillance Agency (*Agência Nacional de Vigilância em Saúde* (ANVISA)) regulates the quality of services and products, including the safety and efficacy of medicines, medical devices and vaccines. The MoH and ANVISA provide national public health leadership and serve as Brazil's national contact points for the WHO on International Health Regulations matters.

Inter-federative commissions, planning processes and financing arrangements have enabled the definition of shared responsibilities and intergovernmental cooperation in Brazil's highly decentralised health system. National health policies need to be discussed and approved by the tripartite management committee (*Comissão Intergestores Tripartite* (CIT)) composed of representatives from the MoH, from the council of SHS (*Conselho Nacional de Secretarias Estaduais de Saúde* (CONASS)) and from the council of MHS (*Conselho Nacional de Secretarias Municipais de Saúde* (CONASEMS)). At the state and regional levels, the implementation of national health policies and the definition of state health policies should be agreed upon by bipartite and regional management committees (*Comissão Intergestores Bipartite* (CIB) and *Comissão Intergestores Regional* (CIR)) consisting of representatives from CONASS and CONASEMS. Municipal governments also have the autonomy to define and implement their own health policies.

Figure 1: Overview of the Brazilian health system



Source: Authors' own work.

Health planning is mandatory at each government level. The planning process should be bottom-up from municipal to federal level, aiming to match (1) health needs (considering epidemiological, demographic and socioeconomic dimensions), (2) availability of resources (considering health infrastructure and historical service production) and (3) health policy commitments and goals. The SUS planning instruments are (1) Health Plans (HP) established every four years by the three levels of government, explaining health policies and policy commitments, (2) Annual Health Programmes (AHP) that define budget allocation and HP monitoring indicators (3) a Quarterly Accountability Report (QAR) that demonstrates HP budget execution and (4) an Annual Management Report (AMR) that presents AHP results achieved and redirections for the HP, if required.

Although these SUS planning instruments are interconnected – seeking to create an integrated inter-federative cyclical process – weaknesses in regional health system organisation, imbalances in the availability of financial resources to meet health needs and fragilities in mechanisms for the prioritisation of resource allocation hinder the effectiveness of the bottom-up planning process. In addition, the high turnover of health leadership at all levels of government (federal, state and municipal), with only a few completing their theoretical four-year term, further limits long-term planning for the SUS.

Strengthening SUS regional governance is a major priority for addressing municipal disparities, health care fragmentation and conflicting roles in health system coordination between municipal and state governments. Decentralisation to the municipal level has expanded the delivery capacity for out-patient care and public health interventions by primary care services across the country, improving access and health outcomes. However, specialised out-patient and hospital facilities remain concentrated in urban centres with larger populations and are mostly available for private sector patients. Moreover, given the significant disparities, differences in municipal technical, administrative and fiscal capacities have created distinct patterns of service delivery and integration of health care networks in the SUS, increasing multiplication of lines to access services and waste of scarce resources.

1.1.2 Multilevel governance

Along with the universal right to health, the Constitution defines that federal, state and municipal governments are responsible for providing comprehensive health care at all levels of complexity. Several instruments set government roles and responsibilities regarding policy development, planning, funding and provision of services, as well as accountability. However, structural fragilities in health system organisation remain, resulting in high regional inequalities in resource allocation and service provision, increasing expenditure due to health litigation and low cooperation between public and private sub-systems.

National policies, health plans (HP) and the Annual Health Programme (AHP) set responsibilities for financing and delivering SUS services according to level of health care complexity and negotiation between municipal and state governments. Health care services and medicines that the SUS should universally provide are defined by MoH. *Relação Nacional de Serviços de Saúde* (RENASES) comprises primary care, emergency care, mental health care, specialised out-patient and hospital care and public health actions (RENASES, 2012). At the same time, *Relação Nacional de Medicamentos* (RENAME) is composed of basic, strategic and specialised pharmaceutical components (RENAME, 2022).

The allocation of SUS financial resources from the federal government to states and municipalities is calculated in three ways: (1) per capita, (2) based on historic data regarding service production and (3) incentives. Per capita calculations are used to finance primary health care, pharmaceutical care and public health actions. Historic data of the quantity of services provided are used to calculate the financing of, for the most part, specialised out-patient and hospital services. Incentives are used as a mechanism to encourage the adoption of national priority policies and certain types of services, such as ambulatory mental health facilities with psychosocial support centres (*Centros de Apoio Psicossocial* (CAPS)) and emergency care with *Unidades de Pronto Atendimento* (UPA).

According to HP and AHP definitions, the MoH reimburses state and municipal governments monthly using a fund-to-fund mechanism. About 70% of the MoH budget is decentralised to states and municipalities. Most of the remaining budget is spent on the purchase of strategic products, including specialised and high-cost medicines and vaccines. State or municipal governments pay for the provision of health services under their administration. Some states contribute to municipality financing. However, as the imbalance between federal transfers and cost-of-service operations grows, the financial burden falls on the states and mainly on municipal governments. It also contributes to exacerbating inequalities in resource allocation, especially with regard to the distribution of doctors.

Municipal governments are ultimately responsible for organising the provision of publicly funded health services for their residents. The provision of primary care, mental health care and emergency services; the delivery of basic components of pharmaceutical care; and the rendering of several public health actions, including vaccination and epidemiological surveillance, are the responsibility of municipalities. For specialised and hospital care, the HP and AHP set the types, volumes and budget allocation for services provided in each health region and the municipalities that will deliver services for the residents of other municipalities in the region. State governments are responsible for the coordination of strategic programmes such as organ transplants and the provision of high-cost medicines, as well as delivering health services that have not been decentralised to municipalities, such as specialised care, high complexity tests and hospital care.

Aligning the training, allocation and provision of health care workers, as well as incorporating health technologies to address health system needs, is crucial to improving SUS sustainability. Professional regulation is shared between the MoH, the Ministry of Education and professional councils. The Ministry of Education is responsible for the authorisation of professional education courses. Licensure for working is delegated to health professional councils. Some medical specialty societies are given periodic accreditation. Half of all Brazilian physicians currently engage in dual practice – working in both the public and private sectors, while only one-fifth work exclusively in the public sector. Most litigation of the SUS by individuals claiming access to treatments not offered on the public system are procedures or medicines prescribed by doctors working in the private sector.

Health technology assessment (HTA) organisations operate nationally to support the incorporation of new technologies into the Brazilian health system. First, to enter the Brazilian market, new medicines and health products and devices must register with ANVISA, which analyses evidence of efficacy and safety. For medicines, the Medicines Market Regulation Chamber (*Câmara de regulação do mercado de medicamentos conselho de ministros* (CMED)), linked to ANVISA, defines a cap price for selling in the Brazilian market based on evidence of efficacy, comparison of treatment costs and international prices. To be accepted by the SUS, after ANVISA approval, new technologies must be submitted to the *Comissão Nacional para Incorporação de Tecnologias* (CONITEC), linked to the MoH. CONITEC assists the MoH in formulating policies, guidelines and goals for incorporating, modifying or excluding health technologies within the SUS and updating RENASES and RENAME.

Improving coordination between the SUS and Voluntary Private Health Insurance (VPHI) is another challenge to improving the sustainability of Brazil's health system. The private health sector is subsidised through tax exemptions, with subsidies amounting to R\$57.7bn (0.5% of GDP) in 2018. A significant proportion is used to subsidise the 49 million Brazilians (24% of the population in 2022) who pay for VPHI and who are concentrated in larger municipalities and wealthier regions, while smaller cities and poorer regions have less private coverage. The rules for VPHI operation are defined by federal law (Brasil, 1998), setting the types of health plans, the companies entitled to provide VPHI, types of contracts and the scope of health care provision by private providers. ANS oversees VPHI operations, such as price adjustments, the avoidance of adverse selection of patients and the list of medical procedures (*Rol de Procedimentos e Eventos em Saúde*) that should be covered by VPHI, as well as the rules for providing these procedures. The law also establishes that private insurance companies must reimburse the government for the utilisation of SUS services by its beneficiaries.

1.1.3 Accountability, integrity and trust

SUS control and accountability mechanisms consist of instances of social participation and governmental bodies for internal and external control. For social participation, health councils (*Conselhos de Saúde*) are part of the organisational structure of the SUS at the three levels of government. They are responsible for debating and approving health policy priorities and supervising their implementation. They comprise 50% community members, 25% providers and 25% health system managers, including social movements, professional unions, the scientific community and private health facilities. In addition, the health councils are responsible for holding health conferences (*Conferências de Saúde*) every four years, in order to hear the demands of the population, to address them to the public authorities, to approve health policy priorities for the HP and to evaluate the accomplishment of previous health plan goals.

At the governmental level, internal control bodies are composed of the general Controller's Office in each tier of government and a specific National Audit System (*Sistema Nacional de Auditoria* (SNA)) for the SUS. The SNA is coordinated by the National Audit Department of the SUS (*Departamento Nacional de Auditoria do SUS* (DENASUS)) which is linked to the MoH and which comprises audit offices in SHSs and MHSs. It evaluates the attainment of goals, execution of programmes and governmental budgets using monitoring indicators, evaluation of performance and audits. The audit reports issued by SNA bodies support members of health councils to supervise SUS manager activities. Among the most common problems identified are insufficient HP and AHP details, management reports that are incompatible with the AHP, deficiencies in quality of care and access to health services, failures in the application of resources defined by the SUS, non-execution of the budget, or use of own or received financial resources (Brasil, 2015).

External control of the SUS monitors compliance in the implementation of health policies, the integrity of administrative acts, the regularity of public spending and budget execution. It is carried out at the federal level by the National Congress, supported by the Federal Court of Auditors, at the state level by the State Legislative Assemblies, supported by the State Court of Auditors, and at the municipal level by the Municipal Chambers of Councillors, with the assistance of the State Audit Court. The Federal and State Public Prosecutor's Offices are also part of the external control body.

Aiming to improve transparency and accountability, in addition to defining a minimum amount of health expenditure at the three levels of government, Law 141/2012 requires that SUS managers must make public health accounts widely available for population analysis and prepare a detailed management report with the following information: (1) amount and source of resources invested in health, (2) audits carried out or being executed and their recommendations or determinations and (3) production of health services in the care network that are government owned and contracted. Failure to comply with the provisions entails the suspension of financial transfers between the entities.

1.1.4 Evaluation of programmes and policies

Brazil has made important progress in the transparency of health data, with the development of information systems by the *Departamento de Informática do SUS* (DATASUS) linked to the MoH and fed by states, municipalities and directly by health facilities, as is the case of the National Register of Health Facilities System (*Sistema de Cadastro Nacional de Estabelecimentos de Saúde* (SCNES)) and the Information Systems for Out-patient Production (*Sistema de Informação Ambulatorial* (SIA)) and Hospital Production (*Sistema de Informação Hospitalar* (SIH)) and the Public Health Budget Information System (*Sistema de Informações sobre Orçamento Público em Saúde* (SIOPS)), among others. However, the low level of computerisation of the health care network, low use of electronic medical records, and problems with the integration and updating of databases, are barriers to the use of these data as accurate instruments for the evaluation of programmes and policies.

In addition, although Brazil has a relevant public health scientific community and some initiatives to evaluate the health system and health policies, the use of systematic policy evaluation to improve SUS performance needs to improve. In 2011, the federal government created the National Programme for Improvement of Access and Quality of Primary Care (*Programa Nacional de Melhoria do Acesso e da Qualidade da Atenção Básica* (PMAQ)) to evaluate performance of primary care teams using a matrix to score (1) municipal management for the development of primary care, (2) structure and operating conditions of primary care, (3) appraisal of workers, (4) access and quality of care and organisation of the work process and (5) access, utilisation, participation and population satisfaction. Participation in PMAQ was voluntary for municipalities. However, it has expanded rapidly, reaching 93.9% of teams by the end of 2018 (Fardousi et al., 2022).

Other relevant initiatives for the evaluation of programmes and policies are linked to the Oswaldo Cruz Foundation (Fiocruz). The Centre for Integration of Data and Knowledge for Health (*Centro de Integração de Dados e Conhecimentos para Saúde* (CIDACS)) has carried out interdisciplinary studies linking large volumes of data to support decision-making in public policies, such as the Cohort of 100 Million Brazilians, Zika Platform, Equity and Urban Sustainability and Bioinformatics and Genetic Epidemiology (Epigen), among others. The Health System Performance Assessment Project (*Projeto de Avaliação de Desempenho do Sistema de Saúde* (PROADESS)) integrates different health system indicators to support the planning of health policies and programmes for SUS managers at all administrative levels.

1.2 Resilience

1.2.1 Preparedness

SUS arrangements for preparedness and response to public health emergencies in Brazil started to be set when federal funding for Epidemiology and Diseases Control (*Teto Financeiro de Epidemiologia e Controle de Doenças* (TFECD)) was established in 1996 and implemented in 1999 (Silva Júnior et al., 2004). Along with the National Policy of Health Surveillance (*Política Nacional de Vigilância em Saúde* (PNVS)), attributions were defined for tiers of government that combined political autonomy and cooperation mechanisms. The surveillance and response system are composed of passive and active strategies. Passive surveillance is composed of epidemiological, sanitary and laboratory activities, as well as deaths, workers' health and environmental surveillance. The Health Surveillance Strategical Information Centre (*Centro de Informações Estratégicas em Vigilância em Saúde* (CIEVS)) also conducts event-based surveillance.

In the late 1990s, a response to an outbreak of nephritis in the state of Minas Gerais was supported by the US Centers for Disease Control and Prevention (Bailer et al., 2000). This event fostered a partnership between Brazilian and US governments for professional training, named the Field Epidemiology Training Program (*EpiSUS* in Portuguese). In the same year, the national health foundation created the Fast Responses in Epidemiological Emergencies Centre (*Núcleo de Respostas Rápidas em Emergências Epidemiológicas* (NUREP)) (FUNASA, 2000a, 2000b), with responsibility for planning, resource mobilisation and action coordination to reduce and eliminate public health risks. Later, in 2005, Brazil was the third country to sign the International Health Regulations (RSI) and to create a national focal point for the RSI, known as the Health Surveillance Strategical Information Centre, with responsibility for detecting health-related rumours and receiving public health events notifications (Brasil, 2005).

In 2011, the Public Health Emergency of National Importance (*Emergência em Saúde Pública de Importância Nacional* (ESPIN)) declaration and SUS National Force (FN-SUS) were established. In this process, the MoH is responsible for coordinating the national response to avoid political and administrative differences and for equalising federal support to affected states (Brasil, 2011). In 2018, Brazil established the National Policy for Health Surveillance (*Política Nacional de Vigilância em Saúde* (PNVS)). The PNVS defines a public health emergency (*Emergência de Saúde Pública*

(ESP)) as a “situation which demands urgent prevention, control and contention measures of public health risks”. Responses to public health emergencies require coordinated actions between governmental and non-governmental organisations in articulating and organising efforts.

1.2.2 Response

CIEVS investigated the first SARS-CoV2 rumours on 3 January 2020. These were acknowledged by the WHO on 5 January, after which the MoH began active monitoring, through weekly meetings of an Events Monitoring Committee (*Comitê de Monitoramento de Eventos* (CME)) and the sharing of epidemiological reports (SVS, 2020). On 30 January 2020, the WHO declared the spread of COVID-19 a public health emergency of international importance. In Brazil, nine imported suspected cases were being investigated and, on the same day, the Inter-ministerial Executive Group of Public Health Emergency of National Importance (GEI-ESPIN) was created through Decree 10.211 (Brasil, 2020).

On 3 February 2020, a Public Health Emergency of National Importance (ESPIN) was declared by health ministerial Ordinance 188. Public Health Emergency Operational Centre (COE-COVID-19) duties were defined as the national mechanism of coordinated management to respond to the national emergency. Later, on 16 March 2020, the Crisis Committee was instituted to supervise and monitor the impacts of COVID-19 as a redundant mechanism aimed at articulating government actions with the Brazilian president’s power. At this stage, there was an overlap between presidential acts and MoH guidance.

On 20 March 2020, the MoH published an ordinance declaring community transmission in Brazil. This led to changes in MoH recommendations, to guide the Health Surveillance National System to deal simultaneously with the spread of COVID-19, influenza and other respiratory viruses during the ESPIN. The Operational Coordination Centre, within the Crisis Committee, was another redundant mechanism established by Decree 10,289 on 24 March 2020 to supervise and monitor the impacts of COVID-19, which also overlapped with MoH activities.

The National Contingency Plan for Human Infection by the Coronavirus (*Plano de Contingência Nacional para Infecção Humana pelo novo Coronavírus*) (COVID-19) defined the response level and the command structure to respond to the COVID-19 emergency in Brazil. Each level was based on a risk evaluation of the effect of the novel coronavirus on Brazilian public health. Important questions were considered in this evaluation, including (1) disease transmissibility, (2) geographical propagation of the new coronavirus, including global distribution in affected areas, business volume and travel, (3) disease clinical gravity, as per serious complications, hospitalisations and deaths, (4) population vulnerability, including pre-existing immunity and subjects at greater risk, (5) access to preventive measures, such as vaccines and possible treatments and (6) WHO recommendations and scientific evidence. Based on the national plan, municipal and health secretaries, public and private health services, and agencies, as well as general companies, were all recommended to elaborate their own plans regarding COVID-19 response measures. Following this recommendation, state health secretaries created their own contingency plans and shared them with the MoH. However, the implementation of the national plan faced significant hurdles due to political instability. The country had four different ministers of health in one year from April 2020 to March 2021. Moreover, the lack of federal coordination and misinformation propagated by federal authorities further burdened regional and local governments.

Despite the political challenges, in 2021, the CIEVS network, which promotes epidemiological intelligence unity in detection, verification, evaluation, monitoring and risk communication, maintained 164 operational units, one in each state health secretariat, 26 in state capitals, 14 in borders, 46 in strategic municipalities, 34 in indigenous health departments, 16 in state regionals, and one national unit.

1.2.3 Recovery and learning

In response to the lack of federal support to manage the crisis, state and municipal governments assumed a leading role in response to the pandemic and implemented various initiatives to mitigate the impact of COVID-19 on their populations, including expanding testing capacity, increasing the number of hospital beds, implementing social distancing measures, and ensuring large-scale public health interventions in such a large and profoundly unequal country. In addition, even with problems related to coordination and communication between different levels of government and health care providers, there was an evolution of health care regionalisation in Brazil, with greater interconnection between states and municipalities into the health regions.

To face the threat of data distortion by the federal government, a consortium composed of media, the National Council of State Health Secretaries (CONASS) and Brazilian researchers and universities became sources of information about the pandemic in the country. Following pressure from different areas of Brazilian society, including from legislative and judicial powers, the federal government launched a national COVID-19 vaccination campaign. This experience demonstrated the importance of SUS participation mechanisms in the public health governance dynamic.

Therefore, the response to COVID-19 in Brazil has highlighted the need for investment in public health infrastructure and systems, as well as the importance of effective coordination and communication between different levels of government and health care providers. The pandemic has also exposed underlying health inequalities in the country, with marginalised communities and those living in poverty disproportionately affected by the virus (Rocha et al., 2021; Castro et al., 2021).

1.3 Recommendations

RECOMMENDATION 1A

Improve the regulation of the SUS principles – universality, comprehensiveness, decentralisation, and social participation – to ensure sustainable and equitable progress towards universal health access and coverage in Brazil.

RECOMMENDATION 1B

Create regional health system governance with defined regional public health authority and public administrative structures for health care financing, planning and management to alleviate health inequalities at the municipal level.

RECOMMENDATION 1C

Establish general indicators to monitor SUS quality and coverage, including geographical areas lacking assistance, regional imbalances and access and outcome indicators in health regions.

RECOMMENDATION 1D

Create mechanisms for federal governments to support the allocation of resources (professionals, products and technologies) in regions of greater vulnerability and difficult access (e.g., the Amazon region and indigenous areas).

RECOMMENDATION 1E

Improve transparency in the use of SUS resources by enhancing instruments for SUS accountability, auditing, social participation and social control.

RECOMMENDATION 1F

Integrate available health information and databases from different public and private sources to improve health system resilience by permanently monitoring a wide range of public health threats.

RECOMMENDATION 1G

Improve the regulation and coordination of private health insurance and services by strengthening the Ministry of Health's role in coordinating the National Agencies for Supplementary Health (ANS) and Health Surveillance (ANVISA), in alignment with SUS policies.

RECOMMENDATION 1H

Organise the chain of command for risk and crisis management, including in public and private sectors, and strengthen the network of Health Surveillance Strategic Information Centres (CIEVS).

2. DOMAIN 2
Financing



2.1 Sustainability

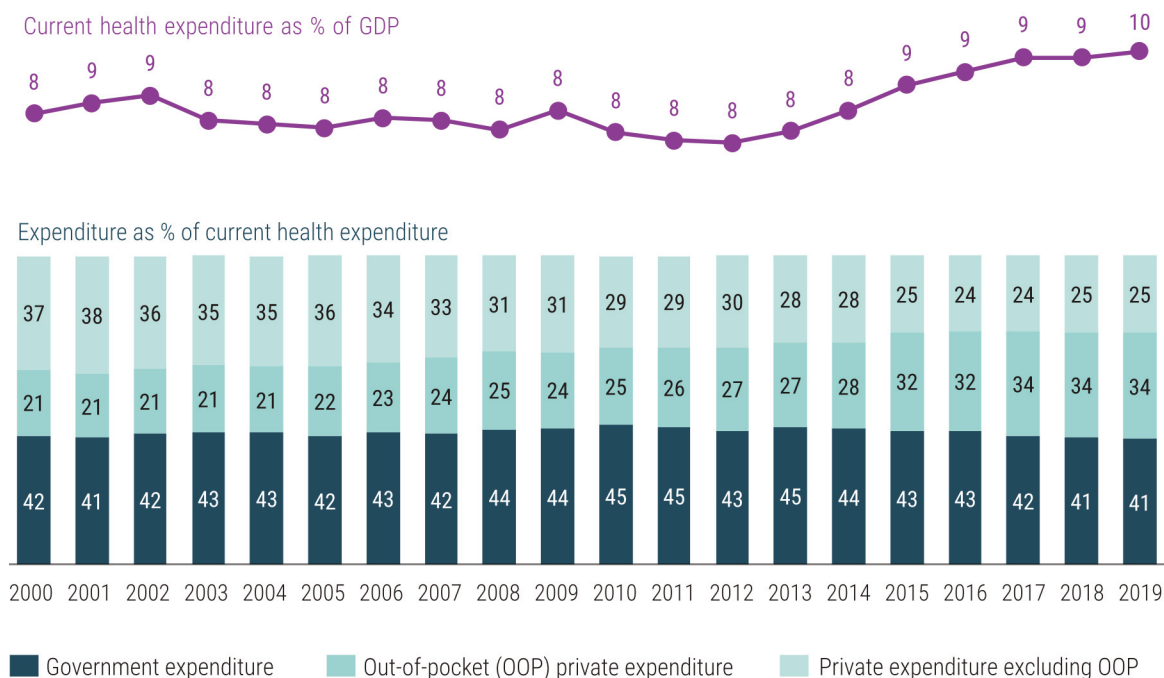
2.1.1 Revenue generation

Public underfunding has been a major challenge for SUS sustainability since its inception and has worsened in the past 10 years. Despite an increase from 6.7% to 9.5% in total health expenditure as a proportion of GDP from 1990 to 2019, the pattern of health financing in Brazil has remained predominantly private. Unlike other countries with universal health systems, public spending in Brazil has always remained below 45% of total health expenditure. In 2019, 59.11% of total health expenditure in the country was private and 40.74% was public (Figure 2).

Underfinancing of SUS results from a lack of sustainable and sufficient sources of funding. The 1988 Constitution has defined that the three government tiers should finance the health system through tax revenues and social contributions. However, it was not until 2000 that Constitutional Amendment 29 (EC-29) approved a minimum amount for health funding by each government level: state governments had to spend at least 12% of their total revenue on health, municipalities had to apply a minimum of 15% of their total revenues and the federal government was expected to invest the amount spent in the previous year, adjusted for GDP variation. In 2012, Law 141 defined the scope of actions and public health services considered as health expenditure, endorsed the previous minimum values for states and municipalities and changed the formula for the federal government to reach 15% of current net revenue.

However, in 2016, a federal government spending cap rule introduced by Constitutional Amendment 95 again changed the calculation for minimum health expenditure, with the minimum to be calculated by updating the minimum of the previous year according to the inflation rate, imposing a strict limit on the growth of public expenditure until 2036. Between 2018 and 2022, it is estimated that SUS losses due to EC 95 reached almost R\$60bn, discounting expenses related to COVID-19, which were not accounted for in the spending cap.

Figure 2: Health system expenditure



Source: World Bank (2022).

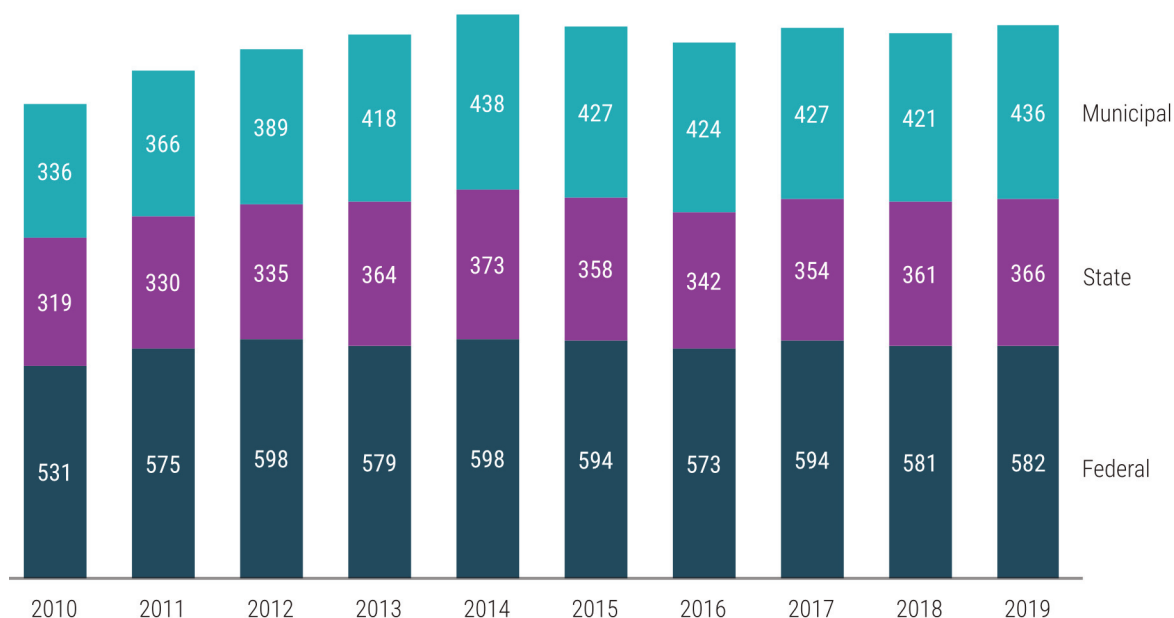
There was a change in the composition of private expenditure between 2000 and 2019, with a drop in out-of-pocket expenditure (from 36.6% to 27.5%) and an increase in VPHI expenditure (from 20.5% to 29.2%). The VPHI sector has developed to cover SUS bottlenecks in access to specialised and hospital care. In addition, individuals can offset private health care expenses on their tax returns. Personal health care tax exemptions are estimated to represent 0.5% of GDP. From 2000 to 2015, the number of people with private health plans grew from 30 million to 50 million, falling to 47 million with the increase in unemployment from 2015. Approximately 70% of private health plans are collective, linked to formal employment.

2.1.2 Resources coverage and allocation

An important change in the composition of public health expenditure in Brazil has occurred which affects resource coverage and allocation. From 1990 to 2019, there was a decrease in federal government participation (from 75% to 42%) and an increase in state (from 15% to 26%) and municipality (from 12% to 32%) participation. In the last ten years, there has been a constant increase of state expenditure per capita, from R\$319.36 to R\$336.47 and in municipal spending per capita from R\$336.46 to R\$435.82, while federal expenditure per capita has stabilised since 2014/2015 and decreased in 2016, 2018 and 2019 (Figure 3).

Since 2016, health system financing through parliamentary amendments increased exponentially, causing a deterioration in the efficient allocation of resources (Vieira, 2020, 2022). Parliamentary amendments are not a stable or predictable source of funding, making it increasingly difficult for health administrators to plan long-term programmes. In addition, this mechanism of resource allocation is not subject to the same level of accountability as other forms of public spending, leading to potential misuse or misallocation of funds. The lack of transparency and accountability also creates opportunities for corruption. Overall, while parliamentary amendments can provide additional funding for the Brazilian health system, they may not be the most effective or sustainable way to finance the system.

Figure 3: Health expenditure per capita by administrative tier (R\$)



Note: Municipal, state and federal expenditures per capita are mutually exclusive.

Sources: PROADESS (2022) and World Bank (2022).

Therefore, in the years leading up to the COVID-19 pandemic, municipalities and states struggled to increase their health expenditure due to decreased participation from the federal government, which is the tier with greatest financial capacity (Costa, 2022; Cruz et al., 2022).

2.1.3 Financing policies and provider payments

Despite limited SUS resources, the creation of mechanisms to transfer federal funding to states and municipalities reconfigured the governance of the health system. Before the SUS, payment for services provided was made directly by the federal government to health providers, most of which were private, through reimbursement per health service delivered. In addition, to transfer financial resources from the federal government to states and municipalities, it was necessary to establish fixed-term agreements.

With the SUS, health system management responsibilities were progressively transferred to states and municipalities. To underpin this process, in 1994, Decree 1,232 established an innovative mechanism – the Fund-to-Fund – for the federal government to transfer from the National Health Fund to state and municipal funds, without the need for fixed-term agreements. As a result, federal transfers became regular and automatic, sustaining the SUS decentralisation process to the municipal level over time.

In addition, the creation of funds directed towards strategic areas of the system increase the reach of public health actions nationwide. Among the most important is the Primary Care Floor (*Piso da Atenção Básica* (PAB)). Implemented in 1998, the PAB replaced fee-for-service reimbursement for walk-in procedures in primary care. Composed of a fixed per capita component (based on population) and a variable component (linked to national priorities), the PAB channelled monthly, regular and automatic federal resources directly to all municipalities in the country.

In 2006, federal financial incentives were divided into six funding blocks – Primary Care, Medium and High Complexity Care, Pharmaceutical Assistance, Health Surveillance, SUS Management and Investments. As a result, federal resources transferred to states and municipalities began to be spent within the blocks, guiding local managers to invest in areas considered strategic for the SUS. However, in 2017, the blocks were merged in only two – one for the cost of services expenses and the other for investments in health infrastructure.

Spending by level of care was concentrated according to tier of government. Municipalities are the government entities responsible for 61% of primary care expenditure, which represents 14.5% of total SUS expenditure. At the other end, state governments are responsible for 50% of hospital care expenses, which represents 21.1% of expenses. Meanwhile, the federal government is responsible for 50% of specialised care funding, which represents 13.7% of public spending on health.

Thus, even though the PAB has benefitted the poorest regions, which did not have the infrastructure to receive federal funds via reimbursement, as well as having induced the adoption of the FHS model, the municipalities assumed responsibility for providing primary care services under highly unequal technical, administrative and fiscal conditions. Poorer municipalities and rural areas had greater difficulty attracting and retaining health professionals, especially physicians, limiting the expansion of the ESF.

In 2019, a new capitation model called Brazil Prevent (*Previne Brasil*) was introduced to incentivise municipalities to increase registration and to extend access to primary care and coverage. Based on the new rules, instead of total population of the municipality, intergovernmental transfers are calculated based on the number of people registered to primary care services. The new federal primary care funding policy is based on three pillars of weighted capitation, payment-for-performance and incentives for implementing strategic actions.

State and municipal governments are responsible for most out-patient specialised care and hospital contracting and payment. There are two basic mechanisms to finance in-patient and out-patient

care: (1) the federal government estimates the quantity and type of admission for each state or municipality, according to population, infrastructure and trends, and then transfers the funds to the government tier responsible for provider payments and (2) high complexity procedures are reimbursed directly and not projected (Machado et al., 2015). Other federal financial incentives for state and municipal governments encourage providers to adopt national guidelines, such as the integration of healthcare networks.

The private sector follows different provider reimbursement models, which vary according to health insurance plan and facilities.

2.2 Resilience

2.2.1 Preparedness

SUS's financial preparedness to face a public health emergency is based on past experiences, such as HIV (Greco, 2016), Dengue fever, Zika virus and Chikungunya virus. The MoH Health Surveillance Secretariat document, *Response Plan to Public Health Emergencies* (Ministério da Saúde, Health Surveillance Secretariat, 2014), establishes a “financial leader” in the public health emergency team, responsible for management and provision of all needed financial resources to the health system (Ministério da Saúde, Health Surveillance Secretariat, 2014). Past epidemics have, however, created some “internal” knowledge among municipal, state and federal practitioners, including with regard to finances, to improve allocation during exceptional times (Greco, 2016).

Nevertheless, SUS financing was far from prepared to fight a global pandemic such as COVID-19 (Servo et al., 2020). The experienced SUS financing experts interviewed in this acknowledged they did not know risk projections or “budget triggers” that would detect a public health emergency; nor were they aware of risk management financial plans to create additional funds or reserves to cope with a sanitary crisis.

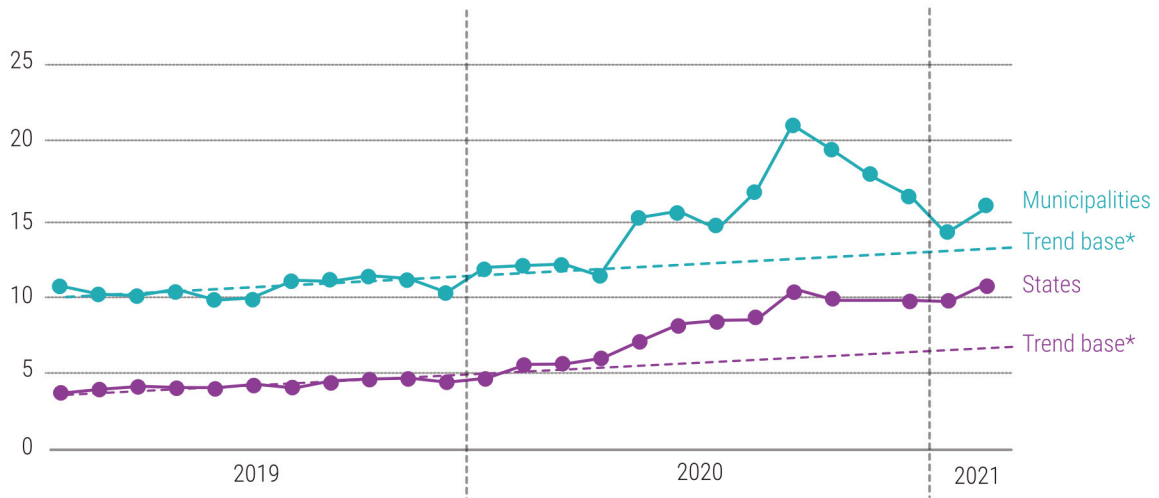
2.2.2 Response

The absence of the federal government, represented by the MoH, in the financial response to the COVID-19 pandemic is common knowledge among researchers and public health practitioners (Faleiros & Pereira, 2021; Servo et al., 2020). Financial support for the health system came from additional funds provided by the Brazilian National Congress through a legislative decree (Brazilian National Congress, 2020), which also enabled the federal government to promulgate law 13,982/2020 which provided financial support to the most vulnerable families. After funding was secured, it was distributed equally among governmental tiers according to geographical specifications, but not taking into consideration that financially vulnerable regions might be in greater need (Bigoni et al., 2022).

Variations in national health fund (*Fundo Nacional de Saúde* (FNS)) transfers to states and municipalities during the first year of the COVID-19 pandemic are presented in Figure 4. Financial resources for the health system increased from 10% to 15 or 20% for municipalities, and from 5% to 10% for states (Faleiros & Pereira, 2021). The same pattern is confirmed by Servo et al., (2020), who added that MoH direct applications evolved from close to 0% in April 2020 to 4.7% in October 2020.

Finally, previous COVID-19 pandemic studies have already pointed out the problem of fiscal austerity discourse, disguised as the search for efficiency in the health system, which supports a reduction in financial investment and a reduction in federal participation in health expenditure (Castro et al., 2019; Massuda et al., 2018; Servo et al., 2020).

Figure 4: Balances of national health fund (FNS) transfers – SUS (R\$ billion)



* Trend lines are from January 2019 to March 2020.

Source: Faleiros and Pereira (2021)

2.2.3 Recovery and learning

Given the lack of coordination from the federal government in the response to COVID-19, (Abrucio et al., 2020), there was no central or organised initiative to create/improve a financial contingency plan for the crisis. Some state and local initiatives shared financial knowledge acquired in the health system and there were some research/think tank actions that contributed methodological knowledge (IEPS, 2022).

However, the continuous defunding and breaching of SUS collaborative management have had a significant impact on the functionality of Brazil's health system and have weakened the country's resilience. Despite an increase in federal funding to states and municipalities, the lack of proper distribution and support for the health system's response to those with higher needs has resulted in poorer outcomes. State and municipal governments did what they could with their own resources, but their efforts had limitations. This led to a sharp decrease in health care procedures and increased already existing health disparities in the country (Bigoni et al., 2022).

The experience of financing the health system response to COVID-19 in Brazil has emphasised the need for increased public funding for the SUS, better coordination between federal, state and local governments, transparency in the allocation of resources, targeted funding for specific programmes and projects and international cooperation. By addressing these key lessons, Brazil can better prepare for future health emergencies and ensure that its health system is equipped to provide high-quality care.

2.3 Recommendations

RECOMMENDATION 2A

Establish a progressive increase in financial resources from 4% to 6% of GDP in 10 years to support SUS sustainability, including consideration of additional taxation on unhealthy products (e.g., tobacco, alcohol, sugar, etc.).

RECOMMENDATION 2B

Redefine criteria for allocating financing and other resources according to population and epidemiological needs, health care infrastructure and expected outcomes in health system regions.

RECOMMENDATION 2C

Expand financing for primary health care to support scaling up community-based family health teams, the diffusion of health promotion and prevention actions and integration with other health care levels within health regions.

RECOMMENDATION 2D

Promote reforms in hospital and specialised care provider contracts and payment from fee-for-service to contracts based on capitation and performance to support integrated, equitable and cost-effective delivery models within health system regions.

RECOMMENDATION 2E I

Improve private insurance reimbursement mechanisms to the SUS when their beneficiaries receive care by the public sector.

RECOMMENDATION 2F

Create a specific SUS reserve fund for use in the event of a public health emergency.

3. DOMAIN 3

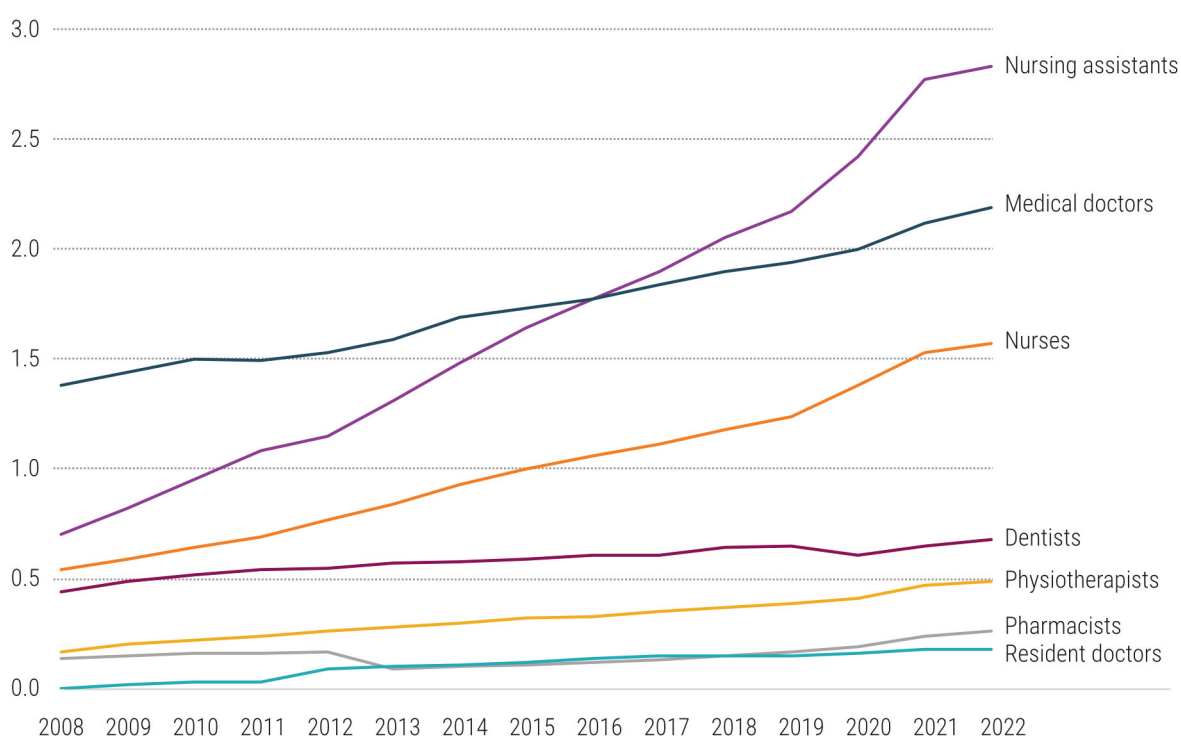
Workforce



3.1 Sustainability

Since SUS implementation, training of health professionals has expanded rapidly, albeit without appropriate human resource planning and regulation. Figure 5 shows the total number of health workforce professionals per 1,000 inhabitants in Brazil. At first glance, the increase in the number of all health professional between 2008 and 2022 is clear. An analysis by category shows that (1) the number of dentists constantly increased until 2019, with some stabilisation in recent years; (2) the number of nurses constantly increase in all years, with a boost in 2020 and 2021; (3) the number of pharmacists remained stable until 2013, when there was a notable decrease, followed by an evolution in the following years; (4) the number of physiotherapists constantly increased in all years, with a boost in 2020 and 2021; (5) the number of resident doctors constantly increased until 2017, stabilised to 2019 and then increased in 2020 and 2021; (6) the number of nursing assistants

Figure 5: Health workforce professionals per 1,000 inhabitants



Source: PROADESS (2022).

constantly increased in all years, with a boost in 2020 and 2021 and (7) the number of medical doctors constantly increased in all years, with a boost in 2020 and 2021.

The increase in the number of health education schools across the country, both in public and private sectors (Machado & Ximenes Neto, 2018), but mostly in the private sector, explain these data (Poz et al., 2022; Scheffer & Dal Poz, 2015). Some studies address a decrease in quality among recently graduated health workforce professionals, including medical doctors (Novato et al., 2022), nurses and nursing assistants (da Silva & Machado, 2020).

Despite health workforce increases in recent years, inequality remains the primary problem in the distribution of the workforce, mostly affecting the most vulnerable regions in Brazil (Massuda et al.,

2018) and creating a market dispute between public and private sectors for the labour force (Campoy et al., 2020). Studies have shown a higher number of health care professionals in the less vulnerable, such as the South and Southeast regions, and lower numbers in the most vulnerable, such as the North and Northeast regions (Paschoalotto et al., 2022; Machado et al., 2022). There has been a shift in the health workforce from the public to the private sector, due to the higher capacity for payment, creating problems in human resources allocation (Bahia & Scheffer, 2018; Campoy et al., 2020). The distribution of medical specialists or generalists follows the same workforce distribution trend, concentrated in the richer South and Southeast regions of the country (Scheffer et al., 2020). Forty percent of medical doctors are not specialists, most work in both the public and private sectors, and only 21.5% work exclusively in the SUS with most located in metropolitan regions, leaving demographic deserts elsewhere (Scheffer et al., 2020).

In the primary care workforce, the Family Health Strategy (FHS), designed in 1994, was adopted in 1998 as a national model to expand health services across the country. Between 1998 and 2020, the number of FHS teams grew from 2,054 to 43,286, reaching an estimated 133.7 million people (63.6% of Brazilians). FHS teams are composed of up to 12 community health workers, one nurse assistant, one nurse and one medical doctor. Each FHS team should cover up to 4,000 people. Based on regional/local needs, FHS teams can have the support of health professional specialists based in the NASF (*Núcleo de Apoio ao Saúde da Família*), such as nutritionists, pharmacists, psychologist, social workers, and others, and medical specialists, including paediatrician, gynaecologist, psychiatrist, and others. In addition, oral teams of one dentist and dental assistant are provided to the population. Following the same community health strategy, the mental health strategy leaves behind the hospital-based approach, with multi-professional teams of psychologists, social workers and therapists assigned to provide care through clinical and psychosocial rehabilitation.

Innovative public policies addressed the SUS workforce fragilities. In 2013, the *Mais Médicos* (More Doctors) programme was implemented to address imbalances in the distribution of primary care doctors. The 'Mais Médicos' was instrumental in increasing the supply of doctors in distant or unattractive areas – reducing healthcare gaps and increasing primary care coverage and delivery of care for many municipalities, especially the smallest and poorest ones (Massuda et al., 2022). Some results achieved by the More Doctors Programme include (1) a reduction of almost 50% in the shortage of medical doctors in the most vulnerable municipalities (Girardi et al., 2016), (2) a negative association between the programme and hospitalisation due to hypertension and cerebrovascular disease (Özçelik et al., 2020) and (3) the allocation of most medical doctors within the programme in vulnerable municipalities (Özçelik et al., 2021).

Another innovative public policy for the SUS workforce is the National Permanent Health Education Policy (PNEPS) (Brasil, 2018) Implemented in 2004, the PNEPS aims to provide a continuous training to improve health professionals capacities through an integrated and decentralised approach (Gonçalves et al., 2019). The results achieved by PNEPS are the creation of a training culture in the SUS, encouraging teamwork organisation, interdisciplinarity and the active participation of professionals in the management and development of health policies. Despite the progress promoted by the PNEPS, the municipal initiatives are not integrated (Rocha et al., 2021), with few opportunities for benchmarking of training experiences among the SUS workforce (Johnson et al., 2013).

Therefore, health workforce sustainability in Brazil has been developed with an increase in the number of professionals, health schools, and innovative strategies (FHS, More Doctors Programme and PNEPS). However, some obstacles remain, including (1) the absence of national plan to better aligning health workers' training, allocation, and provision, (2) quality control and regulation in private health schools, (3) inequality in the distribution of the health workforce between the regions of Brazil and (4) "unequal competition" between the private and public sectors to attract health professionals leaving a gap in the health care of the most vulnerable (ANAHP, 2022; CONASS, 2022; IEPS, 2022).

3.2 Resilience

3.2.1 Preparedness

As a consequence of the lack of national coordination in responding to the COVID-19 pandemic, Brazil's workforce preparedness to Covid-19 relied on existing contingency and emergency plans. In 2011, the Decree 2,952/2011 established the SUS national force to work in the case of national public health emergencies (Ministério da Saúde, 2011). In 2014, the Ministry of Health enhanced the 2011 legal framework by implementing a response plan for public health emergencies. Additionally, Brazil has had prior experiences with epidemics, such as HIV, Dengue fever, and the Chikungunya virus. These previous outbreaks have contributed to the accumulation of knowledge among health professionals regarding crisis response strategies.

3.2.2 Response

The lack of national coordination exacerbated disparities in health workforce response to the COVID-19 pandemic. Regions with higher vulnerability in terms of socioeconomic factors, and limited human resource capacity, were disproportionately affected compared to less vulnerable regions. The latter had the advantage of being able to quickly increase their health workforce to respond to the crisis (Rocha et al., 2021). Moreover, state government responses employed different strategies in varied conditions: (1) in Espírito Santo, there has been an improvement in the capacity of the health workforce inside and outside hospitals since 2019, allowing for a more structured response; (2) São Paulo, the richest state in the country, faced fewer challenges in hiring health professionals to expand the capacity of human resources in health; (3) Amazonas faced a shortage of doctors and nurses, particularly in hospitals, due to limited financial resources. On the other hand, the response in the public sector was characterised by a faster and more substantial increase in the hiring of doctors, nurses and physiotherapists compared to the private sector (Paschoalotto et al., 2022).

SUS frontline workers also suffered and adapted differently during the COVID-19 pandemic. Nurses had greater autonomy to create new roles and changes in response to the crisis, while community health workers were not in demand in primary care during the first moments of the pandemic (Lotta et al., 2021). The health workforce was also pushed to provide telehealth services owing to social distancing measures, thus improving the technological knowledge and skills of health professionals (da Silva et al., 2021).

A study comparing the feelings of medical doctors, nurses and community health workers and their preparedness for the COVID-19 pandemic also revealed differences. A common feature was that all professionals felt insufficiently resourced, experienced mental health issues and were untrained (Lotta, Fernandez, et al., 2021). Mental health issues in the SUS workforce were due to a decrease of income, risk exposure and exposure to more information about contamination and deaths (Duarte et al., 2020). It is common knowledge that the lack of a national strategy to address exposure to risk or care of health workers led to increased physical and mental health issues in Brazil (Lotta, Coelho, et al., 2021; Lotta, Fernandez, et al., 2021).

3.2.3 Recovery and learning

The COVID-19 pandemic was a learning opportunity for the SUS health workforce, even in the absence of a national policy initiative to share this knowledge. Some of the knowledge that health care professionals acquired included (1) the use of telehealth and the increase of technological skills to provide health services delivery (da Silva et al., 2021), (2) a new "skill mix" between health care professionals and (3) new techniques to address an unknown disease with the potential of new pandemics emerging in the future.

The COVID-19 pandemic has highlighted the critical role that health care workers play in responding to public health emergencies and the need to ensure their protection and well-being. In Brazil, health care workers were not adequately protected, leading to a high incidence of infections and death. As such, it is important for health care systems to prioritise the provision of adequate PPE, training in infection prevention and control and other measures to protect health care workers. In addition, health care systems need to invest in human resources to ensure that they have enough staff to effectively respond to emergencies. This can be achieved by improving working conditions, increasing the number of health care workers and investing in education and training.

3.3 Recommendations

RECOMMENDATION 3A

Integrate health and education policies to align technical training, graduation, residencies and postgraduation according to health system needs.

RECOMMENDATION 3B

Establish career plans in priority areas of the SUS administration, surveillance and assistance.

RECOMMENDATION 3C

Improve mechanisms for the federal provision of medical professionals in the most difficult areas to supply within health regions.

RECOMMENDATION 3D

Improve the capacity for planning, managing, monitoring and evaluation of the SUS workforce.

RECOMMENDATION 3E

Establish a health care workforce plan for health crises and natural disasters, including the provision of psychological support for health workers.

RECOMMENDATION 3F

Improve digital health capability across the health workforce and expand digital technology in care settings.

4. DOMAIN 4
**Medicines
and
technology**



4.1 Sustainability

4.1.1 Technology adoption

SUS provides free health care services at the point of care and free access to some medicines, procedures and technologies. Regulation of medicines and health products is a federal responsibility, but responsibility for pharmaceutical assistance policy is shared between the government tiers and organised by component specification (basic, strategic and specialised). The component specification list can be found in the *Relação Nacional de Medicamentos* (RENAME) (RENAME, 2022).

In recent years, progress has been made in improving access to innovative therapies and vaccines. For instance, between 2012 and 2018, SUS introduced a range of new medicines and technologies to treat cancer, including eleven drugs, four procedures, one vaccine, six therapeutic protocols and three examinations (Observatório de Oncologia, 2018). 2017 saw the introduction of novel direct-acting antiviral drugs (DAAs) to treat hepatitis C, covering patients in need (Fonseca et al., NEJM). However, the health system faces several barriers that make it difficult to ensure timely access to these treatments for all patients, including socioeconomic disparities, limited health care resources and complex regulatory processes. In addition, Brazil's large geographic size and diverse population create challenges of distribution of and access to new treatments and vaccines.

Which medicines and technologies are available through SUS is based on a list of approved drugs and procedures. This list is periodically updated and includes medicines and technologies that are deemed essential and cost-effective.

To be registered for use in Brazil, analysis of clinical evidence of efficacy and safety is carried out by the National Health Surveillance Agency (*Agência Nacional de Vigilância Sanitária* (ANVISA), an independent regulatory agency affiliated to the MoH. In the case of medicines, this is followed by pricing determination by the Medicines Market Regulation Chamber (CMED). The economic benefits are assessed by the National Committee for Health Technology Incorporation (*Comissão Nacional de Incorporação de Tecnologias no SUS* (CONITEC)). The final stage are the negotiations to purchase and make the product available.

ANVISA is responsible for regulating the production, marketing and use of those products and services that are subject to health regulation (e.g., medicines, cosmetics, food). This includes related environments, processes, ingredients and technologies, as well as control at ports, airports and borders.

CMED, linked to ANVISA, is required to establish a price ceiling for marketing each medicine in both public and private markets. This is based on evidence of efficacy, comparison of treatment costs and consideration of international prices. It is important to note that while medicines are available for use in the private sector after determination of a price ceiling, they are not available for use in the public sector (SUS) until after incorporation (standard procedure) or the litigation process in the judiciary system (non-standard procedure).

CONITEC advises the MoH on the incorporation of medicines or technologies in SUS list. Although inspired by the British National Institute for Health and Care Excellence (NICE), it does not have the same administrative independence. Its activities include budget impact analyses and health technology assessments (Brasil, 2015). The health technology assessment (*Avaliação de Tecnologia em Saúde* (ATS)) process includes (1) studies of efficacy, effectiveness and safety and (2) cost evaluations, including health economics, cost-benefits, cost-effectiveness, cost-utility and cost-minimisation. Once a medicine or technology is incorporated into SUS's pharmaceutical programme, it becomes eligible for delivery by SUS.

Price negotiations between the Brazilian MoH and the supplier are the last step before medicines reach patients. These depend on the volume of purchases, discounts and other factors.

This regulatory design attempts to rationalise medicine and health product acquisition in Brazil, defining criteria and minimum standards for products, and more transparent parameters for price setting.

The official deadlines for the time taken for each phase of the process are shown in Table 4 for medicines and in Table 5 for health products

Table 4. Official deadlines for medicines appraisal

Phase	Organisation	Medicine type	Deadline
Registration – analyses of efficacy and safety evidence	ANVISA	Priority	120 days
		Non-priority	365 days
Determination of price ceiling – based on efficacy, and comparisons of treatment costs and international prices	CMED	Categories III, IV, V and VI	60 days
		Categories I, II, non-new biologicals and non-typical cases	90 days
Incorporation – formulation of guidelines for use and availability in SUS	CONITEC		270 days (180 days with possible extension for another 90 days)

Source: Elaborated by the authors based on Anvisa (2017), CMED (2004) and Brasil (2011).

Table 5. Official deadlines for health products appraisal

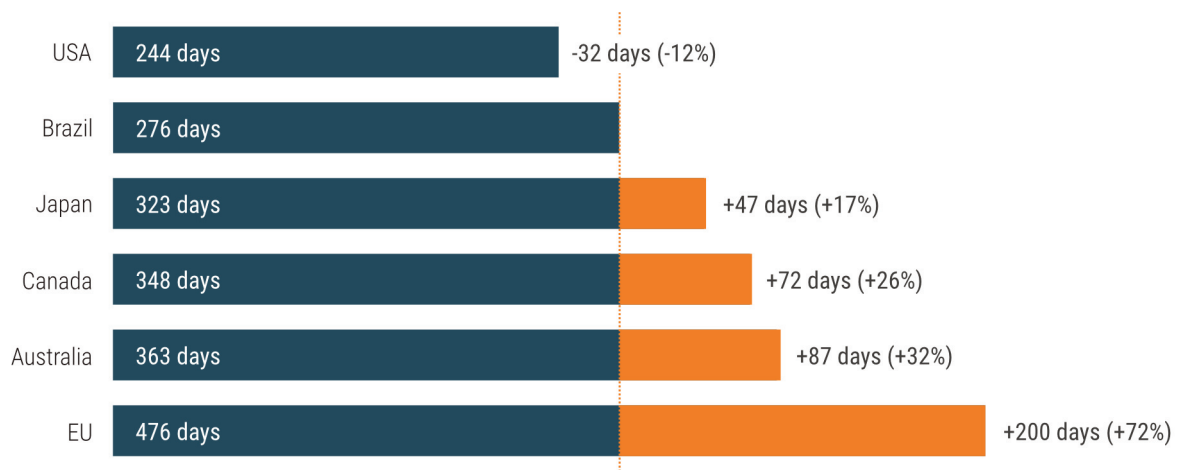
Phase	Organisation	Medicine type	Deadline
Health Surveillance Register analysis	ANVISA		90 days
Health Technology Assessment (for inclusion in SUS)	CONITEC		270 days (180 days with possible extension for another 90 days)

Source: Elaborated by the authors based on Anvisa (2017), CMED (2004) and Brasil (2011).

The actual timelines are different from the official ones. In 2019, ANVISA took an average of 276 days to approve the registration of new active substances and 188 days for generics and branded generics, while CONITEC took an average of 243 days for oncological and 266 days for other high-cost medicine (Capucho et al., 2022; BBC News, 2019).

The average times taken for regulatory approval do not differ much from the main international reference countries and markets – while longer than in the US, Brazil is quicker than Japan, Canada, Australia and the European Union (Figure 6). However, compared to other Latin American countries, Brazil has the second longest time for oncology treatments, taking on average over 1,000 days for these to receive regulatory approval (IQVIA, 2022).

Figure 6: International comparison of average time for new medicine appraisal (2017/2018)

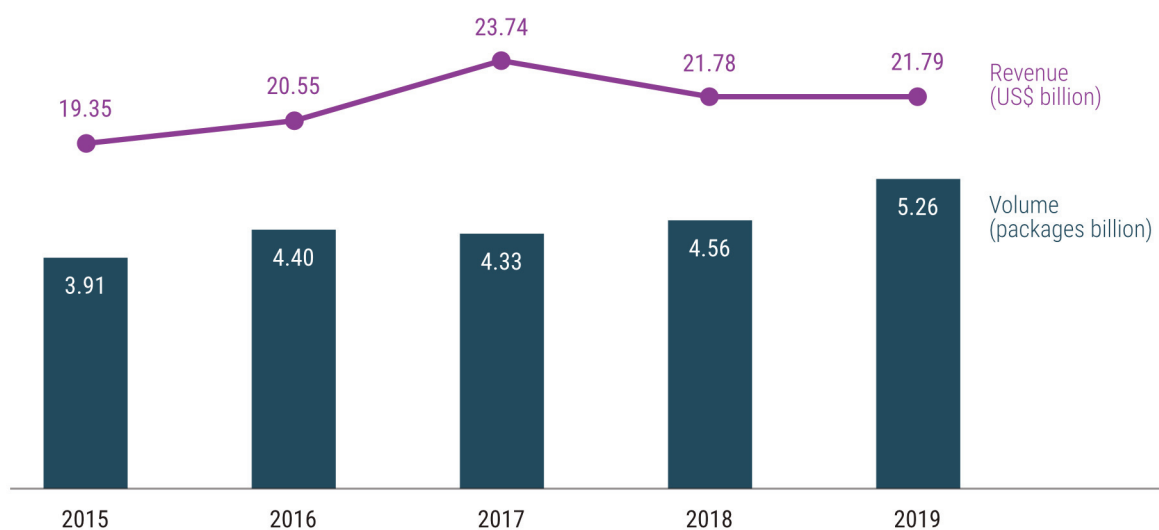


Source: Adapted from BBC News (2019).

During the pandemic ANVISA operated with the smallest workforce in 20 years (AMB, 2022). To tackle the lack of human resources, for some time ANVISA has been investigating measures to optimise analysis. These include regulatory reliance, which provides for the use of analysis carried out by an Equivalent Foreign Regulatory Authority (AREE). With this approach, ANVISA's technicians will be able to make use of studies carried out and approved by partner international regulatory agencies, such as the United States (FDA), European Union (EMA), United Kingdom (MHRA) and Health Canada, in their analyses (JOTA, 2022). The adoption of this mechanism could increase agility in analysis of registration and post-registration requests for drugs, biological products and active substances, without compromising safety, efficacy and quality.

The medicines market in Brazil is well established and resilient and, due to the size of population, is one of the largest markets in the world. It has grown at a high rate in recent years and this is likely to continue (IQVIA, 2022). According to official CMED data, in 2019, the medicines industry generated revenue of US\$21.7bn with a volume of almost 5.3 billion packages (Figure 7). Revenue has been impacted in recent years by the effect of the value of the US dollar on the exchange rate

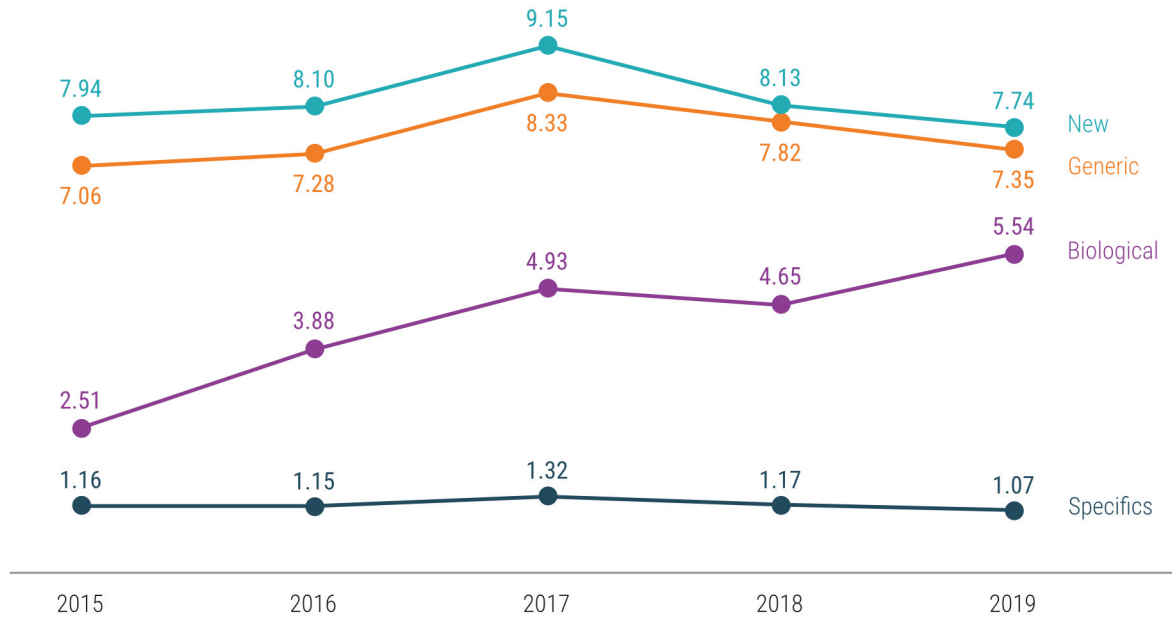
Figure 7: Medicine revenue and volume (US\$ billion)



Source: Elaborated by the authors based on CMED (2020).

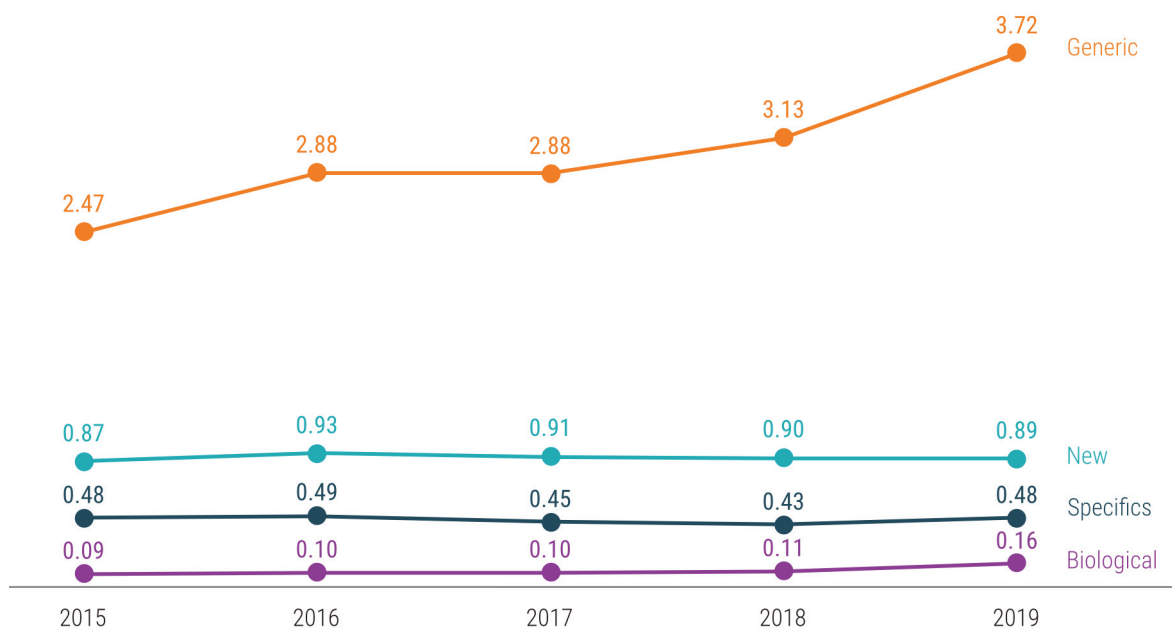
Drugs account for approximately 18.5% of health expenditure in Brazil (IBGE, 2019). The generics market (including similar drugs) has the highest market share at one-third of revenue and 70% of volume (Figures 8 and 9).

Figure 8: Pharmaceutical industry evolution by product type – revenue (US\$ billion)



Note: Specifics refer to products with no product interchangeability.
 Source: Elaborated by the authors based on CMED (2020).

Figure 9: Pharmaceutical industry evolution by product type – volume (packages billion)



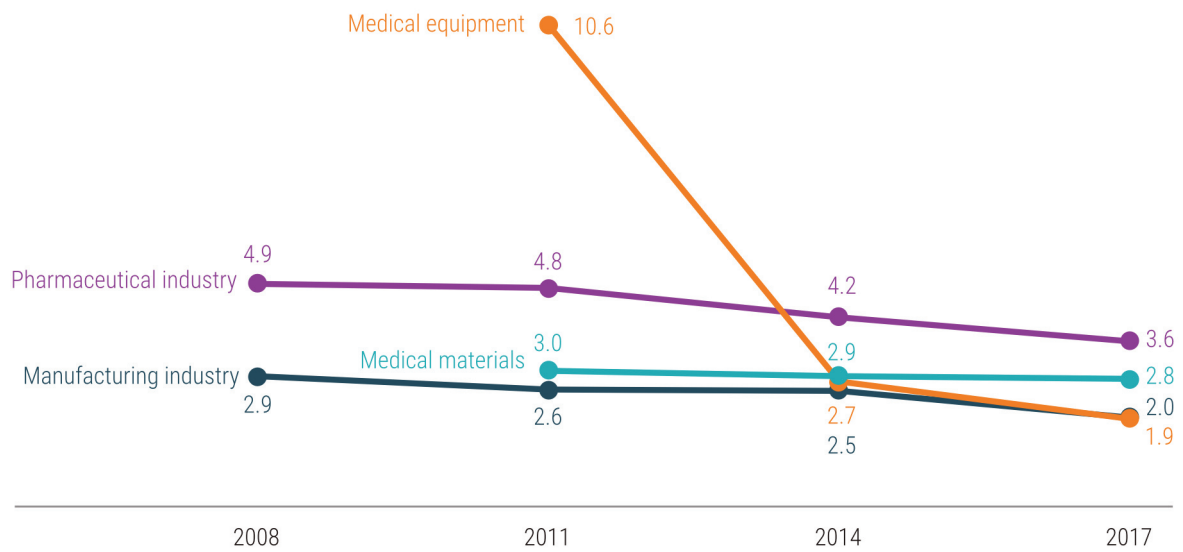
Note: Specifics refer to products with no product interchangeability.
 Source: Elaborated by the authors based on CMED (2020).

4.1.2. Research and development

Since 2008, Brazil has experienced a decrease in its main innovation indicators and this is also the case in the health sector, with a steady reduction in innovation activities expenditures as a percentage of net income between 2008 and 2017 in both manufacturing and health sectors, as shown in Figure 10.

R&D expenditure showed more resilience over the same period. Manufacturing industry showing little change, while the pharmaceutical industry saw continued year-on-year growth (Figure 11). R&D expenditure accounts for two-thirds of all innovation investments in the pharmaceutical industry.

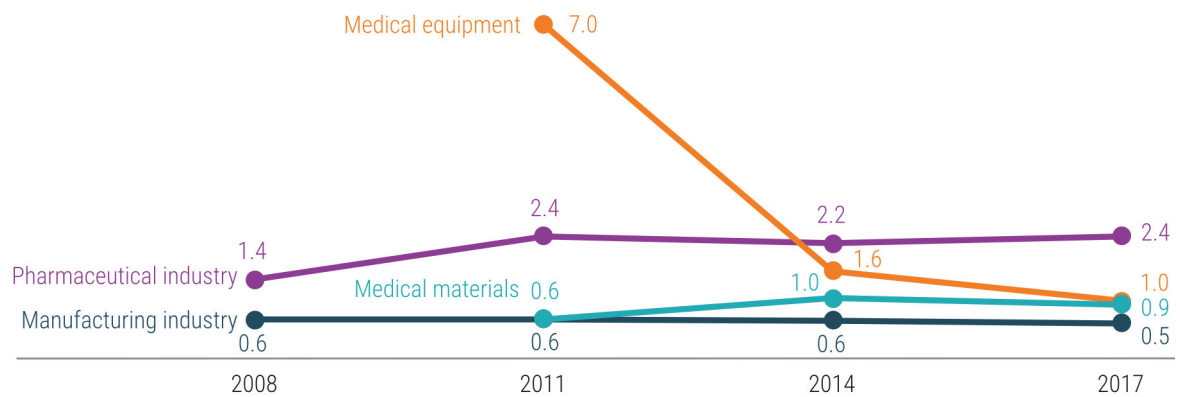
Figure 10: Innovation activities expenditure as percentage of net income



Note: Innovation activities include all developmental, financial and commercial activities that are intended to result in an innovation (OECD/Eurostat, 2018).

Source: Elaborated by the authors based on PINTEC (2008, 2011, 2014, 2017).

Figure 11: R&D expenditure as percentage of net income



Source: Elaborated by the authors based on PINTEC (2008, 2011, 2014, 2017).

Government incentives for R&D and innovation in industries and process technologies in Brazil are financed through the Brazilian Development Bank (*Banco Nacional de Desenvolvimento Econômico e Social* (BNDES)), using different types of funds, including the Development Programme to Support the Pharmaceutical Productive Chain (*Programa de Apoio ao Desenvolvimento da Cadeia Produtiva Farmacêutica* (PROFARMA)) and the Technological Development Fund (*Fundo de Desenvolvimento Tecnológico* (FUNTEC)). Both initiatives aim to foster the development of Health Industrial-Economic Complex (*Complexo Econômico-Industrial da Saúde* (CEIS) in Brazil. However, the lack of public investments and excessive regulation (red tape) and the lack of resources and the National Institute of Intellectual Property's extensive backlog hinder the possibility of improving and innovating barriers to advance R&D agenda in the country.

4.1.3. Digital health

A Digital Health Strategy for Brazil – 2020 to 2028 (*Estratégia de Saúde Digital para o Brasil – 2020 a 2028*) is a document that presents seven digital health priorities for the Brazilian health system up to 2028: (1) governance and leadership; (2) informatisation of the three health care levels; (3) support health care improvement; (4) set users as protagonists; (5) training and formation of human resources for digital health (HRDH); (6) interconnectivity environment and (7) innovative ecosystem (Ministério da Saúde, Secretaria-Executiva, Departamento de Informática do SUS, 2020).

Since the expansion and evolution of the SUS, informatic and decision-making systems have spread across Brazilian territories, but not in an integrated fashion (Coelho Neto et al., 2021). Until 2018, Brazil had 54 national health information systems, divided into seven decentralised centres and with autonomy from the Brazilian Health Informatics Department (DATASUS) (Coelho Neto & Chioro, 2021). The country created one of the world's largest centralised health databases with the Brazilian Health Informatics Department (DATASUS) which includes 5570 municipalities, 485 health regions, 26 states, one federal district, and the national tier, with indicators relating to health care, morbidity and epidemiology, health infrastructure and networks, vital statistics, sociodemographics and finances. Despite advances in the first 30 years of the SUS, some challenges to the health informatic and decision-making systems in Brazil remain, including (1) improving the connection between levels of care, government tiers and private and public systems and (2) boosting business intelligence tools to support decision-making at different governance levels (ANAHP, Associação Nacional de Hospitais Privados, 2022; IEPS, 2022).

Despite some federal initiatives, such as a national telehealth programme (Prado et al., 2013), development is non-integrated and fragmented, influenced by the socioeconomic conditions of each state, region or municipality. Before the COVID-19 pandemic, there were some initiatives in the most remote areas, mainly in the Northeast region, to facilitate access to health care services, such as basic care (Oliviera et al., 2015). Telehealth has been successful in permanently educating the SUS workforce, sharing knowledge and initiatives and improving health consultation between government tiers and departments (Dolny et al., 2019).

There still a long road ahead in this field. Despite the spread of democratic spaces in the municipalities, such as municipal health councils, access and understanding of the health indicators remain problems for health literacy in Brazil (Krüger & Serapioni, 2020).

4.2 Resilience

4.2.1 Supply security

Brazil has a diversified productive system in the area health care. In the pharmaceutical industry (1) large multinationals provide the national market with innovative products, (2) large private national industries provide the national market with generic and biosimilar products and (3) public laboratories are the main suppliers of vaccines and biological and synthetic products. In the area of

health products, the national market supply of equipment, materials and systems, used in prevention, diagnosis, treatment, rehabilitation or contraception, is a combined effort between small- and medium-sized private national companies and medium and large multinationals. However, considerable commercial dependence causes a continuous increase in the trade balance deficit. This dependence is higher in the pharmaceutical inputs sector. According to Conta Satélite health data (IBGE, 2019), in 2019, Brazil imported approximately 88.1% of the pharma chemical products it consumed. This includes 26.8% of ready for market medicines, 23.7% of health equipment and 31.2% of medical and dental materials.

This dependence increased during the COVID-19 pandemic. There were disruptions to global production chains due to an increase in demand and shortages to medicines and health products; this also occurred in the Brazilian market. During the COVID-19 pandemic, product shortages were critical. The government responded with (1) national directives to treat and prevent COVID-19, (2) COVID-19 clinical protocols, (3) a national plan to operationalise vaccination, (4) presidential decrees determining priority technologies, (5) MoH ordinances and (6) ANVISA resolutions. Resolutions from CMED increased pricing regulation flexibility for products with shortage risks, while the Brazilian Foreign Trade Chamber (*Câmara de Comércio Exterior (Camex)*) and Administration Executive Committee (*Comitê Executivo de Gestão (Gecex)*) documented a temporary reduction of tax on imports and temporary laws were enacted to prohibit the export of medical, hospital and essential hygiene products.

Despite these measures, the challenge of product shortages persisted in Brazil until 2022. Municipalities, states and the federal government had difficulties acquiring a range of products and, at the national level, there is no practice of regulatory stockpiling to guarantee the supply of these products.

4.2.2 Vaccine implementation

Brazil has a well-known national vaccination plan (National immunisation plan, *Programa Nacional de Imunizações (PNI)*), with 45 different immunobiological immunisations available to the Brazilian population through annual and regular vaccination campaigns. The system is supplied by public laboratories that produce almost 75% of all vaccinations consumed in Brazil. The two largest public laboratories are the Oswaldo Cruz Foundation and the Butantan Institute. The remaining 25% of vaccines are imported.

These two laboratories played an important role in the production and supply of the COVID-19 vaccine in Brazil, through partnerships with foreign companies. Both public laboratories had experience with technology transfer to supply the SUS. The Butantan Institute engaged in a partnership with a Chinese private laboratory, Sinovac, and the Oswaldo Cruz Foundation had a technology transfer agreement with AstraZeneca for producing COVID-19 vaccines in Brazil. The combination of the local production of COVID-19 vaccines and Brazil's history of annually promoting mass vaccination campaigns resulted in high COVID-19 vaccination uptake, despite political controversies regarding the Brazilian response to the pandemic. By November 2022, 84% of individuals had received at least one course of vaccination, 79% had received both and 49% had opted for a booster.

4.2.3 Digital health

The COVID-19 pandemic has affected the digital health in the Brazilian health system. The federal government was inactive during important periods of the pandemic, impairing communication and transparency regarding the actual situation (Villela & Gomes, 2022). To overcome this situation, an initiative by CONASS in partnership with a national press consortium sought to monitor and communicate the COVID-19 situation across the states in Brazil, showing an alignment to solve the communication problem (Souto & Silva, 2021).

The COVID-19 pandemic boosted the advance of health informatics and decision-making systems. Immediately after the outbreak of the COVID-19 pandemic, some states and municipalities designed business intelligence panels to support operational control centres and web platforms were implemented to improve communication with the population and support government decision-making processes. This technological evolution also generated a digital closeness between society and the SUS, enabling the improvement in reading and understanding epidemiological, morbidity and structural health indicators.

There was a huge expansion in Brazil's telehealth infrastructure to maintain some essential services (Silva et al., 2021). Initiatives addressing telehealth services spanned different areas, such as (1) basic attention through community health agents (Maciel et al., 2020), (2) mental health through digital consultation with psychologists (Depolli et al., 2021) and (3) health education and updating (Massucato et al., 2021). This movement occurred in an unequal way and despite a lack of federal coordination.

It is necessary to share these successful digital health initiatives and adapt the next strategic steps to absorb this new knowledge, to develop an equal digital health environment across all Brazilian municipalities, regions and states, and to avoid the generation of further inequalities in the SUS.

4.2.4 Recovery and learning

The COVID-19 pandemic presented significant challenges to Brazil's pharmaceutical assistance programme, including the need to rapidly scale up the use of new medicines and technologies to respond to the crisis. While there have been some setbacks and challenges, there have also been important opportunities for recovery and learning in this area. The COVID-19 pandemic has led to the widespread adoption of telemedicine in Brazil, to provide care while minimising the risk of infection transmission. This has created an opportunity for recovery and learning, as health care providers have gained experience with this technology and identified its potential benefits and limitations.

The pandemic also highlighted the importance of supply chain management in ensuring the availability of vaccines, essential medicines and technologies. This has created an opportunity for recovery and learning, as health care providers have identified areas for improvement and have developed strategies to strengthen the supply chain. Meanwhile, the pandemic has led to an increased focus on research and development in Brazil, including the development of new medicines and technologies to address the crisis.

Regarding vaccination, Brazil had the capacity to locally produce COVID-19 vaccines. Fiocruz concluded the COVID-19 vaccine transfer in 10 months, as it was able to supply the SUS during the most critical time of the pandemic. In this sense, it was an achievement and a lesson learned in how to absorb an innovative health technology in a short period of time, and with possible improvements for new variants or new health products in the long-term (Fonseca et al., 2023). In addition, ANVISA updated its clinical trials protocols quickly and created an "emergency use" procedure to accelerate the entrance of vaccines into the market (Fonseca et al., 2023).

4.3 Recommendations

RECOMMENDATION 4A

Strengthen health technology and productive development policies to ensure universal access and increase local production competitiveness, reducing the external dependence and the high trade balance deficit in high-cost products.

RECOMMENDATION 4B

Establish institutional and tributary reforms, and regulatory process improvements, such as reduction of red tape and refinement of Intellectual Property scheme, to create a competitive advantage with external markets.

RECOMMENDATION 4C

Foster local research and development through increased investment in public and private sectors of the health economic and industrial complex in the country.

RECOMMENDATION 4D

Prioritise the digital transformation of the health system to improve health system management, coordination and integration of levels of care.

RECOMMENDATION 4E

Integrate health informational systems across different levels of care (primary, secondary and tertiary), government tiers (municipal, state and federal) and public and private sectors (SUS, supplementary and private).

RECOMMENDATION 4F

Align the expansion of telehealth access with primary care expansion, to create a well-connected network.

5. DOMAIN 5
**Service
delivery**



5.1 Sustainability

The SUS has shifted the model of care in Brazil through rapid expansion of a comprehensive approach to primary care, followed by the development of health networks for mental health services, emergency care and specialised out-patient services. In addition, it offers comprehensive hospital services, including complex treatments. However, hospitals in the SUS face structural and organisational challenges, such as lack of autonomy and accountability, inefficient financing and payment systems, inefficient use of resources, variable quality of care, lack of integration within health networks and suboptimal use of managerial information (Castro et al., 2019). In addition, access to specialist care remains a major bottleneck in the SUS, resulting in unmet demand, queues, long waiting times and delays in diagnoses. In addition, supplier induced demand, overuse and overprescription of diagnosis methods are also current challenges (Castro et al., 2019). These problems increased due to the COVID-19 impact, threatening the sustainability of the SUS.

5.1.1 Efficiency and quality measures

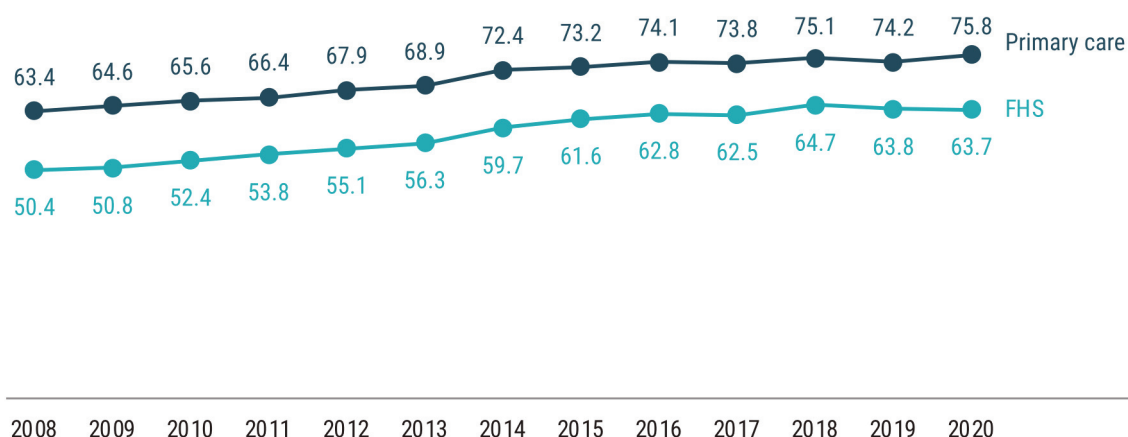
The MoH is part of the WHO Patient Safety Protocol, and initiatives for hospital accreditation began in Brazil in 2000. In 2022, of almost 6,500 existing hospitals, approximately 8% were accredited by agencies. The Brazilian Sanitary Surveillance Agency (ANVISA) is responsible for defining quality protocols for health services and a National Patient Safety Programme was launched in 2013. However, the implementation and control of those measures vary widely across the country. All other initiatives are voluntary. Private association initiatives to improve care quality in Brazil have low participation and representativity. In general, outcomes and/or quality of care have no influence on payments, either by public or by private organisations. In addition, there are no official incentives for health care improvement.

5.1.2 Role of primary health care

Primary care is the most important entry point to the SUS. The Family Health Strategy (FHS), the national policy for the expansion of primary care, comprises multi-professional teams to provide acute care services, health promotion, prevention, chronic disease management and maternal and child services for a community in a geographical area. This became the core of primary care in the SUS, with major expansion since 1998 when a federal financing mechanism for primary care was established. Evidence demonstrates that the expansion of the FHS improved population health, with reductions in morbidity and mortality levels. FHS and primary care expansion have impacted (1) a reduction in racial inequalities in mortality (Hone et al., 2017), (2) a reduction in general mortality and some diseases, such as hypertension, diabetes, cerebrovascular disease, asthma and others (Diaz et al., 2022) and (3) a positive association with life expectancy (Rasella et al., 2013).

However, disparities in FHS coverage remain across income and geographic groups. As municipalities assumed regular payments for primary care services, without adequate support from state governments, imbalances in resource allocation were exacerbated, especially in the distribution of medical doctors, limiting further increases in primary care coverage and quality. In addition, despite its importance, primary care financing has decreased in recent years (Vieira et al., 2022). The evolution of primary care and FHS coverage is presented in Figure 12. To ensure equitable access to healthcare services and further expand primary care coverage, it is crucial to address these imbalances and establish a more coordinated approach between municipalities, states, and federal governments in resource allocation (Massuda et al., 2022).

Figure 12. Primary care coverage (% population)



Source: E-Gestor (2022).

5.1.3 Coordination and new models of care

Other changes in health care delivery in the SUS include the implementation of specialised reference centres. As part of the psychiatric reform, there have been pioneering organisational innovations in health policies for mental health care with the design of community-based Centres for Psychosocial Support (*Centro de Atenção Psicossocial (CAPS)*). For Sexually Transmitted Diseases and HIV-AIDS, the SUS established an innovative model of Reference Centres, composed of multidisciplinary and multi-professional teams, combining counselling and rapid testing, provision of antiretroviral treatment (ART), prevention strategies, continuous care and long-term follow-up, integration with other medical specialties, aiming to address not only the biomedical aspects but also the psychosocial needs of patients. In emergency care, a network of services has been established aiming to integrate ambulance services (*Serviço de Atendimento Móvel de Urgência (SAMU)*), centres to coordinate emergency response with hospitals (by monitoring occupancy levels in hospitals) and pre-hospital emergency services (*Unidade de Pronto Atendimento (UPA)*).

Despite the significant expansion of healthcare services in Brazil through the implementation of SUS, access to specialist and hospital care in the public sector continues to be a significant challenge. This leads to unmet need, long waiting times, queues, and delays in diagnoses (Castro et al, 2019). The issue is particularly pronounced for populations living in remote and low-income regions, exacerbating health disparities. The COVID-19 pandemic further exposed the unequal distribution of specialised services and hospital infrastructure, characterised by shortages in equipment, specialised beds, and qualified healthcare professionals (Rache et al., 2020).

In addition, there has been a lack of effective and sustainable strategies to improve coordination among different levels of care. Ministerial policies implemented since 2011 aimed to integrate healthcare services through health networks, such as mental health, emergency, maternal health, disabilities, and chronic diseases. However, insufficient financial incentives and a regional managerial structure have hindered the efforts to overcome fragmentation (Massuda et al, 2022). Ineffective coordination leaves users feeling lost when navigating the healthcare system after accessing specialised care. While the presence of social workers in some health facilities helps to address this issue, its impact is limited.

The constraints on accessing specialist care within the SUS have resulted in the growth of a private market for outpatient specialist and hospital care, which are predominantly concentrated in

wealthier regions of the country. However, the existence of a private health sector, in parallel to the public, adds further complexity to coordinate the healthcare system. For conditions that require high-cost treatment, such as cancer and renal dialysis, patients initially diagnosed in private facilities often need to seek care within the SUS. Furthermore, the lack of integration between different electronic record systems in the public and private sectors also leads to duplication of services and increased costs. This reality imposes challenges to better coordinate the public and private sectors in the Brazilian health system.

5.1.4 Distribution and access to services

The evolution of health care services in Brazil is presented in the following three tables. Table 6 shows an increase in pre-natal care consultations until 2015, achieving a rate of 130.23 per 1,000 population. Ambulatory out-patient (SIA) and hospital in-patient (SIH) care also show an increase until 2015, with SIA reaching 20,228.82 procedures per 1,000 population. However, by 2019, SIA numbers had decreased by over 11%, to 17,897.56. A different trend is seen in SIH procedures, where procedures remained relatively stable, varying between 56.20 and 60.16 per 1,000 population, until 2020 and 2021 when the system recorded its lowest values since its implementation in 2008.

Table 6: Total number of procedures per 1,000 population

Years	Pre-natal care consultations	Ambulatory out-patient (SIA) procedures	Hospital in-patient (SIH) procedures
2008	94.84	15257.31	58.15
2009	104.15	16822.59	59.65
2010	102.22	17259.73	60.16
2011	99.91	18200.03	59.22
2012	104.71	18578.50	57.69
2013	127.83	18989.19	57.60
2014	138.49	20268.19	57.57
2015	130.23	20228.82	57.20
2016	89.39	19429.50	56.19
2017	89.45	19237.54	56.46
2018	50.43	17544.98	57.56
2019	29.61	17897.46	58.80
2020	25.43	14895.83	50.47
2021	21.71	16370.65	54.50

Source: Elaborated by the authors based on SIH and SIA (2022).

Table 7 shows an increase in elective ambulatory procedures over the years; an increase in urgent ambulatory procedures of over 200% after 2016; a steady decrease in elective hospital procedures until 2016 followed by an increase until 2019; and an overall reduction in urgent hospital procedures.

Table 8 presents data on ambulatory and hospital chemotherapies and hospital haemodialysis. In all procedures, there has been a constant increase until 2021.

Table 7: Total number of procedures by urgency per 1,000 population

Years	Ambulatory out-patient (SIA) procedures		Hospital in-patient (SIH) procedures	
	Elective	Urgent	Elective	Urgent
2008	2,705.31	80.11	14.51	47.99
2009	3,062.68	71.97	11.76	46.70
2010	2,900.98	60.36	12.17	47.09
2011	3,210.56	49.12	11.96	46.12
2012	4,249.84	66.09	11.28	45.41
2013	4,579.01	50.43	11.50	45.11
2014	5,030.25	62.43	11.80	44.99
2015	5,151.49	73.35	11.41	44.56
2016	5,389.54	86.48	10.98	44.15
2017	5,931.37	133.42	11.22	44.66
2018	6,214.49	202.95	12.08	44.90
2019	6,453.24	273.14	12.56	45.59
2020	6,518.23	262.17	7.96	41.83
2021	7,083.07	356.33	8.83	45.40

Source: Elaborated by the authors based on SIH and SIA (2022).

Table 8: Total number of procedures by procedure group per 1,000 population

Years	Ambulatory out-patient (SIA)	Hospital in-patient (SIH)	Hospital in-patient (SIH)
	chemotherapy	chemotherapy	haemodialysis
2008	3.37	0.20	52.47
2009	3.70	0.21	54.71
2010	3.96	0.23	56.74
2011	4.16	0.27	58.85
2012	4.45	0.28	61.14
2013	4.78	0.30	62.82
2014	5.13	0.31	64.97
2015	5.23	0.32	66.51
2016	5.35	0.32	67.69
2017	5.68	0.35	69.00
2018	5.96	0.37	71.39
2019	6.25	0.38	74.16
2020	6.47	0.38	75.86
2021	6.82	0.40	75.12

Source: Elaborated by the authors based on SIH and SIA (2022).

5.1.5 Chronic disease prevention

The health system in Brazil is facing an increasing burden of chronic diseases, with cardiovascular diseases, complications of obesity, and type 2 diabetes becoming major causes of mortality. Strategies to raise awareness of the risk of hypertension and diabetes is a target to health care providers. Screening for hypertension and type 2 diabetes are incorporated into the daily practices of primary health care. However, only 65% of patients with hypertension were aware of their condition (Macinko et al., 2018). In addition, health promotion strategies also have had to improve. The healthcare community has acknowledged that industrialisation has resulted in the increased availability of calorie-dense foods on Brazilian family tables, often lacking essential nutrients. In response, there has been a movement to revive food culture and promote healthier dietary habits. The Dietary Guidelines for the Brazilian Population have been developed as one of the most comprehensive sets of dietary guidelines worldwide. These guidelines serve as a valuable resource to educate and guide individuals towards making healthier food choices.

Following cardiovascular disease, cancer is the second biggest killer in Brazil. In 10% of the Brazilian municipalities, cancer is the main cause of death (Observatório de Oncologia, 2022). Cancer mortality showed great variation among residents of capitals and the interior of the country's major regions. Clear decrease in mortality was seen for the main types in the Southeast and South regions. The North and Northeast regions have patterns compatible with cancers associated with poverty, while the large increase of the cancers related to sedentary lifestyle stand out (Silva, et al., 2020). Brazil has successfully implemented campaigns to reduce smoking rates through comprehensive campaigns, involving a wide range of media, from pamphlets available at primary health care units, to warning labels on cigar boxes and messaging in soap operas. Similar strategies were used for other conditions, using different media formats to provide information regarding mammograms, skin cancer and prostate cancer.

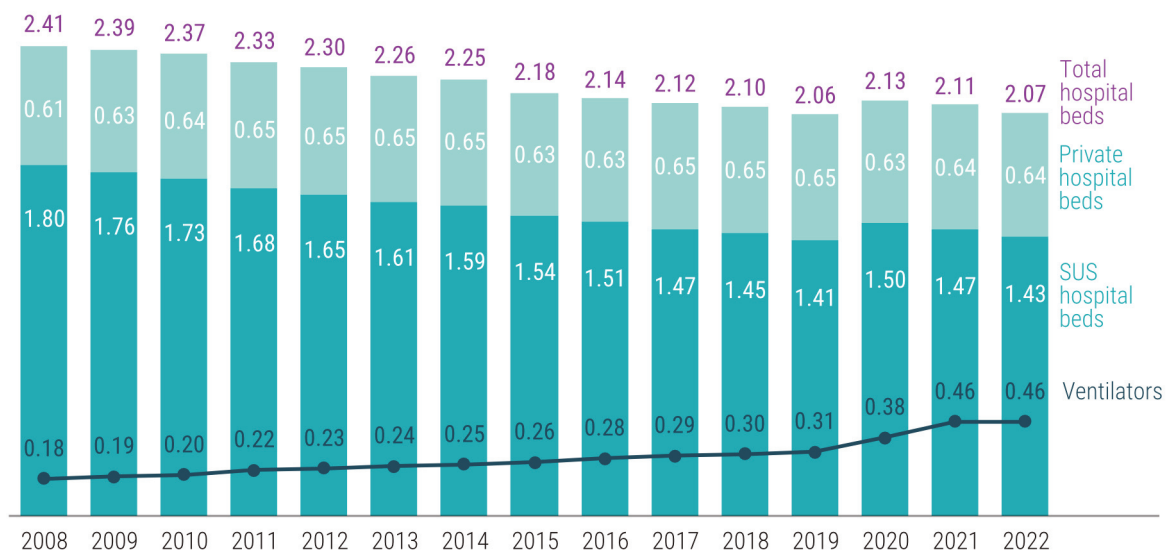
A recent study proposes recommendations to improve efficiency, equity, and effectiveness of cancer care in Brazil (ICCI-LA, 2021). Among the recommendations are: (a) improving coordination of cancer care and establishing a national registry to reduce fragmentation and enhance data collection, (b) creating an innovation hub, restructuring service delivery for consistent and high-quality care, and implementing digital care pathways, (c) strengthening prevention efforts, enhancing healthcare provider training, and (d) restructuring payment models to incentivise improved outcomes.

5.2 Resilience

5.2.1 Services in crisis

One of the main aspects of health system resilience is the ability to sustain resource utilisation even after a shock. This capacity usually relies on historical efforts to build a system where resources can be relocated and increased with flexibility through the use of administrative and financial mechanisms. In the case of Brazil, from 2008 to 2015, the country increased hospital beds in both the public and private sectors. However, from 2015 onwards, the number of private hospital beds remained more or less static while the number of hospital beds available to the SUS diminished. However, the number of pieces of equipment, such as ventilators, increased steadily over the years (Figure 13).

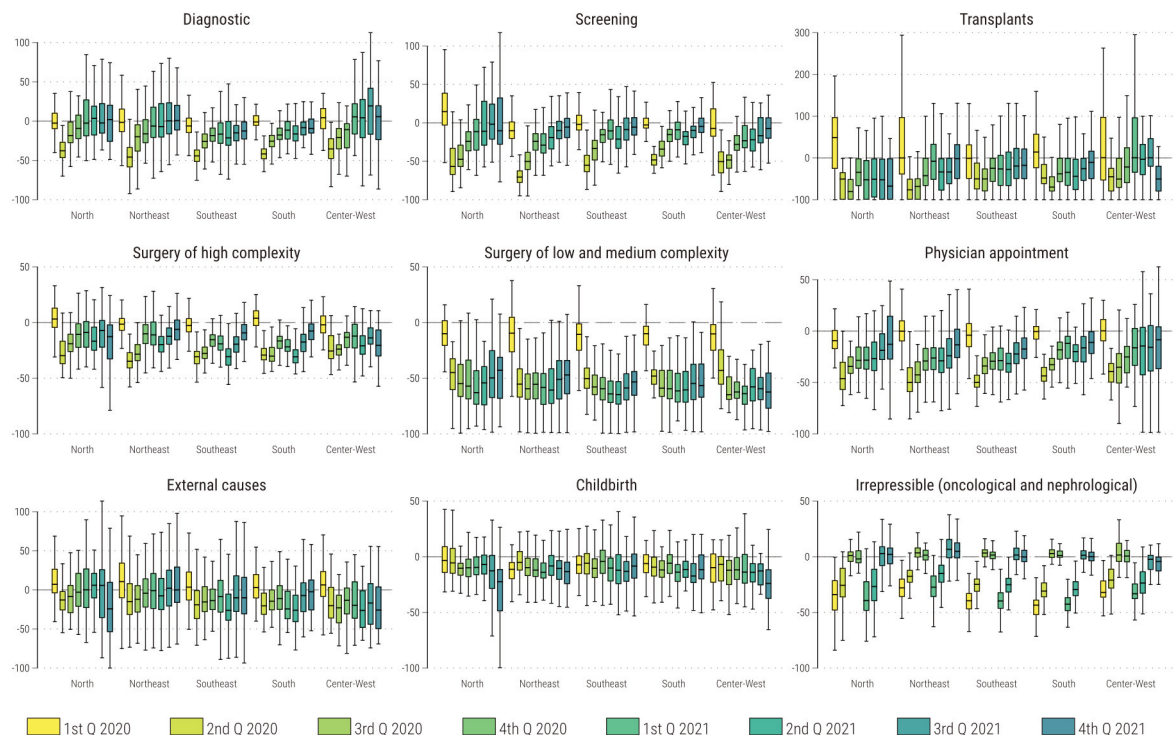
Figure 13: Physical resources per thousand inhabitants



Source: Elaborated by the authors based on CNES (2022)

The Brazilian health system was already impaired by austerity policies that deprived it of resources necessary to maintain its capacity five years before the first case of COVID-1. Figure 14 shows the impact of the COVID-19 pandemic in all regions of the country, quarter. The boxplots represent the distribution of changes in health care production rates compared to previous years. We grouped these into nine different categories of procedures to show the impact on different types of care.

Figure 14: Changes in procedures rates by major health region, 2020–2021



Source: Elaborated by the authors based on SIA and SIH data and using Bigoni et al.'s (2022) methodology. *Significant at the 5% level.

The first boxplot shows the baseline, the pre-pandemic quarter, and the mean is very close to zero, showing, on average, almost no change relative to the previous year. This was followed by a sharp drop in nearly all groups and in almost all regions in the first quarter of the pandemic. It is important to note that the amplitude of the boxplot also reduced in relation to the baseline, showing that disparities in the country have decreased. The entire country was hit in the same way and virtually at the same time. The recovery of each procedure group and each region paints a more heterogeneous picture. Diagnostic procedures, screenings, low and medium-complexity surgeries and clinical appointments with physicians were the most affected. By the end of 2021, diagnostic and screening procedures returned to almost normal levels, while surgeries of low and medium complexity and clinical appointments with physicians did not. Disparities in the country increased substantially in all regions, but especially in those with fewer resources, such as the North, Northeast and Center-West. This will have huge implications for the future of health in the country given that these procedures are essential to early diagnosis and treatment patterns.

The pandemic also led to a substantial reduction in diagnostic procedures, transplants and highly complex surgeries. The procedures group is comprised of chemotherapies, radiotherapies and haemodialysis. This group showed unusual behaviour in the first quarter due to a change in how the procedures were registered at the beginning of 2019. Stability in the subsequent quarters highlight the resilience of the SUS in preserving non-elective procedures. A slight reduction in childbirths and treatment of injuries from external causes were a consequence of changes in psychosocial behaviours during the pandemic.

When looking at health care production in the country, the COVID-19 pandemic was marked by a reduction in production and increased disparities across and within regions. It is unclear if or when the healthcare utilisation pattern will return to pre-pandemic levels. A backlog of procedures not performed during the pandemic is an unavoidable consequence. The impact of long-COVID is also a concern, but its magnitude remains unknown. The Brazilian health system needs to be protected and strengthened to deal with the backlog in demand that will come in the near future.

5.2.2 Coordination of care in crisis

The coordination of care during the COVID-19 pandemic was mismanaged by the federal government, represented in this case by the MoH, and led to an unequal response in the different regions of the country (Bigoni et al., 2022; Massuda et al., 2022). The most affected areas were the most vulnerable socioeconomic regions (Rocha et al., 2021). In past epidemics, the MoH was an important player in the organisation and management of the response, through adequate governance between the tiers (Greco, 2016; Teixeira et al., 2018). Therefore, states and municipalities gained more responsibilities to manage the COVID-19 crisis (Barberia & Gómez, 2020; The Lancet, 2020).

The SUS underwent important changes to coordinate the COVID-19 pandemic crisis. First, movement to increase human and physical resources coming from the public sector was evident, with some stability and movement in the private health sector as the months went by and new waves of the virus arrived (Paschoalotto et al., 2022). Second, CONASS and CONASEMS, public health participation instruments, partially substituted for the federal government's absence in coordinating COVID-19 surveillance and response actions (Vieira & Servo, 2020). Third, states responded differently to the COVID-19 crisis, coordinating their actions more closely to their own municipalities. Some states (e.g., Espírito Santo) improved care regionalisation and did not expand the services structure, others (e.g., São Paulo) used their economic power to quickly expand service delivery, while still others decentralised their response to the municipalities. Fourth, there were some initiatives to share facilities, mainly hospitals, between the private and public sectors to improve resource management (Massuda et al., 2020).

The COVID-19 response of the different levels of complexity of care (primary, secondary and tertiary) showed some changes. An increase of telehealth services in PHC was forced by COVID-19

pandemic social distancing measures while, in specialist care, some UPAs, and outside hospitals, were adapted to receive and treat COVID-19 cases, and private and public partnerships shared facilities. Brazil experienced unequal responses regarding the use of technology for coordinate care mechanisms, such as the construction of “temporary hospitals”, changes to the UPA structure and private and public relations.

5.2.3 Recovery and learning

The COVID-19 pandemic has required health care providers to be flexible and to adapt their service delivery models to respond to changing needs and conditions. This has created an opportunity for recovery and learning, as health care providers have gained experience with alternative service delivery models, such as virtual consultations and home-based care, and have identified best practices for their use. The telehealth structure implemented during the COVID-19 pandemic will remain in the SUS structure and will change the way health services are delivered, with an increase in remote consultations. This developed in an unequal way, so that these advances are in different stages of implementation. There is no national policy initiative to share the knowledge acquired during the pandemic or to improve health system resilience in the delivery of health care.

The COVID-19 pandemic has exposed existing gaps in health care and emphasised the importance of primary health care services in Brazil, particularly in underserved communities. The pandemic has also highlighted the impact on mental health for both patients and health care providers, creating an opportunity for recovery and learning in this area. Moreover, the pandemic has disproportionately affected vulnerable populations in Brazil, including those on low-income, those with limited access to healthcare and those with pre-existing health conditions. This has emphasised the need for a more equitable and inclusive health care system and created an opportunity for health care providers to identify strategies to improve access to care for marginalised populations.

5.3 Recommendations

RECOMMENDATION 5A

Prioritise primary care as the main source of access for comprehensive care, encompassing preventive, diagnostic (e.g, early screening), treatment and palliative care in the SUS and its integration with other levels of care, including mental health care and emergency services.

RECOMMENDATION 5B

Define national and regional lists of health services and products based on health technology assessments offered by the SUS to ensure efficient, effective and equitable use of resources to address health needs.

RECOMMENDATION 5C

Establish emergency actions to address unmet needs worsened by the pandemic, prioritising cancer, cardiovascular and infectious diseases.

RECOMMENDATION 5D

Establish national, state and municipal contingency plans for public health emergencies involving both public and private sectors.

RECOMMENDATION 5E

Promote efficient models of public-private partnerships to expand specialised and hospital services delivery reach prioritising areas of care and regions of the country with greater needs.

6. DOMAIN 6

**Population
health and
social
determinants**



Brazil is a continental country, covering 8.5 million km² (47% of South America), with 215 million inhabitants (IBGE, 2022a), and more than four million of its nationals living abroad (Brasil, 2020). The country is divided into five geographical regions – North, Northeast, Midwest, Southeast and South – comprising 26 states and a federal district (Brasília), and 5,570 municipalities (70% with fewer than 20,000 inhabitants). The regions have large demographic differences and socioeconomic inequalities. The Northeast and North regions (where most of the Amazon Forest is located) are historically the areas with the highest poverty levels. The South and Southeast (with 11% of the territory and 43% of the population), on the other hand, are the wealthiest regions.

Like many Latin American countries, Brazil implemented social reforms to alleviate high levels of poverty and reduce socioeconomic inequalities (Atun et al., 2015). Since its implementation, the SUS has had a significant impact on health outcomes in Brazil. Life expectancy at birth in Brazil increased from 66.9 years in 1990 to 75.5 years in 2016, while child mortality decreased from 69.7 per 1,000 live births in 1990 to 14.9 per 1,000 live births in 2017. In addition, the SUS has played a key role in the fight against infectious diseases such as HIV/AIDS, tuberculosis and malaria. However, challenges persist in the SUS, including the quality and availability of health care services and the equitable distribution of resources across different regions of the country. These problems have worsened since the federal government's adoption of long-term austerity measures in 2016, in response to an economic crisis, with a disproportionate impact on low-income individuals and marginalised communities, exacerbating existing inequalities and widening of the gap between Brazil's rich and poor.

6.1 Indicators of population health

The Brazilian Institute of Geography and Statistics (IBGE) estimated in 2019 that life expectancy in the country was 76.6 years (IBGE, 2019). This number is still heavily weighted by high levels of infant and child mortality (França et al., 2017) and deaths due to external causes, such as violence and accidents, which take a toll on the young adult population (Malta et al., 2017). It is expected, however, that Brazilians reaching 60 years of age will live, on average, a further 22.7 years (IBGE, 2022b). The reliability of these estimates improved considerably in the last three decades, with the improvement in the quality of vital registration (Lima et al., 2014). Death registration quality remains a significant concern in the country. However, strategies have been implemented to improve registration quality (Marinho et al., 2019), thus reducing the number of deaths registered with ill-defined causes and incorrect or non-existent codes.

In 2019, child mortality was 12.4 deaths per 1,000 live births (Table 9), having decreased for the past four decades; this is a direct effect of an increase in education levels (Rebouças et al., 2022) and political representation (Hessel et al., 2020) among women. Increasing primary health care coverage (Vieira-Meyer et al., 2019) and specific health policies (Ramos et al., 2021) have also been responsible for reducing child mortality. Brazil has also experienced a significant reduction in child malnutrition (de Cássia Ribeiro-Silva et al., 2022), with programmes such as the *Programa Nacional de Alimentação Escolar* (PNAE) providing meals for more than 70% of all public schools since 1998 (Silva, 2019). The PNAE programme, together with the Bolsa Família programme, have not only helped to increase education levels (Kroth et al., 2020), but have reduced stunting and wasting rates in low-income areas (Kitaoka, 2018).

There is still work to be done to strengthen child mortality policies. An increase in child mortality due to Zika virus in 2016 and persistent ethnic inequalities affecting child mortality expose gaps in the resilience and strength of Brazilian infant and child health policies (Leal et al., 2018). Unlike other countries, Brazil's child health policies are not managed solely by the MoH, as strategies such as PNAE are managed by the Ministry of Education. This can make child health a secondary policy objective (Kroth et al., 2020). However, the country requires proof of vaccination for children to attend public schools; a decision that helped to maintain high vaccination rates until 2022 (Sato, 2020). During the pandemic, levels of vaccination uptake were undermined by political movements

Table 9: Population health and demographic characteristics, per 100,000 population

	1998	2000	2003	2008	2013	2019	2020
Life expectancy		69.8	71.2	73.2	74.8	76.6	
Child mortality		21.3	18.9	15.0	13.4	12.4	11.5
Acute diarrheic diseases < 5 years old		4.5	4.3	2.8	1.9	1.2	1.0
Standardized rates of deaths by:							
Diseases of the circulatory system		186.7	177.4	175.3	158.0	138.3	131.3
Ischemic heart diseases		56.4	54.0	52.8	49.7	44.8	40.4
Cerebrovascular diseases		60.8	57.7	54.6	46.5	38.2	36.1
Cervical cancer		5.4	5.2	5.2	5.0	5.2	5.1
Breast cancer		11.6	11.8	12.7	13.1	14.0	13.4
Prostate cancer		10.9	11.9	13.7	13.0	12.1	11.0
External causes		71.1	72.2	71.8	74.6	65.6	66.4
Land transport accidents		17.7	19.0	20.3	20.8	14.6	14.8
Suicide		4.3	4.7	5.0	5.2	6.1	6.2
Proportion of the population that reports:							
Not being able to perform daily activities		6.5	6.4	6.9	4.9	6.9	
Not being able to perform daily activities due to health		6.3	6.9	8.3	7.0	8.1	
Diagnosis of hypertension		17.1	18.5	20.1	22.1	24.0	
Diabetes		3.1	3.9	5.1	7.0		
Health status as being poor or very poor		3.6	3.4	3.8	5.6	5.8	
Smoking				17.3	14.7	12.8	

Source: Elaborated by the authors using PROADESS (2022), PNS (2003, 2008, 2013, 2019) and IBGE (2019).

and misinformation (Neves & Massarani, 2022). Brazil could benefit from SUS oversight in policies that have major health consequences while implementing strategies to shield itself from extremist and non-scientific positions on health.

Brazilians are living longer and having fewer children than ever (World Bank, 2020). Among the reasons is the increase in women's access to education and family planning policies (Lopes et al., 2022) which reduce fertility rates (Leal, 2018). These demographic changes bring with them major epidemiological shifts (Marinho et al., 2013). Most of the population is now at lower risk of dying from infectious diseases and malnutrition but more likely to be diagnosed with at least one non-communicable disease in their lifetime (Malta et al., 2020). The picture at the subnational level is more heterogenous, showing a country marked by extreme inequalities in sanitation (Diep et al.,

2021), health access and infrastructure (Rocha et al., 2021). The North and Northeast regions are at a different moment in their epidemiological transition than the southern regions (Borges, 2017). Policies that do not account for these differences often widen them (Bigoni et al., 2022). This is not the case for many of the large policies implemented today. The decentralisation of SUS, the Family Health Strategy and Bolsa Familia have helped reduce disparities between the country's regions and even within states and municipalities (Castro et al., 2019).

In parallel with other LMICs undergoing similar demographic and epidemiological transitions, Brazil is starting to see the increased burden of non-communicable diseases (NCDs) in its population (Malta et al., 2017). Although they represent an improvement in sanitation and access to health care in critical stages of life, the increase in NCDs exposes a need for strengthening primary health care policies (Tasca et al., 2020). Since NCDs are usually chronic or may require specialised care for treatment and management, they burden local health systems (Malta et al., 2017). Although death rates by malignant neoplasms are stable, the incidence is increasing. The total number of smokers has decreased, mostly due to a reduction in the habit among men, while the numbers of women who smoke has increased (Bigoni et al., 2019).

Notably, strategic public health policies have led to a subsequent reduction in tobacco consumption in Brazil. Smoking is acknowledgeable to be the main risk factor for lung cancer. However, as in most countries, lung cancer is the major cause of cancer mortality in Brazil and 80% of lung cancer patients are smokers. Lung cancer is the second most incident cancer among and the fourth most incident cancer among women. 70% of lung cancer patients are diagnosed in late stages, therefore delay in early diagnosis of lung cancer is one of the major challenges (Araújo, et al., 2018).

The rise in the number of people who are obese and overweight is a cause for concern (Ferrari et al., 2022). Cardiovascular diseases such as ischemic heart disease are responsible for 44.8 deaths per 100,000 inhabitants (Table 17). Nutritional policies and guidelines were put in place to educate the population about healthy choices (de Castro Almeida et al., 2018). Brazil's Dietary Guidelines for the Brazilian population are considered an example worldwide, and they have changed how foods are classified, reaching the population through policies (Monteiro & Jaime, 2020). Alongside obesity, the burden of diabetes is a growing concern (Duncan et al., 2020). Although the prevalence of people living with diabetes is attributed to increasing access to health care (Neves et al., 2014), type 2 diabetes imposes a growing economic burden on the health system (Bahia et al., 2019). It is expected that, by 2040, type 2 diabetes will be the third leading cause of death (Duncan et al., 2020).

Gender dynamics play an essential role in the health of the Brazilian population (Caldwell, 2017). Men are more likely to die from accidents and violence (Moura et al., 2016), but the motives behind this violence are multiple. Women are more likely to experience violence in the form of intimate partner violence, and femicide is still the primary cause of death for most women who die from violence in Brazil (Martins-Filho, et al., 2018). Women in many parts of the country still lack access to affordable feminine hygiene products (Soeiro et al., 2021) and birth control (Lopes et al., 2022). In addition, abortion laws are being pushed back by a new conservative and religious movement in the country, depriving women of free and safe abortions and disproportionately affecting women in marginalised communities (Galli, 2020).

6.2 Structural determinants of health and population health inequalities

The rapid decline of Brazil's health situation is a major concern. In addition to surpassing 690,000 deaths caused by COVID-19 (11% of global deaths), the pandemic seriously affected the SUS's provision of non-COVID-19 procedures, which dropped 25% in 2020 compared to the previous year, mainly in the most vulnerable regions of the country (Bigoni et al., 2022). Moreover, in 2021 and 2022, SUS out-patient and hospital production were below pre-pandemic levels. As a result, unmet health needs are accumulating and health outcomes are deteriorating rapidly.

The impacts on SUS functionality and health outcomes have been rapid. Although primary care coverage has stagnated at 63% of population since 2016, there has been a sharp drop in the rate of those who report using primary care services as a regular source to access the health system (from 53.7% in 2013 to 35.9% in 2019). Since 2016, vaccination coverage has been decreasing; less than 70% of the target population was vaccinated against Poliomyelitis in 2022, the lowest rate since 1994. Lastly, infant mortality stopped falling in the country, and an unprecedented increase was recorded in 2016, while the maternal mortality rate jumped 94.3% in 2021, compared to 2019.

Certain population groups, such as Blacks and Indigenous peoples, have been disproportionately affected. The catastrophic impact of environmental policies by 2019-2022 government has resulted in deforestation rates not seen in decades, severe forest fires and a rapid expansion of illegal gold mining in the Amazon region. This has affected the local population of the Amazon in different ways, including an increase in violence, worsening health conditions and disruption of the culture and ways of life of local indigenous groups.

6.3 Recommendations

RECOMMENDATION 6A

Increase preventive health policies for people of all ages and prioritise vulnerable groups – women, afro-descendants, quilombolas (descendants of Afro-Brazilian slaves who escaped from plantations), and rural and indigenous populations.

RECOMMENDATION 6B

Implement emergency measures aimed at protecting the indigenous child population.

RECOMMENDATION 6C

Strengthen the monitoring capacity of the SUS health surveillance for early detection the rise of infectious diseases with epidemic potential.

RECOMMENDATION 6D

Improve good-quality mortality registries to identify target regions where health interventions are needed.

RECOMMENDATION 6E

Strengthen the indigenous health subsystem within the SUS, in partnership with National Indian Foundation (FUNAI) and indigenous communities, in order to improve preventive measures, healthcare services, and health surveillance for indigenous populations.

RECOMMENDATION 6F

Improve the regulation of commercial activities and practices that affect health, including tobacco, unhealthy foods and/or alcohol.

RECOMMENDATION 6G

Promote Health in All Policies and intersectoral action capacities by addressing policies, such as those influencing transport, housing and urban planning, the environment, education, agriculture, finance, taxation and economic development.

7. DOMAIN 7

Environmental sustainability



Brazil is an important territory with regard to the green economy, biodiversity, water resources, the carbon cycle and emissions, a diversified population and geographic space, and is an important actor concerning global environmental governance actions, groups and associations (Viola & Franchini, 2018), with power to influence and innovate in global environmental sustainability initiatives and green economy dynamics (Viola & Gonçalves, 2019). More specifically, Brazil's global environmental governance image has, in the past, been linked as a major player in the global carbon market, the United Nations Framework Convention on Climate Change (UNFCCC) and other policies that aim to tackle environmental problems with other major world economies (Viola et al., 2012).

Brazil's environmental sustainability can be better understood through three different perspectives: government actions, market actions and SUS initiatives. The first topic explores Brazilian government environmental strategies to create a sustainable society, the second explores market perspectives and programmes to improve sustainable enterprise policies and the third explores the role of the SUS in environmental sustainability.

7.1 Government

Until 2016, the main achievements of the federal government in the environmental area involved: (1) funding and investment management to facilitate sustainable development in the Amazon through environmental agencies and participation mechanisms, (2) actively combating deforestation, (3) increasing renewable resources, such as hydroelectric power, in the Brazilian energy matrix and (4) investing in non-polluting fuels, such as alcohol as a substitute for petrol or oil. However, some problems persist, such as: (1) fossil fuel subsidies; (2) substantial loans to large enterprises to explore the Brazilian territory and (3) strong and culturally illegal mining and logging activities. Despite these, Brazil was admired globally for its pro-active initiatives and its attempt to create a more environmental country (Viola & Gonçalves, 2019).

This situation changed in 2019, with the election of a new federal government. The government continued to neglect the Brazilian environment, threatening the protection of forests, indigenous people and agricultural sustainability. (Dutra da Silva & Fearnside, 2022). Some of its actions, or inactions, include: (1) weakening administrative structures, by replacing environmental bureaucrats or reducing staff funding, in institutions linked to environmental sustainability, such as National Indian Foundation (FUNAI) and the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) (Ruaro et al., 2021) and (2) advancing the rural agenda, associated with large farmers and extensive agriculture, with legislation changes to facilitate entrance into "conservation areas" and funding to support agribusiness, mining and logging (Ferrante & Fearnside, 2021).

President Lula da Silva, inaugurated January 2023, now faces the task of addressing these setbacks and ultimately reconstructing the environmental and health sectors. The return of the environmental agenda and strengthening of the SUS were defined as government priorities, and Marina Silva was appointed as Minister of Environment and Climate Change (MMA). In the first 100 days of Lula's government, fines for deforestation and other infractions against the flora of the Amazon increased by 219% compared to the average for the same period of the previous four years, according to data from the IBAMA (Agência Brasil, 2023). In April 2023, the Amazon deforestation decreased by 68% compared to the same month in 2022, according to the National Institute for Space Research (INPE, 2023).

7.2 Market

From a market perspective, environmental, social and governance (ESG) practices have gained relevance in recent years due to their utilisation in Brazil's publicly traded "big companies" (Molnar, 2022). ESG practices emphasise that stock-exchange enterprises should address those activities that create environmental (climate change and risks), social (health, education and social care) and governance (board and accountable structure) problems, due to their responsibilities to their

shareholders and stakeholders (Boffo & Patalano, 2020). In Brazil, there has been an increase in ESG practices due to the current obligation of “open-market” companies to participate on the stock exchange, which does not necessarily mean they already had impact on environmental issues (Miralles-Quirós & Miralles-Quirós, 2018). It is important to point out that some group owners of private hospitals and health insurers have joined this movement, which also could impact private health care activities.

Beyond stock exchange companies, other market initiatives also affect Brazil’s environmental sustainability. First, the use of the ISO 14001 certification process by some organisations has increased, generating some environmental benefits, as the reduction of the environmental fines due to the activities of ISO 14001 certification (Rino & Salvador, 2017). Second, an increase in the consumption of organic products in Brazil has impacted some companies in their production and market strategies to fit with this new type of consumer, thus reducing environmental impact (Candiotta, 2018). Third, Brazil’s circular supply chain, supported by the recycle movement, has affected both environment and social issues, due for the most part to recycling collection organised by cooperatives of socially vulnerable people (Batista et al., 2019). Fourth, local and regional initiatives coordinated by non-governmental organisations (NGOs) have traditionally been important in Brazil’s environmental movement, providing alternative solutions in the absence of the federal government (Hochstetler, 2021).

7.3 SUS

The SUS was founded and developed at a time when basic sanitation was a big problem in Brazil, and was part of the sanitary movement (Farias et al., 2020). The right to treated water and waste, to housing and to optimum living conditions went hand-in-hand with SUS expansion, and both were established in the 1988 Brazilian Federal Constitution (Castro et al., 2019). As a unified health system and with a strong primary health care network spread across the Brazilian municipalities, SUS plays an important role in environmental sustainability through its intersectoral capacity (Barros et al., 2020). FHS teams in the field have contact with families and territories and are responsible for informing and communicating with social work teams about the sanitary and other environmental problems they encounter in the area (Farias et al., 2020).

By 2018, following 30 years of SUS, Brazil has developed numerous public participation spaces, together with policies and institutions to better integrate SUS actions with environmental issues, creating a more ecological approach (Freitas et al., 2018). One of the main SUS activities linked to a more sustainable environment is sanitary surveillance. Municipal sanitary surveillance agents supervise and guarantee that all consumed foods meet certain standards, and they intervene in cases of environmental, foods circulation or service problems related to public health (Ferreira, 2021). In this sense, SUS protects the Brazilian population and manages environment problems related to sanitation.

7.4 Recommendations

RECOMMENDATION 7A

Foster the participation of the health sector in environmental agendas, including strategies to strengthen the SUS in the Amazon region, enhancing the role of local communities.

RECOMMENDATION 7B

Study strategies and commit to the transition to green energy sources within the SUS.

RECOMMENDATION 7C

Increase the severity of penalties for environmental crimes that cause damage to public health, such as the indiscriminate use of pesticides, illegal mining in Indigenous areas and the logging industry.

8. CASE STUDY 1

Preparedness for the COVID-19 pandemic



Context

Brazil has a long history of combatting epidemics since the beginning of the 20th century, producing prominent epidemiologists such as Oswaldo Cruz, Carlos Chagas, and other health experts (Waldman, 2012). Nonetheless, few epidemics have been as complex and challenging as the 2019 Coronavirus Disease Pandemic (COVID-19). The COVID-19 pandemic required an unprecedented and well-coordinated management process from health systems around the world. In Brazil, however, the political context posed a major challenge to the response. The federal government rejected technical recommendations based on scientific evidence, including restrictions on physical distancing and use of face masks, affecting the initial spread of COVID-19 in the country. Existing socioeconomic inequalities, rather than age, health status, and other risk factors for COVID-19, defined the course of the epidemic, with a disproportionate adverse burden on states and municipalities with high socioeconomic vulnerability (Rocha et al., 2021).

In this context, the capacity of the Unified Health System (SUS – Sistema Único de Saúde) to respond to the Covid-19 pandemic was tested immediately after the declaration of a National Public Health Emergency (ESPIN – Emergência em Saúde Pública de Importância Nacional). On January 11–12 2020, China informed the World Health Organization (WHO) that the etiological agent responsible for the outbreak was a coronavirus (WHO, 2020a). Rapid efforts were made to develop resources for laboratory detection using molecular techniques. However, when the WHO declared a Public Health Emergency of International Concern (ESPUI – Emergência em Saúde Pública de Importância Nacional e Internacional), there was an inadequate supply of resources, technical capacity, and infrastructure in Brazilian Public Health Laboratories (Lacen – Laboratórios Centrais de Saúde Pública). Five out of the 27 Lacen did not have the equipment to perform the tests, and consequently, did not train teams to conduct RT-PCR testing.

Goal

Prepare the Brazilian health system to respond to the introduction of SARS-CoV2 by i) expanding laboratory capacity and ii) training health care professionals in primary, medium and high complexity, epidemiological, sanitary and laboratory surveillance, over the collection, storage, transport and processing of suspected Covid-19 samples led by the Ministry of Health technical teams in a challenging political context in Brazil.

Relevant domains

Domain 1: Governance

Domain 3: Workforce

Domain 4: Medicines and technology

The Case

■ Expanding laboratory capacity

The use of laboratory diagnostic testing for detecting positive cases of COVID-19 was one of the main strategies for coping with the initial spread of the virus, however poor availability of supplies hindered its adoption on a global scale (Sachs, 2022). In Brazil, the first case suspect was identified in Minas Gerais in late January 2020, but molecular tests were not yet available at that time. Given the absence of molecular tests, metagenomic analysis was adopted as the immediate approach to understanding virus spread. Meanwhile, the Ministry of Health issued a public call to national manufacturers to produce molecular tests in Brazil. In response, the Oswaldo Cruz Foundation (FIOCRUZ), the Molecular Biology Institute of Paraná, and the Oswaldo Cruz Institute led research to develop these tests.

By mid-April 2020, the World Health Organization (WHO) had not validated any serological test for COVID-19. However, on April 8, 2020, the WHO recommended the use of rapid serological tests only for research, and not for diagnosis in public and private laboratories (WHO, 2022). Thus, the gold standard for COVID-19 detection remained the Reverse Transcriptase Polymerase Chain Reaction with real-time amplification (RT-PCR in real-time or RT-qPCR). In addition to suspected cases, only molecular tests (rRT-PCR) for asymptomatic cases or those with mild symptoms could be considered for individuals who have had contact with a COVID-19 case, generating the need for screening protocols adapted to the local situation (with suspected cases, confirmed cases, etc.) and increasing the demand for tests.

In Brazil, any test purchase of medical supplies, by the SUS or the private sector, must be registered by the National Health Surveillance Agency (*Agência Nacional de Vigilância Sanitária* (ANVISA)). However, by April 2020, only 17 tests were registered, with no guarantee of providing the tests given the high demand for their resources globally.

In parallel, the preparation of specialized health professionals for rapid collection of samples from patients with suspicion of Covid-19 was defined as priority by the Ministry of Health technical team for clinical management and outbreak control. The entire process of conducting laboratory tests had to follow the Technical Regulation for the operation of Clinical Laboratories (Brasil, 2005), which defines the requirements for the operation of clinical laboratories and laboratory collection points.

In a conference held March 16, 2020, the WHO recommended the escalation of social distancing and measures, such as closing schools and canceling sporting events and other meetings but did not consider the need to scale-up testing, isolation, and contact tracing (WHO, 2020b). At that time, the Brazilian Ministry of Health was following the recommendation to test suspected cases regardless of severity. However, given the change in the WHO recommendation, the international demand for inputs for the production of tests increased rapidly. Newspapers reported the international supply shortages, prompted in part by the WHO announcement and the spread of the virus in Brazil (Figure 15).

Figure 15: News published during the period in which the WHO guides the expansion of tests



A March 21 2020 article published in the Folha de São Paulo newspaper, titled “Without inputs, private laboratories have to limit tests to detect the coronavirus”, reported the bottleneck was in the limited amount of inputs available for the test production, which were purchased mainly from the United States, Europe, and China. Home tests were suspended, and new medical orders were accepted only from accredited hospitals. According to the news, the representatives from laboratories reported that: “The previous protocol [of testing everyone suspected] overloaded the system as a whole”. The protocol change was a way to “guarantee the care of critical patients”, explained vice president for Rede Dasa, the largest diagnostic medicine company in Latin America.

The Director of the Brazilian Association of Diagnostic Medicine (Abramed – Associação Brasileira de Medicina Diagnóstica) stated that the country was working at the “limit of test capacity” and had “consumed many inputs testing those who did not need it”, agreeing that the Ministry of Health needed to change the protocol to avoid having no remaining tests whatsoever (Folha de São Paulo, 2020).

To address the increased demand with scarce resources, the Public Health Emergency Operational Center (COE-COVID19) established the preparation and response strategies, following WHO recommendations, which included: engagement of private laboratory services and the academic sector, and implementing mobile laboratories with automated molecular test systems for remote geographical regions.

■ Training health care professionals

With the announcement of the WHO Public Health Emergency of International Concern (PHEIC) and the increasing availability of tests, suppliers, and resources, the Ministry of Health (MoH) developed a series of actions to implement and expand the COVID-19 laboratory diagnosis in Brazil. On January 31, 2020, the Pan American Health Organization (PAHO) trained national reference laboratories at Fiocruz, the Adolfo Lutz Institute, and the Evandro Chagas Institute (Fiocruz, 2020).

In February 2020, Fiocruz and the Ministry of Health's Surveillance Secretariat (SVS/MS) carried out 528 tests, acquired 124 multiplex kits for the diagnosis of 21 different viruses in real-time, and purchased personal protective equipment. However, resource prices drastically increased in February, and WHO was only able to send 250,000 tests to 70 reference laboratories worldwide.

On February 7, 2020, Fiocruz, Ministry of Health, and PAHO provided laboratory diagnosis training for specialists from Argentina, Bolivia, Chile, Colombia, Ecuador, Panama, Paraguay, Peru, and Uruguay (PAHO, 2020). Participants developed a practical exercise in 2019-nCoV molecular detection and received diagnostic materials (primers and positive controls), to review and discuss the main tests and protocols available.

On February 14, 2020, Fiocruz received the first batch of 2 kits and 48 tests. By February 20, 2020, they commenced the first batches of their own production, with 528 tests. Private laboratories also offered tests for detection. The first confirmed case was detected in Brazil on February 26, 2020, in the city of São Paulo.

By the end of March 2020, even with limited supplies and infrastructure across the country, Brazil had conducted 45,240 RT-PCR tests acquired by Fiocruz and 500,000 rapid serological tests acquired by private companies and donated to the Ministry of Health. Public-private partnerships were also established with private laboratories and other government agencies, in the agriculture, security, and research fields, allowing them to use their structures to support resources distribution by the Ministry of Health's Surveillance Secretariat. Petrobras donated 600,000 RT-PCR tests, and Fiocruz began the import of 2 million tests from China to complement their capabilities.

By April 8, 2020, 344,852 RT-PCR tests had been distributed throughout the Brazilian territory. However, at this point, Brazil faced a political crisis with the replacement of two Health Ministers in less than 30 days.

Analysis

The ability of the Unified Health System and civil society to organize themselves in solidarity to face the challenges was exemplary. However, the political crisis and denial of scientific evidence opposing technical recommendations posed unprecedented operational challenges. Health care teams became demotivated, hindering the initiatives of public-private collaboration. The consequence was a rapid increase in the case curve after a slight reduction between April and June 2020 (Brasil, 2023a). Mistrust in national reporting arose when the Ministry of Health threatened to change the way information was disclosed, leading to an unprecedented partnership process between the media and the National Council of Health Secretaries (Conass – Conselho Nacional de Secretários de Saúde) to monitor cases and deaths from July 2020 (Souto & Silva, 2021). On the other hand, the Unified Health System demonstrated its capacity for solidarity: training neighbouring countries, even while developing its own response structures.

Key findings

The resilience of the SUS to deal with Covid-19, in its initial stages, was influenced by the prior experience of the technical teams at the Ministry of Health, even in the absence of fulsome government support. Brazil has been expanding capacities to prepare and respond to public health emergencies since 2005, based on the International Health Regulations. However, the federal government can significantly obstruct the ability of the SUS to respond to emergencies. In this sense, the SUS sustainability could use this experience as a learning process, to (a) be better prepared for the next public health emergencies and (b) address other health concerns to the systems, such as NCDs and cancer.

In addition, the COVID-19 pandemic demonstrated the need of a profound revision of the International Health Regulations to improve Annex II, which concerns the "Core Surveillance and Response Capacities."

Preparation and response to public health emergencies lack specific instruments, trained and dedicated professionals, financial resources, and appropriate structures to confront them.

Decision-makers must:

- (1) invest in the development of emergency plans, contingency plans, protocols, and standard operating procedures, as well as equipment, training, and qualified personnel to diagnose the local situation;
- (2) recognize the common emergencies in local and regional areas to participate collaboratively with other units of the federation through the SUS National Force strategy, through multiprofessional teams of doctors, nurses, pharmacists, biomedical scientists, epidemiologists, communicators, and other necessary professionals; and
- (3) enhance the ability and capacity of SUS, private sector and civil society to join efforts, based on this case study experience, to improve early detection and diagnosis of other diseases in Brazil, such as cancer.

9. CASE STUDY 2

**Social
participation
mechanisms
and
communication**



A National Consortium to Cover the Federal Government Absence in the Covid-19 Pandemic

Context

The Brazilian Unified Health System (SUS) is a decentralized health system with shared responsibilities between the federal, state, and municipal government tiers. SUS has inter-federative commissions (tripartite management committees at national level; and bipartite management committees at state level) to guarantee the consideration and approval of national policies by representatives of State Health Secretaries (CONASS – Conselho Nacional de Secretários de Saúde) and Municipal Health Secretaries (CONASEMS – Conselho Nacional de Secretários Municipal de Saúde). Both national councils represent each of the governmental tiers' health secretaries, state and municipal respectively, and to give technical and management support.

During health crises, clear and accurate communication is essential for providing strategic and accountable information to aid public understanding, to mitigate fear and panic, and to guide people towards taking necessary precautions, based on technical information provided by the health authorities. During the Covid-19 pandemic in Brazil, the political context posed a major challenge for effective communication (Rocha et al., 2021). In the beginning, the Ministry of Health published daily bulletins with COVID-19 information and situation reporting, supporting the media and press in the communication (Brasil, 2023b). However, this prominent role for the Ministry of Health was disagreeable to the President of the Republic, who himself opposed the scientific-based guidelines provided by the national health authority (Knaul et al., 2021)). As a result, the Health Minister was removed by the President in April 2020, and a successor resigned less than a month later (Reis et al., 2023). A political appointee (non-technical) Minister was placed in charge in June 2020, and problems arose with the technical reporting and information around COVID-19, obstructing national coordination (Souto & Silva, 2021).

To address the inadequate and absent government COVID-19 data, a unique partnership was established: a national press consortium – comprising the Brazilian press, CONASS, and Brazilian researchers and universities (Souto & Silva, 2021). The strategy was to require all State Health Secretaries, through the leadership of CONASS, to provide official and daily COVID-19 data, based on researchers and universities knowledge, and provide trustworthy information to the press. Therefore, the social participation mechanisms of the SUS (i.e. CONASS) mitigated the lack of the main national health coordination structure, the Ministry of Health, helping the press and media in the COVID-19 communication (Santos et al., 2022).

Goal

The main purpose of this case study is to present and explore the national press consortium established in Brazil to provide trustworthy and accurate information about the COVID-19 pandemic, due to the absence and misinformation of the federal government system at the time. The described national press consortium can collaborate with other health systems in the world regarding participation mechanisms and social communication as a feature of public health emergency response.

Domains

Domain 1: Governance

Domain 4: Medicines and Technology

The case

Formal federal government communication at the start of the COVID-19 pandemic was presented every day at 5pm, Brasilia time, by the Ministry of Health and specific national health secretaries through a national and televised interview, with information about COVID-19 cases and deaths (Idrovo et al., 2020). These interviews were supported by the data emitted from the epidemiological bulletins provided by the Public Health Emergency Operational Center (COE-COVID-19 – Centro de Operações de Emergências em Saúde Pública), Health Surveillance Secretary (SVS – Secretaria de Vigilância em Saúde) and Ministry of Health (Brasil, 2023b). In this sense, public communication had scientific and technical support and was accepted by the press, generating community engagement in the process.

But, after two changes in the Ministry of Health and in the leadership of a Minister of Health without technical expertise (Souto & Silva, 2021), on June 3, 2020, when Brazil was registering a new record in COVID-19 deaths, the government reneged on transparency by publishing the information at 9:45pm. The Ministry of Health continued to share information inadequately. The following day, with a new record in COVID-19 deaths, the Ministry did not give the national and televised interview, and published the COVID-19 information on their webpage only at 10pm (Idrovo et al., 2020). In addition, in the next days and months, the Ministry of Health webpage changed its format for data publication, with i) hidden information about the accumulated COVID-19 cases and deaths, and ii) registering “recovery” cases, without international protocol for that. With the inaccurate and unreliable official information, public trust in the COVID-19 pandemic data started to decrease, generating doubts about the applied non-pharmaceutical interventions (Santos et al., 2022).

Seeking official, reliable, and consistent COVID-19 reporting, CONASS and the press launched the national press consortium on June 8, 2020 (Reis et al., 2023). The initiative, provided daily at 8pm, offered information about COVID-19 status over all Brazilian states, and from January 2021, COVID-19 vaccination coverage (Conass, 2023a). The COVID-19 status information comprised (1) COVID-19 cases and deaths tables, by day, week, 15-day epidemiological week, and month, and from all the Brazilian states; (2) graphs with the COVID-19 cases and deaths by epidemiological week; and (3) maps showing COVID-19’s geographical distribution (Conass, 2023a).

CONASS had the role of leading and supporting the state health secretaries to provide the correct COVID-19 information, following scientific methods (e.g. epidemiological week). The press consortium, comprising different Brazilian press organizations, had the role of communicating this credible and dependable information to the Brazilian public. For CONASS, the initiative generated the continuous CONASS COVID-19 Panel (Painel Conass Covid-19), with a transparent and available webpage (Conass, 2023b). The press consortium operated for 965 days of the pandemic.

Analysis

A health system is a complex organisation, and public trust in health systems is dynamic and highly responsive to media, politics, and public discourse (Gille, Smith & Mays, 2017). With a public health emergency (e.g. COVID-19 pandemic), the health system needs to be resilient and new elements gain force in the dynamic: community engagement (Haldane et al., 2021) and communication and social participation. In this sense, the Brazilian national press consortium case is an example of this relationship and phenomenon.

With the failure of one important element of the Brazilian health system governance in the COVID-19 pandemic response, the Ministry of Health (Santos et al., 2022), two other sources of authority shared the responsibility and provided resilience to generate community engagement: CONASS, representing the social participation dimension, and the press, representing the communication dimension.

Key Findings

With the case presented, we can see that even with the absence of information, or misleading information, presented by one important part of the health system, the federal government, other components (social participation – CONASS; and social communication – the press) created a new structure to address this problem, showing a resilient capacity. Therefore, the SUS structures are strong enough to work together to address disease outbreaks even where there is not support from federal government. The press national consortium is an example to other decentralized health systems of (1) a health system's capacity to adapt, (2) the importance of social participation mechanisms, and (3) social communication to provide accountability to society.

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11. References



- Abrucio FL, Grin EJ, Franzese C, Segatto CI & Couto CG (2020). Combate à COVID-19 sob o federalismo bolsonarista: um caso de descoordenação intergovernamental. *Revista de Administração Pública*, 54(4), 663–677. <https://doi.org/10.1590/0034-761220200354>
- AMB (2022) Associação Médica Brasileira. Anvisa tem menor número de servidores em 20 anos. <https://amb.org.br/brasil-urgente/anvisa-tem-menor-numero-de-servidores-em-20-anos>
- Agência Brasil (2023). Ministra destaca volta do país ao protagonismo de políticas ambientais. <https://agenciabrasil.ebc.com.br/geral/noticia/2023-04/ministra-destaca-volta-do-pais-ao-protagonismo-de-politicas-ambientais>
- ANAHP, Associação Nacional de Hospitais Privados (2022). Propostas para o futuro da saúde no Brasil: Como criar caminhos de acessibilidade, igualdade e modernidade.
- ANVISA (2017). Resolução da diretoria colegiada – RDC 204, de 27 de dezembro de 2017.
- Araújo LH et al. (2018). Lung Cancer in Brazil. *Jornal Brasileiro de Pneumologia*, 44(1), 55–64.
- Atun R, De Andrade LO, Almeida G, Cotlear D, Dmytraczenko T, Frenz P, Garcia P, Gómez-Dantés O, Knaul FM, Muntaner C & De Paula JB (2015). Health-system reform and universal health coverage in Latin America. *The Lancet*, 385(9974), 1230–1247.
- Bahia LR, da Rosa MQ, Araujo DV, Correia MG, Dos Rosa RD, Duncan BB & Toscano CM (2019). Economic burden of diabetes in Brazil in 2014. *Diabetology & metabolic syndrome*, 11(1), 1–9.
- Bahia L & Scheffer M (2018). O SUS e o setor privado assistencial: interpretações e fatos. *Saúde Em Debate*, 42(spe3), 158–171. <https://doi.org/10.1590/0103-11042018s312>
- Baiter S et al. (2000). Epidemic nephritis in Nova Serrana, Brazil. *The Lancet*, 355, 1776–1780.
- Barberia LG & Gómez EJ (2020). Political and institutional perils of Brazil's COVID-19 crisis. *The Lancet* 396(10248), 367–368. [https://doi.org/10.1016/S0140-6736\(20\)31681-0](https://doi.org/10.1016/S0140-6736(20)31681-0)
- Barros J de O, Daldon MTB, Rocha T de O, Sznclwa LI & Lancman S (2020). Intersetorialidade em saúde e trabalho no contexto atual brasileiro: utopia da realidade? *Interface – Comunicação, Saúde, Educação*, 24. <https://doi.org/10.1590/interface.190303>
- Batista L, Gong Y, Pereira S, Jia F & Bittar A (2019). Circular supply chains in emerging economies – a comparative study of packaging recovery ecosystems in China and Brazil. *International Journal of Production Research*, 57(23), 7248–7268. <https://doi.org/10.1080/00207543.2018.1558295>
- BBC News (2019). Anvisa é mesmo lenta para aprovar medicamentos, como dizem Bolsonaro e o Congresso? www.bbc.com/portuguese/brasil-49258889
- Bigoni A, Ferreira Antunes JL, Weiderpass E & Kjærheim K (2019). Describing mortality trends for major cancer sites in 133 intermediate regions of Brazil and an ecological study of its causes. *BMC Cancer*, 19(1), 940.

- Bigoni A, Malik AM, Tasca R, Baleeiro M, Carrera M, Maria L, Schiesari C, Gambardella DD & Massuda A (2022). Brazil's health system functionality amidst of the COVID-19 pandemic: an analysis of resilience. *The Lancet Regional Health – Americas*, 10(100222).
<https://doi.org/10.1016/j.lana.2022.100222>
- Boffo R & Patalano R (2020). *ESG Investing: Practices, Progress, and Challenges*, OECD Paris.
- Borges GM (2017). Health transition in Brazil: regional variations and divergence/convergence in mortality. *Cadernos de saude publica*, 33: e00080316.
- Brasil (1990a). Lei 8.080, de 19 de setembro de 1990. Dispõe sobre as condições para a promoção, proteção e recuperação da saúde, a organização e o funcionamento dos serviços correspondentes e dá outras providências.
- Brasil (1990b). Lei 8.142, de 28 de dezembro de 1990. Dispõe sobre a participação da comunidade na gestão do Sistema Único de Saúde (SUS) e sobre as transferências intergovernamentais de recursos financeiros na área da saúde e dá outras providências.
- Brasil (1998). Lei 9.656, de 3 de junho de 1998. Dispõe sobre os planos e seguros privados de assistência à saúde.
- Brasil (2005). Portaria 30, de 7 de julho de 2005 – Institui o Centro de Informações Estratégicas em Vigilância em Saúde, define suas atribuições, composição e coordenação. Ministério da Saúde.
- Brasil. Ministério da Saúde. Agência Nacional de Vigilância Sanitária. (2005). Resolução 302, de 13 de Outubro de 2005. Dispõe sobre Regulamento Técnico para funcionamento de Laboratórios Clínicos. https://bvsms.saude.gov.br/bvs/saudelegis/anvisa/2005/res0302_13_10_2005.html
- Brasil (2011). Decreto 7616 – Dispõe sobre a declaração de Emergência em Saúde Pública de Importância Nacional – ESPIN e institui a Força Nacional do Sistema Único de Saúde – FN-SUS.
- Brasil (2011). Lei 12.401, de 28 de abril de 2011. Altera a Lei nº 8.080, de 19 de setembro de 1990, para dispor sobre a assistência terapêutica e a incorporação de tecnologia em saúde no âmbito do Sistema Único de Saúde – SUS.
- Brasil (2011). Decreto 7.508, de 28 de junho de 2011. Regulamenta a Lei nº 8.080, de 19 de setembro de 1990, para dispor sobre a organização do Sistema Único de Saúde – SUS, o planejamento da saúde, a assistência à saúde e a articulação interfederativa, e dá outras providências.
- Brasil (2012). Lei complementar 141, de 13 de janeiro de 2012. Regulamenta o § 3º do art. 198 da Constituição Federal para dispor sobre os valores mínimos a serem aplicados anualmente pela União, Estados, Distrito Federal e Municípios em ações e serviços públicos de saúde; estabelece os critérios de rateio dos recursos de transferências para a saúde e as normas de fiscalização, avaliação e controle das despesas com saúde nas 3 (três) esferas de governo; revoga dispositivos das Leis nos 8.080, de 19 de setembro de 1990, e 8.689, de 27 de julho de 1993; e dá outras providências.
- Brasil (2015). Portaria 26, de 12 de Junho de 2015. Aprova os requisitos para submissão e análise de proposta de incorporação, alteração ou exclusão de tecnologia em saúde no SUS, por iniciativa do Ministério da Saúde e de Secretarias de Saúde dos Estados, dos Municípios e do Distrito Federal.
- Brasil (2015). Vamos conversar sobre Auditoria do SUS?. Série Auditoria do SUS, Volume 2. Ministério da Saúde.

- Brasil (2017). Portaria de consolidação 1, de 28 de setembro de 2017. Consolidação das normas sobre os direitos e deveres dos usuários da saúde, a organização e o funcionamento do Sistema Único de Saúde.
- Brasil – Ministério da Saúde (2018). Política Nacional de Educação Permanente em Saúde: o que se tem produzido para o seu fortalecimento? 1st ed. rev, Brasília.
- Brasil (2020). Comunidade Brasileira residente fora do Brasil. www.gov.br/mre/pt-br/assuntos/portal-consular/arquivos/ComunidadeBrasileira2020.pdf
- Brasil (2020). Decreto 10221 – Dispõe sobre o Grupo Executivo Interministerial de Emergência em Saúde Pública de Importância Nacional e Internacional – GEI-ESP/II.
- Brasil – Ministério da Saúde (2023a). COVID-19 no Brasil. https://infoms.saude.gov.br/extensions/covid-19_html/covid-19_html.html
- Brasil – Ministério da Saúde (2023b). Boletins Epidemiológicos Covid-19. www.gov.br/saude/pt-br/centrais-de-conteudo/publicacoes/boletins/epidemiologicos/covid-19
- Brazilian National Congress (2020). Decreto Legislativo no 6/2020. Reconhece, para os fins do art. 65 da Lei Complementar no 101, de 4 de maio de 2000, a ocorrência do estado de calamidade pública, nos termos da solicitação do Presidente da República encaminhada por meio da Mensagem no 93, de 18 de março de 2020. www.planalto.gov.br/ccivil_03/portaria/dlg6-2020.htm
- Caldwell KL (2017). Health Equity in Brazil: Intersections of Gender, Race, and Policy. University of Illinois Press.
- Campoy LT, Ramos ACV, Souza LLL, Alves LS, Arcoverde MAM, Berra TZ, Arroyo LH, Santos DT dos & Arcêncio RA (2020). A distribuição espacial e a tendência temporal de recursos humanos para o Sistema Único de Saúde e para a Saúde Suplementar, Brasil, 2005 a 2016. *Epidemiologia e Serviços de Saúde: Revista Do Sistema Unico de Saude Do Brasil*, 29(2), e2018376. <https://doi.org/10.5123/s1679-49742020000200020>
- Candiottto LZP (2018). Organic products policy in Brazil. *Land Use Policy*, 71, 422–430. <https://doi.org/10.1016/j.landusepol.2017.12.014>
- Capucho HC, Brito A, Maiolino A, Kaliks RA & Pinto RR (2022). Incorporação de medicamentos no SUS: comparação entre oncologia e componente especializado da assistência farmacêutica. *Ciência & Saúde Coletiva*, 27(6): 2471–2479.
- Castro MC, Massuda A, Almeida G, Menezes-Filho NA, Andrade MV, de Souza Noronha KV, Rocha R, Macinko J, Hone T, Tasca R & Giovanella L (2019). Brazil's unified health system: the first 30 years and prospects for the future. *The Lancet*, 394(10195), 345–56.
- Catanante GV, Hirooka LB, Porto HS & Bava M do CGGC (2017). Participação social na Atenção Primária à Saúde em direção à Agenda 2030. *Ciência & Saúde Coletiva*, 22(12), 3965–3974. <https://doi.org/10.1590/1413-812320172212.24982017>
- CMED (2004). Resolução CMED No. 2, de 5 de março de 2004.
- CMED (2020). Anuário Estatístico do Mercado Farmacêutico.
- CNES – Cadastro Nacional de Estabelecimentos de Saúde (2022). <https://datasus.saude.gov.br/informacoes-de-saude-tabnet>
- Coelho Neto GC & Chioro A (2021). Afinal, quantos Sistemas de Informação em Saúde de base nacional existem no Brasil? *Cadernos de Saúde Pública*, 37(7). <https://doi.org/10.1590/0102-311x00182119>

- Coelho Neto GC, Andrezza R & Chioro A (2021). Integração entre os sistemas nacionais de informação em saúde: o caso do e-SUS Atenção Básica. *Revista de Saúde Pública*, 55, 93. <https://doi.org/10.11606/s1518-8787.2021055002931>
- CONASS – Conselho Nacional de Secretários de Saúde (2022). Propostas do Conass aos candidatos e às candidatas à Presidência da República – 2022.
- CONASS – Conselho Nacional de Secretários de Saúde (2023a). Painel Conass Covid-19 completa mil dias de divulgação diária. www.conass.org.br/painel-conass-covid-19-completa-mil-dias-de-divulgacao-diaria
- CONASS – Conselho Nacional de Secretários de Saúde (2023b). Painel Conass Covid-19. www.conass.org.br/painelconasscovid19
- Costa N do R (2022). A Resiliência das Grandes Cidades Brasileiras no Financiamento da Saúde na Pandemia de Covid-19.
- Cruz WGN, de Barros RD & de Souza LEF (2022). Financing of health and the fiscal dependency of Brazilian municipalities between 2004 and 2019. *Ciencia e Saude Coletiva*, 27(6), 2459–2469. <https://doi.org/10.1590/1413-81232022276.15062021>
- da Silva MCN & Machado MH (2020). Health and work system: challenges for the nursing in Brazil. *Ciencia e Saude Coletiva*, 25(1), 7–13. <https://doi.org/10.1590/1413-81232020251.27572019>
- da Silva RS, Schmtiz CAA, Harzheim E, Molina-Bastos CG, de Oliveira EB, Roman R, Umpierre RN & Gonçalves MR (2021). The role of telehealth in the covid-19 pandemic: a Brazilian experience. *Ciencia e Saude Coletiva*, 26(6), 2149–2157. <https://doi.org/10.1590/1413-81232021266.39662020>
- de Cássia Ribeiro-Silva R, de Jesus Silva N, Felisbino-Mendes MS, Falcão IR, de Andrade RD, Silva SA, Nilson EA, Spaniol AM, Fiaccone RL, Paixão E & Ichihara MY (2022). Time trends and social inequalities in child malnutrition: nationwide estimates from Brazil's food and nutrition surveillance system, 2009–2017. *Public Health Nutrition*, 25(12)1–11.
- de Castro Almeida J, Rochedo CA, do Sacramento MI & de Oliveira MT (2018). Guia alimentar para a população brasileira: complementação por meio de representações gráficas. *RBONE-Revista Brasileira de Obesidade, Nutrição e Emagrecimento*, 12(71): 316–328.
- Depolli GT, Brozzi JN, Perobelli A de O, Alves BL & Barreira-Nielsen C (2021). Ansiedade e depressão em atendimento presencial e telessaúde durante a pandemia de Covid-19: um estudo comparativo. *Trabalho, Educação e Saúde*, 19. <https://doi.org/10.1590/1981-7746-sol00317>
- Diaz MDM, Teixeira AD, Postali FAS, Ferreira-Batista NN & Moreno-Serra R (2022). Assessment of the association between the Brazilian family health strategy and adult mortality. *Health Policy and Planning*, 37(4), 461–471. <https://doi.org/10.1093/heapol/czac011>
- Diep L, Martins FP, Campos LC, Hofmann P, Tomei J, Lakhanpaul M & Parikh P (2021). Linkages between sanitation and the sustainable development goals: A case study of Brazil. *Sustainable Development*, 29(2) 339–52.
- Dolny LL, Lacerda JT de, Natal S & Calvo MCM (2019). Serviços de Telessaúde como apoio à Educação Permanente na Atenção Básica à Saúde: uma proposta de modelo avaliativo. *Interface – Comunicação, Saúde, Educação*, 23. <https://doi.org/10.1590/interface.180184>
- Duarte M de Q, Santo MA da S, Lima CP, Giordani JP & Trentini CM (2020). Covid-19 and the impacts on mental health: a sample from Rio Grande do Sul, Brazil. *Ciencia e Saude Coletiva*, 25(9), 3401–3411. <https://doi.org/10.1590/1413-81232020259.16472020>

- Duncan BB, Cousin E, Naghavi M, Afshin A, França EB, Passos VM, Malta D, Nascimento BR & Schmidt MI (2020). The burden of diabetes and hyperglycemia in Brazil: a global burden of disease study 2017. *Population Health Metrics*, 18(1), 1.
- Dutra da Silva M & Fearnside PM (2022). Brazil: environment under attack. *Environmental Conservation*, 1–3. <https://doi.org/10.1017/S0376892922000364>
- E-Gestor – Informação e Gestão da Atenção Básica (2022). <https://egestorab.saude.gov.br/paginas/acesoPublico/relatorios/relHistoricoCobertura.xhtml>
- Faleiros DR & Pereira BLS (2021). Balances of federal transfers in SUS: What we have and what to expect from the covid-19 increment. *Ciencia e Saude Coletiva*, 26(11), 5639–5651. <https://doi.org/10.1590/1413-812320212611.13712021>
- Fardousi N, Nunes da Silva E, Kovacs R, Borghi J, Barreto JO, Kristensen SR, Sampaio J, Shimizu HE, Gomes LB, Russo LX & Gurgel GD (2022). Performance bonuses and the quality of primary health care delivered by family health teams in Brazil: a difference-in-differences analysis. *PLoS Medicine*, 19(7), e1004033. <https://doi.org/10.1371/journal.pmed.1004033>
- Farias JM de, Minghelli LC & Soratto J (2020). Promoção da saúde: discursos e concepções na atenção primária à saúde. *Cadernos Saúde Coletiva*, 28(3), 381–389. <https://doi.org/10.1590/1414-462x202028030351>
- Federal Court Accounts (2020). Agreement 1487/2020. June 10, 2020. <https://portal.tcu.gov.br/imprensa/noticias/tcu-realiza-levantamento-sobre-a-sustentabilidade-do-sus.htm>
- Ferrante L & Fearnside PM (2021). Brazil's political upset threatens Amazonia. *Science*, 371(6532), 898–898. <https://doi.org/10.1126/science.abg9786>
- Ferrari G, Giannichi B, Resende B, Paiva L, Rocha R, Falbel F, Rache B, Adami F & Rezende LF (2022). The economic burden of overweight and obesity in Brazil: perspectives for the Brazilian Unified Health System. *Public Health*, 207:82–87.
- Ferreira R de A (2021). Interfaces entre a vigilância sanitária de alimentos e a Política Nacional de Alimentação e Nutrição. *Cadernos de Saúde Pública*, 37(suppl 1). <https://doi.org/10.1590/0102-311x00038921>
- Fiocruz – Oswaldo Cruz Foundation (2020). Fiocruz e Organização Pan-Americana da Saúde promovem capacitação para diagnóstico do novo coronavírus. www.fiocruz.br/ioc/cgi/cgilua.exe/sys/start.htm?infoid=3414&sid=32&tpl=printerview
- Folha de São Paulo (2020). Sem insumos, laboratórios privados limitam exames para detectar coronavírus. www1.folha.uol.com.br/equilibrioesaude/2020/03/sem-insumos-laboratorios-privados-limitam-exames-para-detectar-coronavirus.shtml.
- Fonseca EM de, Shadlen KC & Achcar H de M (2023). Vaccine technology transfer in a global health crisis: Actors, capabilities, and institutions. *Research Policy*, 52(4): 104739.
- França EB, Lansky S, Rego MA, Malta DC, França JS, Teixeira R, Porto D, Almeida MF, Souza MD, Szwarcwald CL & Mooney M (2017). Leading causes of child mortality in Brazil, in 1990 and 2015: estimates from the Global Burden of Disease study. *Revista Brasileira de Epidemiologia*, 20(S1), 46–60.
- Freitas CM de, Rocha V, Silva, EL e, Alpino T de MA, Silva MA da & Mazoto ML (2018). Conquistas, limites e obstáculos à redução de riscos ambientais à saúde nos 30 anos do Sistema Único de Saúde. *Ciência & Saúde Coletiva*, 23(6), 1981–1996. <https://doi.org/10.1590/1413-81232018236.04702018>

- Funasa (2000a). Portaria Funasa 473, de 31 de agosto de 2000. Instituiu o Núcleo de Resposta Rápida em Emergências Epidemiológicas (Nurep).
- Funasa (2000b). Portaria 474, de 31 de agosto de 2000 – Regulamenta a coleta de dados, fluxo e periodicidade de envio das informações sobre óbitos para o Sistema de Informações sobre Mortalidade – SIM.
- Funcia FR (2019). Underfunding and federal budget of SUS: preliminary references for additional resource allocation. *Ciencia e Saude Coletiva*, 24(12), 4405–4415. <https://doi.org/10.1590/1413-812320182412.25892019>
- Galli B (2020). Challenges and opportunities for access to legal and safe abortion in Latin America based on the scenarios in Brazil, Argentina, and Uruguay. *Cadernos de Saúde Pública*, 36(supl 1).
- Gille F, Smith S & Mays N (2017). Towards a broader conceptualisation of 'public trust' in the health care system. *Soc Theory Health*, 15, 25–43.
- Girardi SN, van Stralen AC de S, Cella JN, der Maas LW, Carvalho CL & Faria E de O (2016). Impacto do programa mais Médicos na redução da escassez de médicos em atenção primária à saúde. *Ciencia e Saude Coletiva*, 21(9), 2675–2684. <https://doi.org/10.1590/1413-81232015219.16032016>
- Gonçalves CB, Pinto IC de M, França T & Teixeira CF (2019). A retomada do processo de implementação da Política Nacional de Educação Permanente em Saúde no Brasil. *Saúde Em Debate*, 43(spe1), 12–23. <https://doi.org/10.1590/0103-11042019s101>
- Greco DB (2016). Trinta anos de enfrentamento à epidemia da Aids no Brasil, 1985–2015. *Ciencia e Saude Coletiva*, 21(5), 1553–1564. <https://doi.org/10.1590/1413-81232015215.04402016>
- Haldane V et al. (2021). Health systems resilience in managing the COVID-19 pandemic: lessons from 28 countries. *Nature Medicine*, 27(6), 964–980.
- Hessel P, González Jaramillo MJ, Rasella D, Duran AC & Sarmiento OL (2020). Increases In Women's Political Representation Associated with Reductions in Child Mortality in Brazil: study assesses the effects of female political representation on mortality among children younger than age five in Brazil. *Health Affairs*, 39(7), 1166–1174.
- Hochstetler K (2021). Climate institutions in Brazil: three decades of building and dismantling climate capacity. *Environmental Politics*, 30(suppl1), 49–70. <https://doi.org/10.1080/09644016.2021.1957614>
- Hone T, Rasella D, Barreto ML, Majeed A & Millett C (2017). Association between expansion of primary healthcare and racial inequalities in mortality amenable to primary care in Brazil: a national longitudinal analysis. *PLOS Medicine*, 14(5), e1002306. <https://doi.org/10.1371/journal.pmed.1002306>
- IBGE – Instituto Brasileiro de Geografia e Estatística (2019). Expectativa de vida no Brasil. www.ibge.gov.br/en/statistics/social/population/17117-complete-life-tables.html?=&t=resultados
- IBGE – Instituto Brasileiro de Geografia e Estatística (2022a). Estatísticas Sociais e Populacionais. www.ibge.gov.br/estatisticas/sociais/populacao.html.
- IBGE – Instituto Brasileiro de Geografia e Estatística (2022b). Expectativa de vida nos próximos anos. www.ibge.gov.br/en/statistics/social/population/17117-complete-life-tables.html?=&t=resultados

- ICCI-LA – Integrated Cancer Control Initiative in Latin America (2021). Addressing the rising burden of cancer in Brazil: challenges & opportunities. An analysis of Brazil's health system and cancer control policies. www.uicc.org/resources/access-all-resources/reports-integrated-cancer-control-latin-america-icci-la
- Idrovo AJ et al. (2020). Report from Bolsonaro's Brazil: the consequences of ignoring science. *International Journal of Social Determinants of Health and Health Services*, 51(1), 31–36.
- IEPS – Instituto de Estudos para Políticas de Saúde (2022). Agenda Mais SUS: Caminhos para Fortalecer à Saúde Pública no Brasil.
- INPE – Instituto Nacional de Pesquisas Espaciais (2023). Terra Brasilis – PRODES (Desmatamento) – Taxa de desmatamento. http://terrabrasilis.dpi.inpe.br/app/dashboard/deforestation/biomes/legal_amazon/rates
- IQVIA (2022). FIFARMA Patients W.A.I.T Indicator 2022 Survey. https://academiadepacientes.com.br/storage/2022/10/FIFARMA-WAIT-Indicator-2022_Report_vFinal-30SEP2022-4.pdf
- Johnson CD, Noyes J, Haines A, Thomas K, Stockport C, Ribas AN & Harris M (2013). Learning from the Brazilian community health worker model in North Wales. *Globalization and Health*, 9, 25. <https://doi.org/10.1186/1744-8603-9-25>
- JOTA (2022). Medidas de reliance são essenciais para reduzir tempo de espera na Anvisa, diz diretora. www.jota.info/tributos-e-empresas/saude/medidas-de-reliance-sao-essenciais-para-reduzir-tempo-de-espera-na-anvisa-diz-diretora-21122022
- Kitaoka K (2018). The national school meal program in Brazil: a literature review. *The Japanese Journal of Nutrition and Dietetics*, 76(Suppl): S115–125.
- Knaul FM et al. (2021). Punt politics as failure of health system stewardship: evidence from the COVID-19 pandemic response in Brazil and Mexico. *The Lancet – Regional Health Americas*, 4, 100086.
- Kroth DC, Geremia DS & Mussio BR (2020). Programa Nacional de Alimentação Escolar: uma política pública saudável. *Ciência & Saúde Coletiva*, 25(10), 4065–4076.
- Krüger TR & Serapioni M (2020). A participação nos sistemas de saúde de Brasil e Portugal: potencialidades e desafios. *Sociedade e Estado*, 35(1), 231–257. <https://doi.org/10.1590/s0102-6992-202035010010>
- Leal MD, Szwarcwald CL, Almeida PV, Aquino EM, Barreto ML, Barros F & Victora C (2018). Reproductive, maternal, neonatal and child health in the 30 years since the creation of the Unified Health System (SUS). *Ciencia & Saude Coletiva*, 23(6), 1915–1928.
- Leal MD (2018). Childbirth and birth in Brazil: an evolving scenario. *Cadernos de Saúde Pública*, 34(5), e00063818.
- Lima EE, Queiroz BL (2014). Evolution of the deaths registry system in Brazil: associations with changes in the mortality profile, under-registration of death counts, and ill-defined causes of death. *Cadernos de Saúde Pública*, 30(8), 1721–1730.
- Lima JG, Giovanella L, Fausto MCR, Bousquat A & Silva EV da (2018). Atributos essenciais da Atenção Primária à Saúde: resultados nacionais do PMAQ-AB. *Saúde Em Debate*, 42(spe1), 52–66. <https://doi.org/10.1590/0103-11042018s104>
- Lopes A, Lino L, Ramires Y & Bueno R (2022). Reproductive Health in Brazil: Where We Are and Why We Stopped. *Authorea Preprints*, April 18.

- Lotta G, Coelho VSP & Brage E (2021). How COVID-19 has affected frontline workers in Brazil: a comparative analysis of nurses and community health workers. *Journal of Comparative Policy Analysis: Research and Practice*, 23(1), 63–73. <https://doi.org/10.1080/13876988.2020.1834857>
- Lotta G, Fernandez M & Corrêa M (2021). The vulnerabilities of the Brazilian health workforce during health emergencies: Analysing personal feelings, access to resources and work dynamics during the COVID-19 pandemic. *International Journal of Health Planning and Management*, 36(S1), 42–57. <https://doi.org/10.1002/hpm.3117>
- Machado JP, Martins M & Leite I da C (2015). O mix público-privado e os arranjos de financiamento hospitalar no Brasil. *Saúde Debate*, 39(spe), 39–50. <https://doi.org/10.5935/0103-1104.2015s005245>
- Machado MH & Ximenes Neto FRG (2018). The management of work and education in Brazil's unified health system: thirty years of progress and challenges. *Ciencia e Saude Coletiva*, 23(6), 1971–1980. <https://doi.org/10.1590/1413-81232018236.06682018>
- Machado MH, Santos RP de O, dos Santos Neto PM, Santana VGD & Campos FE de (2022). Health workforce: situations and challenges in Latin America, the Caribbean, and Brazil. In: Oxford Research Encyclopedia of Global Public Health, Oxford University Press. <https://doi.org/10.1093/acrefore/9780190632366.013.332>
- Maciel FBM, Santos HLPC dos, Carneiro RA da S, Souza EA de, Prado NM de BL & Teixeira CF de S (2020). Agente comunitário de saúde: reflexões sobre o processo de trabalho em saúde em tempos de pandemia de Covid-19. *Ciência & Saúde Coletiva*, 25(suppl 2), 4185–4195. <https://doi.org/10.1590/1413-812320202510.2.28102020>
- Macinko J & Harris MJ (2015). Brazil's Family Health Strategy. *New England Journal of Medicine*, 373(13), 1277–1278. <https://doi.org/10.1056/nejmc1509056>
- Macinko J, Leventhal DG & Lima-Costa MF (2018). Primary care and the hypertension care continuum in Brazil. *Journal of Ambulatory Care Management*, 41(1), 34–46.
- Malta DC, Bernal RT, Lima MG, Araújo SS, Silva MM, Freitas MI & Barros MB (2017). Noncommunicable diseases and the use of health services: analysis of the National Health Survey in Brazil. *Revista de Saude Publica*, 51(Suppl 1), 4s.
- Malta DC, Duncan BB, Schmidt MI, Teixeira R, Ribeiro AL, Felisbino-Mendes MS, Machado ÍE, Velasquez-Melendez G, Brant LC, Silva DA & Passos VM (2020). Trends in mortality due to non-communicable diseases in the Brazilian adult population: national and subnational estimates and projections for 2030. *Population Health Metrics*, 18(1), 1–4.
- Malta DC, Minayo MC, Soares AM, Silva MM, Montenegro MD, Ladeira RM, Moraes OL, Melo AP, Mooney M & Naghavi M (2017). Mortality and years of life lost by interpersonal violence and self-harm: in Brazil and Brazilian states: analysis of the estimates of the Global Burden of Disease Study, 1990 and 2015. *Revista Brasileira de Epidemiologia*, 20(Suppl 1), 142–156.
- Marinho FM, Soliz P, Gawryszewski V, Gerger A (2013). Epidemiological transition in the Americas: changes and inequalities. *The Lancet*, 381(Suppl 2), S89.
- Marinho MF, França EB, Teixeira RA, Ishitani LH, Cunha CC, Santos MR, Frederes A, Cortez-Escalante JJ & Abreu DM (2019). Data for health: impact on improving the quality of cause-of-death information in Brazil. *Revista Brasileira de Epidemiologia*, 22(Suppl 3).
- Martins-Filho PR, Mendes ML, Reinheimer DM, do Nascimento-Júnior EM, Vaez AC, Santos VS & Santos HP (2018). Femicide trends in Brazil: relationship between public interest and mortality rates. *Archives of Women's Mental Health*, 21(5), 579–582.

- Massucato MAO, Ribeiro ALG, Pessalacia JDR, Neves V de JR & Stolte-Rodrigues VP (2021). Telessaúde como ferramenta na formação médica durante a pandemia da COVID-19: relato de experiência. *Revista Brasileira de Educação Médica*, 45(3). <https://doi.org/10.1590/1981-5271v45.3-20210195>
- Massuda A (2020). Primary health care financing changes in the Brazilian health system: advance or setback? *Ciencia e Saude Coletiva*, 25(4), 1181–1188. <https://doi.org/10.1590/1413-81232020254.01022020>
- Massuda A, Andrade MV, Atun R & Castro MC (2020). International Health Care System Profiles – Brazil. The Commonwealth Fund initiative.
- Massuda A, Bigoni A, Paschoalotto MAC & Tasca R (2022). Rumos para um Sistema de Saúde Resiliente. *GV Executivo*, 21(2).
- Massuda A, Hone T, Leles FAG, de Castro MC & Atun R (2018). The Brazilian health system at crossroads: progress, crisis and resilience. *BMJ Global Health*, 3(4). <https://doi.org/10.1136/bmjgh-2018-000829>
- Massuda A, Kemper ES, Bigoni A, Paschoalotto MAC, Gomes RSL & Tasca R (2022). Inovações na Gestão em Saúde e a Resiliência do SUS: a experiência capixaba na resposta à Covid-19 (1st edition). Rede Unida.
- Massuda A, Malik AM, Lotta G, Siqueira M, Tasca R & Rocha R (2022). Brazil's primary health care financing: case study. Working Paper 1, Lancet Global Health Commission on Financing Primary Health Care. www.researchgate.net/publication/359690387
- Massuda A, Tasca R & Malik AM (2020). Uso de leitos hospitalares privados por sistemas públicos de saúde na resposta à Covid-19. *Saúde Em Debate*, 44(S4), 248–260. <https://doi.org/10.1590/0103-11042020e416>
- Ministério da Saúde (2011). Portaria 2.952, De 14 de Dezembro de 2011. Regulamenta, no âmbito do Sistema Único de Saúde (SUS), o Decreto no 7.616, de 17 de novembro de 2011, que dispõe sobre a declaração de Emergência em Saúde Pública de Importância Nacional (ESPIN) e institui a Força Nacional do Sistema Único de Saúde (FN-SUS). Ministério Da Saúde.
- Ministério da Saúde. Secretaria-Executiva. Departamento de Informática do SUS (2020). Estratégia de Saúde Digital para o Brasil 2020–2028. Ministério Da Saúde. https://bvsmms.saude.gov.br/bvs/publicacoes/estrategia_saude_digital_Brasil.pdf
- Miralles-Quirós M & Miralles-Quirós J (2018). The value relevance of environmental, social, and governance performance: the Brazilian case. *Sustainability*, 10(3), 574. <https://doi.org/10.3390/su10030574>
- Molnar A (2022). Mandatory ESG reporting. A comparative analysis of Brazil, the United States, and Europe. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4121849>
- Monteiro CA & Jaime PC (2020). Brazilian Food Guide attacked. Now, overwhelming support for the Guide in Brazil and worldwide. *World Nutrition*, 11(4), 94–99.
- Moura EC, Santos WD, Neves AC, Schwarz E & Gomes R (2016). Mortality in Brazil according to gender perspective, years 2000 and 2010. *Revista Brasileira de Epidemiologia*, 19(2), 326–338.
- Neves IF & Massarani L (2022). The vaccine in two Brazilian newspapers before and during COVID-19a. *Matrizes*, 16(2), 191–216.

- Neves RG, Duro SM, Nunes BP, Facchini LA & Tomasi E (2021). Health care for people with diabetes and hypertension in Brazil: cross-sectional study of Program for Improving Access and Quality of Primary Care, 2014. *Epidemiologia e Serviços de Saúde*, 30(3), e22020419.
- Novato V de OL, Ferreira V da RS & Paschoalotto MAC (2022). Adherence of the Medical Course PPCs to the parameters of the Brazilian medical education policy. *Revista Brasileira de Educação Médica*, 46(3). <https://doi.org/10.1590/1981-5271v46.3-20210471.ing>
- Observatório de Oncologia (2018). 30 anos de SUS: Saúde no Brasil e a evolução no tratamento do câncer. https://observatoriodeoncologia.com.br/outros_estudos/IQVIA
- Observatório de Oncologia (2022). Câncer como a primeira causa de morte nos municípios brasileiros. <https://observatoriodeoncologia.com.br/cancer-como-a-primeira-caoa-de-morte-nos-municipios-brasileiros>
- OECD/Eurostat (2018). Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation, 4th edition, The Measurement of Scientific, Technological and Innovation Activities. OECD Publishing, Paris/Eurostat, Luxembourg.
- Oliviera DG de, Frias PG de, Vanderlei LC de M, Vidal SA, Novaes M de A & Souza WV de (2015). Análise da implantação do Programa Telessaúde Brasil em Pernambuco, Brasil: estudo de casos. *Cadernos de Saúde Pública*, 31(11), 2379–2389. <https://doi.org/10.1590/0102-311X00125914>
- Oswaldo Cruz F (2022). Carta da Fiocruz aos candidatos à Presidência da República e à Sociedade: Desenvolvimento Sustentável com Equidade, Saúde e Democracia.
- Özçelik EA, Massuda A, McConnell M & Castro MC (2020). Impact of Brazil's More Doctors Program on hospitalizations for primary care sensitive cardiovascular conditions. *SSM – Population Health*, 12, 100695. <https://doi.org/10.1016/j.ssmph.2020.100695>
- Özçelik EA, Massuda A, McConnell M & Castro MC (2021). Assessing the performance of beneficiary targeting in Brazil's More Doctors Programme. *Health Policy and Planning*, 36(2), 149–161. <https://doi.org/10.1093/heapol/czaa137>
- PAHO – Pan American Health Organization (2020). Novo coronavírus: Fiocruz, Ministério da Saúde do Brasil e OPAS organizam treinamento em diagnóstico laboratorial para 9 países. www.paho.org/pt/news/7-2-2020-new-coronavirus-fiocruz-ministry-health-brazil-and-paho-provide-training-laboratory
- Paim J, Travassos C, Almeida C, Bahia L & Macinko J (2011). The Brazilian health system: history, advances, and challenges. *The Lancet*, 377(9779), 1778–1797. [https://doi.org/10.1016/S0140-6736\(11\)60054-8](https://doi.org/10.1016/S0140-6736(11)60054-8)
- Paschoalotto M et al. (2018). A regionalização do SUS: proposta de avaliação de desempenho dos Departamentos Regionais de Saúde do estado de São Paulo. *Saúde e Sociedade*, 27(1). <https://doi.org/10.1590/S0104-12902018170095>
- Paschoalotto MA, Ferreira Lopes JE, Henrique De Oliveira P & Pita Barros P (2022). Performance of subnational governments in the COVID-19 pandemic: an analysis of the public and private health services in Brazil. *Brazilian Administration Review*, 19(4). <https://doi.org/10.1590/1807-7692bar2022220034>
- Paschoalotto MA, Passador JL, Passador CS & Endo GY (2022). Regionalização da saúde no Brasil: Desigualdades socioeconômicas e na performance em saúde. *Gestão & Regionalidade*, 38(113). <https://doi.org/10.13037/gr.vol38n113.7017>

- PINTEC – Pesquisa de Inovação (2008). www.ibge.gov.br/estatisticas/multidominio/ciencia-tecnologia-e-inovacao/9141-pesquisa-de-inovacao.html?=&t=destaques
- PINTEC – Pesquisa de Inovação (2011). www.ibge.gov.br/estatisticas/multidominio/ciencia-tecnologia-e-inovacao/9141-pesquisa-de-inovacao.html?=&t=destaques
- PINTEC – Pesquisa de Inovação (2014). www.ibge.gov.br/estatisticas/multidominio/ciencia-tecnologia-e-inovacao/9141-pesquisa-de-inovacao.html?=&t=destaques
- PINTEC – Pesquisa de Inovação (2017). www.ibge.gov.br/estatisticas/multidominio/ciencia-tecnologia-e-inovacao/9141-pesquisa-de-inovacao.html?=&t=destaques
- PNS – Pesquisa Nacional de Saúde (2003). www.ibge.gov.br/estatisticas/sociais/saude/9160-pesquisa-nacional-de-saude.html
- PNS – Pesquisa Nacional de Saúde (2008). www.ibge.gov.br/estatisticas/sociais/saude/9160-pesquisa-nacional-de-saude.html
- PNS – Pesquisa Nacional de Saúde (2013). www.ibge.gov.br/estatisticas/sociais/saude/9160-pesquisa-nacional-de-saude.html
- PNS – Pesquisa Nacional de Saúde (2019). www.ibge.gov.br/estatisticas/sociais/saude/9160-pesquisa-nacional-de-saude.html
- Poz MRD, Maia LS & Costa-Couto MH (2022). Financeirização e oligopolização das instituições privadas de ensino no Brasil: o caso das escolas médicas. *Cadernos de Saude Publica*, 38(Suppl 2), e00078720. <https://doi.org/10.1590/0102-311X00078720>
- Prado C, Silva IA, Soares AVN, Aragaki IMM, Shimoda GT, Zaniboni VF, Padula CB, Muller FS, Salve JM, Daré Junior S, Wen CL, Peres HHC & Leite MMJ (2013). Telemamentação no Programa Nacional de Telessaúde no Brasil: a experiência da Telenfermagem. *Revista Da Escola de Enfermagem Da USP*, 47(4), 990–996. <https://doi.org/10.1590/S0080-623420130000400031>
- PROADESS. Projeto de Avaliação do Desempenho do Sistema de Saúde (2022). www.proadess.iciet.fiocruz.br/index.php?pag=matraba
- Rache B, Rocha R, Nunes L, Spinola P, Malik AM & Massuda A (2020). Necessidades de infraestrutura do SUS em preparo à COVID-19: leitos de UTI, respiradores e ocupação hospitalar. São Paulo: Instituto de Estudos para Políticas de Saúde, 3, 1–5.
- Ramos D, da Silva NB, Ichihara MY, Fiaccone RL, Almeida D, Sena S, Rebouças P, Júnior EP, Paixão ES, Ali S & Rodrigues LC (2021). Conditional cash transfer program and child mortality: A cross-sectional analysis nested within the 100 Million Brazilian Cohort. *PLoS medicine*, 18(9), e1003509.
- Rasella D, Aquino R & Barreto ML (2013). Impact of income inequality on life expectancy in a highly unequal developing country: the case of Brazil. *Journal of Epidemiology and Community Health*, 67(8), 661–666. <https://doi.org/10.1136/jech-2012-201426>
- Rebouças P, Goes E, Pescarini J, Ramos D, Ichihara MY, Sena S, Veiga R, Rodrigues LC, Barreto ML & Paixão ES (2022). Ethnoracial inequalities and child mortality in Brazil: a nationwide longitudinal study of 19 million newborn babies. *The Lancet Global Health*, 10(10), e1453–1462.
- Reis AT et al. (2023). Trustworthiness of information sources on vaccines for COVID-19 prevention among Brazilians. *Plos One*, 8(1), e0279393.

- RENAME – Relação Nacional de Medicamentos Essenciais (2022). Ministério da Saúde.
- RENASES – Relação Nacional de Ações e Serviços de Saúde (2012). Ministério da Saúde.
- Rino CAF & Salvador NNB (2017). ISO 14001 certification process and reduction of environmental penalties in organizations in Sao Paulo State, Brazil. *Journal of Cleaner Production*, 142(4), 3627–3633. <https://doi.org/10.1016/j.jclepro.2016.10.105>
- Rocha R, Atun R, Massuda A, Rache B, Spinola P, Nunes L, Lago M & Castro MC (2021). Effect of socioeconomic inequalities and vulnerabilities on health-system preparedness and response to COVID-19 in Brazil: a comprehensive analysis. *The Lancet Global Health*, 9(6), e782–792.
- Rocha TIU, Aschar SC de AL, Hidalgo-Padilla L, Daley K, Claro HG, Martins Castro HC, dos Santos DVC, Miranda JJ, Araya R & Menezes PR (2021). Recruitment, training and supervision of nurses and nurse assistants for a task-shifting depression intervention in two RCTs in Brazil and Peru. *Human Resources for Health*, 19(1). <https://doi.org/10.1186/s12960-021-00556-5>
- Ruaro R, Ferrante L & Fearnside PM (2021). Brazil's doomed environmental licensing. *Science*, 372(6546), 1049–1050. <https://doi.org/10.1126/science.abj4924>
- Sachs JD, et al. (2022). The Lancet Commission on lessons for the future from the COVID-19 pandemic. *The Lancet*, 400(10359), 1224–1280.
- Santos RT dos et al. (2022). Saúde pública e comunicação: impasses do SUS à luz da formação democrática da opinião pública. *Ciência & Saúde Coletiva*, 27(4), 1547–1556.
- Sato AP (2020). Pandemia e coberturas vacinais: desafios para o retorno às escolas. *Revista de Saúde Pública*, 54, 115.
- Scheffer M et al. (2020). Demografia Médica no Brasil 2020. São Paulo.
- Scheffer MC & Dal Poz MR (2015). The privatization of medical education in Brazil: trends and challenges. *Human Resources for Health*, 13(1). <https://doi.org/10.1186/s12960-015-0095-2>
- Servo LMS, Santos MAB dos, Vieira FS & Benevides RP de S e (2020). Financiamento do SUS e Covid-19: histórico, participações federativas e respostas à pandemia. *Saúde Em Debate*, 44(S4), 114–129. <https://doi.org/10.1590/0103-11042020e407>
- SIA – Sistema de Informação Ambulatorial (2022). <http://sia.datasus.gov.br>
- SIH – Sistema de Informação Hospitalar (2022). <https://datasus.saude.gov.br/aceso-a-informacao/producao-hospitalar-sih-sus>
- Silva GA e et al. (2020). Cancer mortality in the capitals and in the interior of Brazil: a four-decade analysis. *Revista de Saúde Pública*, 54, 126.
- Silva Júnior JB et al. (2004). Epidemiologia em serviço: uma avaliação de desempenho do Sistema Nacional de Vigilância em Saúde.
- Silva SP (2019). Trajetória e padrões de mudança institucional no Programa Nacional de Alimentação Escolar. Texto para discussão, Instituto de Pesquisa Econômica.
- Silva RS da, Schmtiz CAA, Harzheim E, Molina-Bastos CG, Oliveira EB de, Roman R, Umpierre RN & Gonçalves MR (2021). O Papel da Telessaúde na Pandemia Covid-19: Uma Experiência Brasileira. *Ciência & Saúde Coletiva*, 26(6), 2149–2157. <https://doi.org/10.1590/1413-81232021266.39662020>

- Soeiro RE, Rocha L, Surita FG, Bahamondes L & Costa ML (2021). Period poverty: menstrual health hygiene issues among adolescent and young Venezuelan migrant women at the northwestern border of Brazil. *Reproductive Health*, 18(1), 1–9.
- Souto L & Silva C (2021). O Cebes na luta durante a pandemia da Covid-19. *Saúde Em Debate*, 45(131), 937–940. <https://doi.org/10.1590/0103-1104202113100>
- SVS – Secretaria de Vigilância em Saúde (2020). Boletim Epidemiológico 01. 51(Jan).
- Tasca R, Massuda A, Carvalho WM, Buchweitz C & Harzheim E (2020). Recomendações para o fortalecimento da atenção primária à saúde no Brasil. *Revista Panamericana de Salud Pública*, 44, e4.
- Teixeira MG, Costa M da CN, Carmo EH, de Oliveira WK & Penna GO (2018). Health surveillance at the SUS: development, effects and perspectives. *Ciencia e Saude Coletiva*, 23(6), 1811–1818. <https://doi.org/10.1590/1413-81232018236.09032018>
- Tesser CD & Serapioni M (2021). Obstacles to sus universalization: tax expenditures, labour union demands and health insurance state subsidy. *Ciencia e Saude Coletiva*, 26(6), 2323–2333. <https://doi.org/10.1590/1413-81232021266.22602019>
- The Lancet (2020). COVID-19 in Brazil: “So what?” *The Lancet*, 395(10235), 1461. [https://doi.org/10.1016/S0140-6736\(20\)31095-3](https://doi.org/10.1016/S0140-6736(20)31095-3)
- Vieira FS (2020). Health financing in Brazil and the goals of the 2030 Agenda: high risk of failure. *Revista de Saude Publica*, 54, 1–12. <https://doi.org/10.11606/s1518-8787.2020054002414>
- Vieira FS (2022). Emendas parlamentares ao orçamento federal do sus: método para estimação dos repasses a cada município favorecido, segundo áreas de alocação dos recursos (2015–2020). www.ipea.gov.br/portal/images/stories/PDFs/TDs/td_2732.pdf
- Vieira FS & Servo LMS (2020). Covid-19 e coordenação federativa no Brasil: consequências da dissonância federal para a resposta à pandemia. *Saúde Em Debate*, 44(S4), 100–113. <https://doi.org/10.1590/0103-11042020e406>
- Vieira FS, Almeida ATC de, Servo LMS & Benevides RP de SE (2022). Gasto total dos municípios em atenção primária à saúde no Brasil: um método para ajuste da despesa declarada de 2015 a 2020. *Cadernos de Saude Publica*, 38(5), e00280221. <https://doi.org/10.1590/0102-311XPT280221>
- Vieira-Meyer AP, de Araújo Dias MS, Vasconcelos MI, Rouberte ES, de Almeida AM, de Albuquerque Pinheiro TX, de Lima Saintrain MV, Machado MD, Dufault S, Reynolds SA & Fernald L (2019). What is the relative impact of primary health care quality and conditional cash transfer program in child mortality. *Canadian Journal of Public Health*, 110(6), 756–767.
- Villela DAM & Gomes MF da C (2022). O impacto da disponibilidade de dados e informação oportuna para a vigilância epidemiológica. *Cadernos de Saúde Pública*, 38(7). <https://doi.org/10.1590/0102-311xpt115122>
- Viola E & Franchini M (2018). *Brazil and Climate Change: Beyond the Amazon* (1st ed.). Routledge.
- Viola E & Gonçalves VK (2019). Brazil ups and downs in global environmental governance in the 21st century. *Revista Brasileira de Política Internacional*, 62(2). <https://doi.org/10.1590/0034-7329201900210>
- Viola E, Franchini M & Ribeiro TL (2012). Climate governance in an international system under conservative hegemony: the role of major powers. *Revista Brasileira de Política Internacional*, 55(S), 9–29. <https://doi.org/10.1590/S0034-73292012000300002>

Waldman EA (2012). Os 110 anos de Vigilância em Saúde no Brasil. *Epidemiologias e Serviços de Saúde*, 21(3), 365–366.

World Bank (2020). Brazilian Country Report. <https://data.worldbank.org/country/BR>

World Bank (2022). World Bank Open Data. <https://data.worldbank.org>

WHO – World Health Organization (2020a). Novel Coronavirus (2019-nCoV) – Situation Report 1. January 21, 2020. Available at: www.who.int/docs/default-source/coronaviruse/situation-reports/20200121-sitrep-1-2019-ncov.pdf

WHO – World Health Organization (2020b). WHO Director-General's opening remarks at the media briefing on COVID-19 – 16 March 2020. Available at: www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19--16-march-2020

WHO – World Health Organization (2022). Final WHO SARS-CoV-2 serology test kit evaluation results. July 21, 2022. Available at: https://cdn.who.int/media/docs/default-source/in-vitro-diagnostics/sars-cov-2-serology-report-2022-07-21-en-2-.pdf?sfvrsn=724d221c_1&download=true